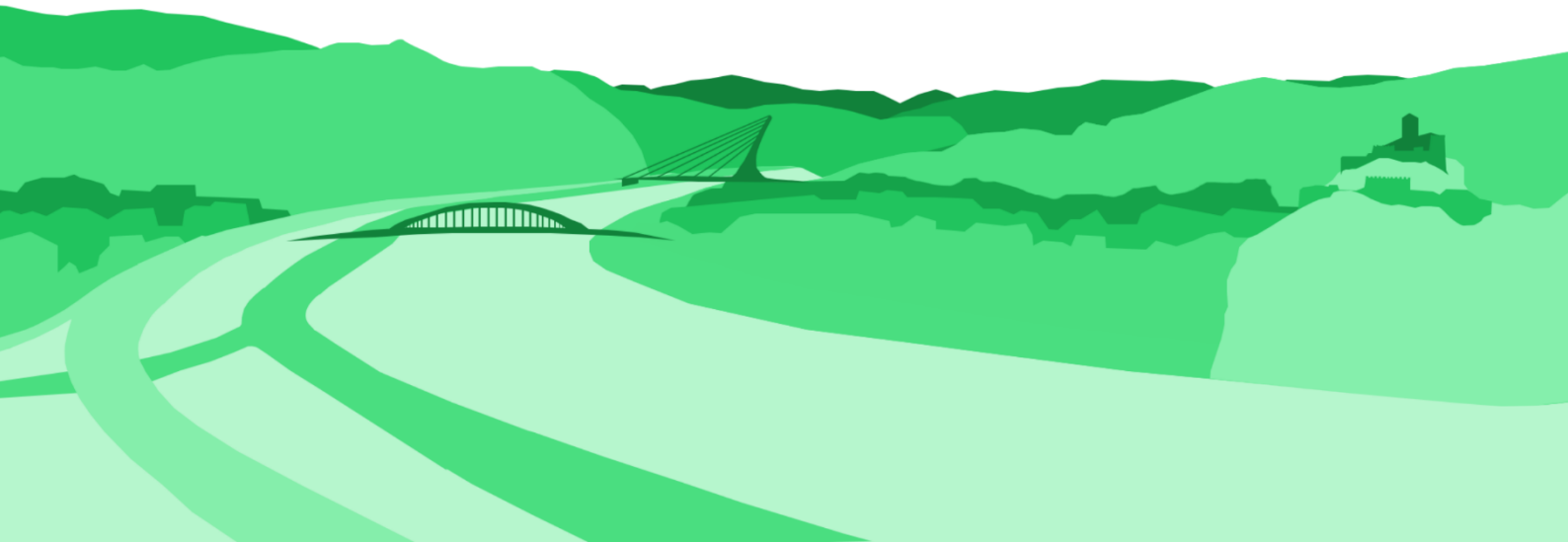
INTERNATIONAL CONFERENCE OF

SPORT, HEALTH AND PHYSICAL EDUCATION

Book of Abstracts

October 23–24, 2024

Ústí nad Labem, Czech Republic



JAN EVANGELISTA PURKYNĚ UNIVERSITY IN ÚSTÍ NAD LABEM
Faculty of Education

3rd International Conference of Sport, Health and Physical Education

BOOK OF ABSTRACTS

October 23–24, 2024
Ústí nad Labem, Czech Republic

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REVIEWED BY:

Elena Bendíková
Department of Physical Education and Sports, Faculty of Education, Catholic University Ružomberok, Slovakia

Štefan Balkó
Department of Physical Education and Sports, Faculty of Education, Jan Evangelista Purkyně University in Ústí nad Labem, Czech Republic

EDITOR:

Josef Heidler
Department of Sports Science and Clinical Biomechanics, University of Southern Denmark

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WELCOME TO ICSHPE 2024

Dear colleagues and friends,

Welcome to Ústí nad Labem for the 3rd International Conference on Sport, Health, and Physical Education. We're pleased to see so many active speakers and poster presentations from researchers. The conference has a strong international presence with participants from many countries. We hope this event fosters a friendly atmosphere, meets your expectations, and leads to new international collaborations.

Best of luck with your presentations, and enjoy the conference.

Štefan Balkó, Chair of the Organizing Committee

EDITOR'S NOTE

Help us make this book of abstracts a masterpiece! Whether you spot a typo, suggest improving clarity, or want to point out a factual error, your feedback is invaluable. Your input will help ensure this publication is accurate, informative, and a valuable resource for the field.

So, please don't hesitate to email me at jheidler@health.sdu.dk with your thoughts. I greatly appreciate your help, and it will help me sleep better at night.

Josef Heidler, Editor

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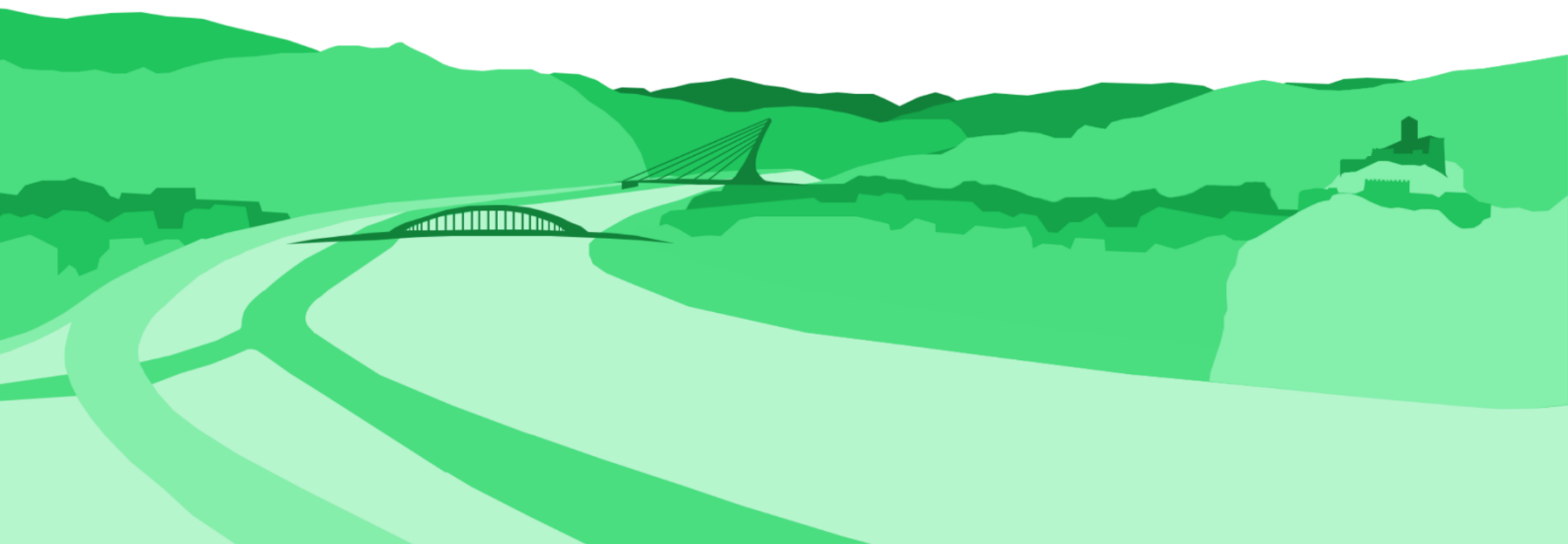

WEDNESDAY – OCTOBER 23, 2024

Location: Pasteurova 5, 400 01, Ústí nad Labem

09:20–10:20 *Entrance Hall*	Check-in & Coffee
10:30–11:00 *Red Hall*	Opening Ceremony
11:00–12:00 *Red Hall*	Keynote Speakers **ACTIVE AGING: A COMPREHENSIVE LOOK AT 24H MOVEMENT BEHAVIOUR, TECHNOLOGY-ASSISTED INTERVENTIONS, AND HEALTH IN OLDER ADULTS** *Jana Pelclová* **INCLUSION OF STUDENTS IN PHYSICAL EDUCATION** *Pål Lagestad*
12:00–12:15 *Red Hall*	Exhibition in collaboration with the Department of Music Education
12:15–13:15 *Cafeteria*	Lunch
13:15–15:00 *Purple Hall*	Session I Chair: *Ladislav Bláha* Language*: Czech, Slovak* **TEACHER'S VIEW ON SELECTED FACTORS INFLUENCING PHYSICAL EDUCATION TEACHING AT PRIMARY SCHOOLS** *David Cihlář, Eliška Škopková* **DUDE, WHERE'S MY HOME? IDENTIFYING PLACES WITH GPS DATA** *Josef Heidler, Jasper Schipperijn* **ANALYSING COMPOSITIONAL DATA: THE ART OF WORKING WITH LOGRATIOS** *Paulína Jašková* **PHYSICAL FITNESS IN POST-LEUKEMIA CHILDREN** *Matěj Šifalda, Jiří Nechvátal, Martin Nosek, Pavel Prchal* **MEANINGFUL TESTING AND ASSESSMENT IN CZECH SCHOOL-AGED CHILDREN IN PHYSICAL EDUCATION** *Iva Šeflová* **OPTIMAL TIME-USE COMPOSITION OF POSTURE-SPECIFIC BEHAVIORS FOR HEALTH OUTCOMES IN OLDER ADULTS** *Jan Vindiš, Paulína Jašková, Jana Pelclová, Karel Hron* **WHAT DOES THE IDEAL FAMILY SUPPORTING CHILDREN'S PHYSICAL ACTIVITY LOOK LIKE? RESULTS OF THE FAMIPASS STUDY ACROSS SEGMENTS OF THE SCHOOL DAY** *Michal Vorlíček, Jan Dygrýn, David Janda, Jaroslava Voráčová, Erik Sigmund, Dagmar Sigmundová*

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Red Hall

Chair: *Jaromír Šimonek*
Language*: English*

OUTDOOR EDUCATION AND THE TERM "FRILUFTSLIV" IN RELATION TO PHYSICAL LITERACY IN PHYSICAL EDUCATION PEDAGOGIES
Idar Lyngstad, Eivind Sæther

PROMOTING GOOD BODY POSTURE THROUGH "ACTIVE SCHOOL"
Elena Bendíková, Ricardo Ricci Uvinha

IS EFFECT OF THE PHYSICAL EXERCISE AFFECTS ON BODY COMPOSITION BY BODY MASS IN ADOLESCENT GIRLS?
Václav Bunc

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WHICH MUSCLES ARE MOST LOADED DURING SUDDEN ACCELERATION ON A TREADMILL?
Michalina Błażkiewicz-Janeczko

LINEAR ONSET WHOLE BODY VO2 KINETICS: A NEW METHOD FOR ASSESSING EXERCISE TOLERANCE IN SPORTS AND CLINICAL SETTINGS
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Entrance Hall

15:30–17:00 Session III

Purple Hall

Chair: *Jana Pelclová*
Language*: English*

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Tobiáš Goldschmidt, Pavel Korvas, Oliver Jarošs

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RUNNING TECHNIQUE ANALYSIS WITH THE HELP OF WEARABLE TECHNOLOGY
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Red Hall

Chair: *Zdeněk Svoboda*
Language*: English*

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Vít Třebický, Daniel Šťastný

18:30–00:00 Social Evening

Cafeteria

A gala dinner featuring a wine degustation from Hutár Winery, accompanied by live music and dance performances including a Caribbean show and a Samba Brasil show.

THURSDAY – OCTOBER 24, 2024

Location: Pasteurova 5, 400 01, Ústí nad Labem

09:00–10:00 Check-in & Coffee
Entrance Hall

10:00–11:00 Keynote Speakers
Red Hall

THE IMPACT OF FATIGUE ON THE SPORTS PERFORMANCE AND INJURY RISK OF HEALTHY AND/OR PARA-ATHLETES
Tatjana Trošt Bobić

VARIABILITY, STABILITY AND COMPLEXITY IN EVALUATION OF HUMAN MOVEMENT BEHAVIOUR
Zdeněk Svoboda

11:00–12:00 Posters & Coffee
Entrance Hall
Chair: *Lenka Vojtíková*

12:00–13:45 Session V
Purple Hall
Chair: *Elena Bendíková*
Language*: Czech, Slovak*

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Daniel Příhoda

HEALTH AND HEALTH-ORIENTED FITNESS OF STUDENTS IN PRIMARY EDUCATION IN THE HORNÁ NITRA REGION
Robert Rozim

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Peter Žiška, Roman Markovič, Peter Melek

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Red Hall

Chair: *Tatjana Trošt Bobić*
Language*: English*

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Chanderkant Dhiman, B. C. Kapri

13:45–14:45 Lunch

Cafeteria

14:45–15:00 Closing Ceremony

Red Hall

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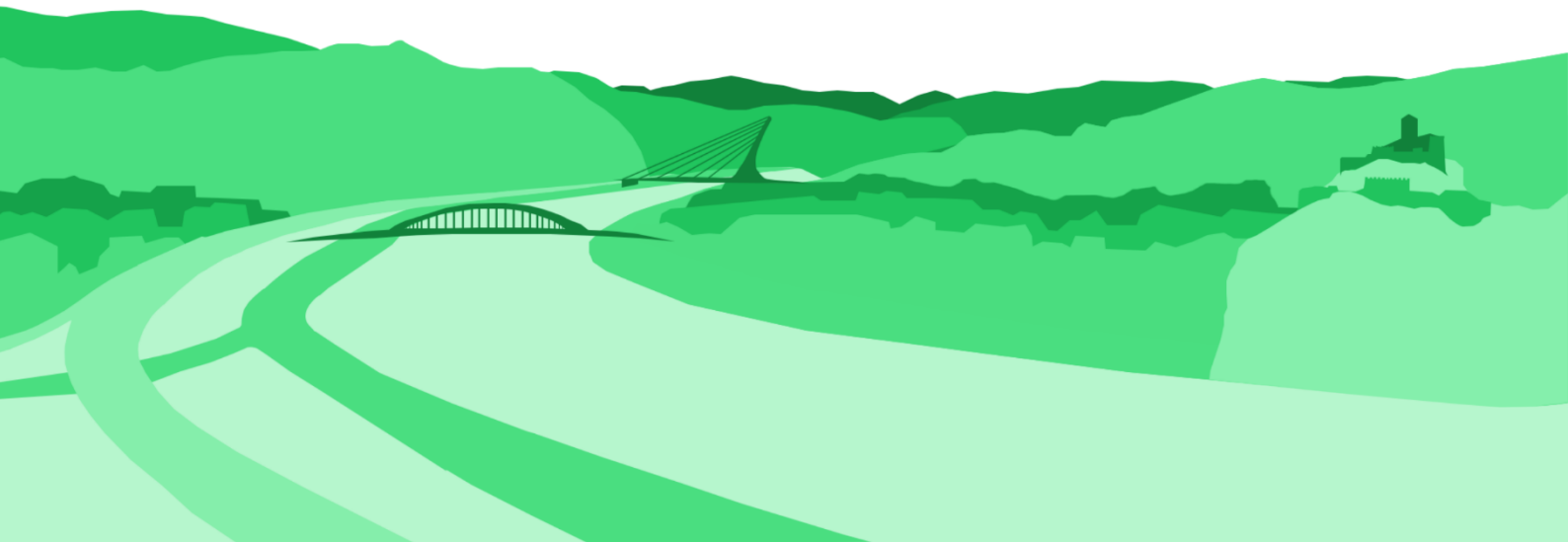

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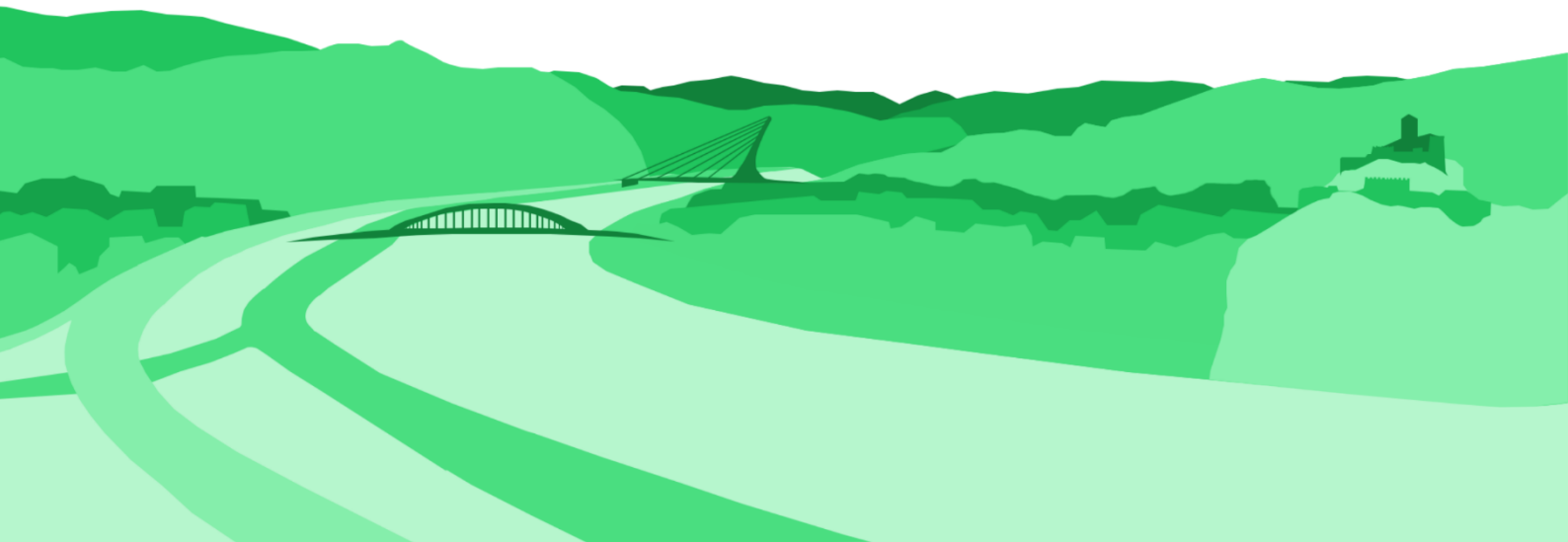


ACTIVE AGING: A COMPREHENSIVE LOOK AT 24H MOVEMENT BEHAVIOUR, TECHNOLOGY-ASSISTED INTERVENTIONS, AND HEALTH IN OLDER ADULTS

Jana Pelclová
Palacký University Olomouc, Czech Republic

Bio: Professor Pelclová is a leading expert in movement behaviour among older adults at Palacký University in Olomouc. Since earning her PhD in 2001, she has been actively involved in research and teaching. Her research focuses on how physical activity affects older adults' health, and she uses technology to monitor their daily movements. She is part of several international research projects, including PhysAgeNet, where she leads a group studying technology-assisted interventions. Professor Pelclová has published extensively, presented at major conferences, and serves on the editorial boards of several academic journals. She has also supervised many graduate students and contributed to developing study programs in her field.

Email: jana.pelclova@upol.cz

INCLUSION OF STUDENTS IN PHYSICAL EDUCATION

Pål Lagestad
Nord University, Norway

Bio: Professor Lagestad is a Nord University in Norway's physical education and sports science expert. He has extensive experience in teaching and research (over 20 years), having worked at various levels of education. His research focuses on physical education's social, pedagogical, and physiological aspects, with a particular emphasis on inclusion. He has published numerous articles on this topic (over 74 papers) and supervised many graduate students. Lagestad is also the leader of a research group dedicated to physical education, activity, and health.

Email: pal.a.lagestad@nord.no

THE IMPACT OF FATIGUE ON THE SPORTS PERFORMANCE AND INJURY RISK OF HEALTHY AND/OR PARA-ATHLETES

Tatjana Trošt Bobić
University of Zagreb, Croatia

Bio: Associate Professor Tatjana Trošt Bobić is a kinesiology expert at the University of Zagreb in Croatia. She teaches kinesitherapy, injury prevention, and adapted physical activity and supervises graduate PhD students. She is a founder and the head of the Laboratory of Therapeutic Exercise, where she researches therapeutic exercise modalities and factors affecting motor performance and injury risk. Bobić has been involved in several international research projects (ITACEP, CRO-PALS) and has published extensively in her field. She also serves as an editor for a scientific journal, Kinesiology.

Email: tatjana.trost.bobic@kif.unizg.hr

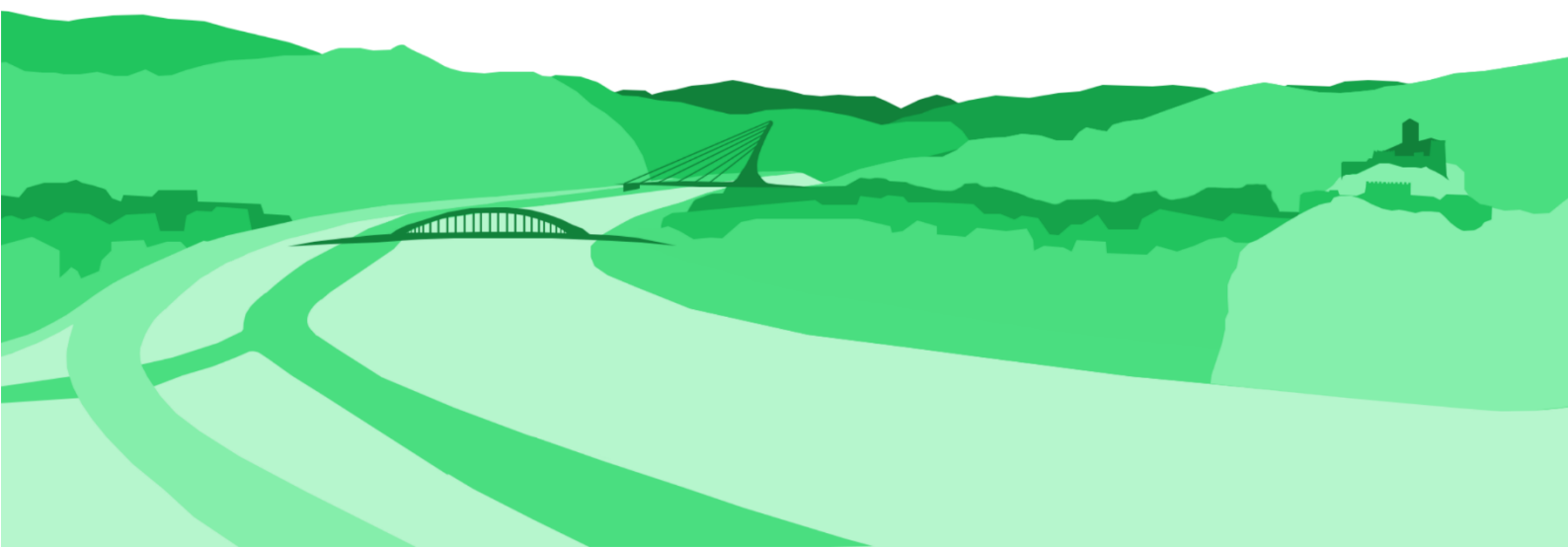
VARIABILITY, STABILITY AND COMPLEXITY IN EVALUATION OF HUMAN MOVEMENT BEHAVIOUR

Zdeněk Svoboda
Palacký University Olomouc, Czech Republic

Bio: Associate Professor Svoboda is a leading expert in human movement research at Palacký University in Olomouc, Czech Republic. He has spent the past twenty years studying the variability and coordination of human movement, particularly during walking. His research has revealed that a certain degree of variation in gait patterns is standard and that different body parts move together in specific ways during walking. Svoboda is a member of several professional organisations and has served as the managing editor of an academic journal, Acta Gymnica. He has also collaborated with researchers from universities worldwide (Australia, Portugal, UK) and has published over 110 articles in Web of Science.

Email: zdenek.svoboda@upol.cz

Session I



TEACHER'S VIEW ON SELECTED FACTORS INFLUENCING PHYSICAL EDUCATION TEACHING AT PRIMARY SCHOOLS

David Cihlář[1], Eliška Škopková[2]

[1] Department of Physical Education and Sport, Faculty of Education, UJEP, Czech Republic
[2] Elementary school Pod Vodojemem, Ústí nad Labem, Czech Republic

Purpose: A significant part of the research and surveys carried out points to very low volumes of physical activity in the child population. It has even been proven that for some children, physical education is the only organized component of physical activity in their daily routine. High demands are placed on physical education teachers to at least somehow compensate for the lack of physical activity in physical education lessons, but at the same time to teach children many skills, cultivate their sports expression and, above all, motivate them to move. However, the actual implementation of physical education lessons and its effectiveness is influenced by many factors that the physical education teacher has to face. In our research, we were interested in how the teacher perceives the factory we have selected and how, in his opinion, they positively or negatively blend into physical education lessons.

Material & Methods: The research was carried out using a questionnaire survey, in which 483 physical education teachers participated. Teachers were approached through the school management. The questionnaire survey was carried out using an electronic questionnaire. The obtained data were evaluated by common statistical procedures using mathematical and statistical methods.

Results: We assumed that teachers would struggle with pupils' reluctance to exercise, but this was not confirmed. However, the assumption of low performance indicators and acquired skills was confirmed. More than 60% of the teachers surveyed say that the above findings have a negative effect on their teaching. At the same time, about half of the teachers do not have sufficient spatial and material conditions to carry out teaching.

Conclusion: The results pointed out the problems that physical education teachers have to face and at the same time also the ways of remedy and possibly areas where effective support should be directed. Last but not least, the results will help to improve the training of future teachers.

Keywords: physical education teacher, primary school, problems, teaching

Author for correspondence: David Cihlář (david.cihlar@ujep.cz)

DUDE, WHERE'S MY HOME? IDENTIFYING PLACES WITH GPS DATA

Josef Heidler, Jasper Schipperijn

Department of Sport Science and Clinical Biomechanics, University of Southern Denmark, Odense, Denmark

Purpose: Our research focuses on understanding and influencing health behaviours to promote healthier lifestyles. A key component involves analysing individuals' movement patterns to identify opportunities for personalised interventions. This abstract presents a novel approach that utilises GPS and GIS data to extract valuable insights into participants' behaviours without relying on traditional questionnaires. By analysing participants' location data, we can identify frequently visited places, travel patterns, and potential activity levels. This information can be used to infer the purpose of trips, such as work, leisure, or healthcare appointments, providing a deeper understanding of participants' daily routines. We aim to demonstrate the potential of GPS and GIS data for health behaviour researchers and highlight the valuable information that can be gleaned from this data alone. This contribution is aimed at identifying places.

Material & Methods: Our proprietary algorithms, which will be publicly available soon, were employed to process and analyse GPS data collected with the open-source mobile application Traccar. Geographic information was sourced from OpenStreetMap (OSM).

Results: The analysis of location detection and trip purposes needs to be conducted. Previous research (yet to be published) on a different dataset (n = 40) evaluated trip and transportation mode detection. Trip detection achieved 79% precision, 84% recall, and 81% F1-score, with an overall accuracy of 93%. Transportation mode classification was most accurate for bicycling (over 90% for all metrics), followed by vehicles (over 85%) and walking/running (over 75%), resulting in an overall accuracy of 90%.

Conclusion: Using GPS data, we can gather detailed information about people's movements. This data can help us understand individual behaviours and develop personalised strategies to promote healthier lifestyles by encouraging positive changes in movement patterns.

Funding: This project is a part of the LABDA (Learning Network for Advanced Behavioural Data Analysis) which received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101072993.

Keywords: algorithm, GIS, LABDA, location, OSM, trip

Author for correspondence: Josef Heidler (jheidler@health.sdu.dk)

ANALYSING COMPOSITIONAL DATA: THE ART OF WORKING WITH LOGRATIOS

Paulína Jašková

Faculty of Physical Culture, Palacký University Olomouc, Olomouc, Czech Republic
Faculty of Science, Palacký University Olomouc, Olomouc, Czech Republic

Purpose: Movement behaviours such as physical activity (categorized by intensity into light, moderate, and vigorous PA), sedentary behaviour (SB), and sleep are interrelated components of daily life and should not be analysed separately. They can be effectively examined using a 24-hour time-use paradigm, integrating all daily movement behaviours to assess their impact on health outcomes. This requires the use of appropriate statistical framework that accounts for their compositional nature.

Material & Methods: Compositional data analysis (CoDA) offers a statistical approach that captures the relative nature of data and the logratio methodology serves as a proper tool for the analysis of theme and allows us a simple interpretation. The choice of an appropriate logratio coordinate system is crucial for the correct interpretation of the relationship between movement behaviours and adiposity outcomes, ensuring that meaningful conclusions can be drawn from various statistical analyses (such as regression analyses and reallocations).

Conclusion: This contribution highlights the application of the compositional approach and basic logratio methodology for analysing physical activities and their association with adiposity outcomes. It also demonstrates the advantages of using a compositional approach for time-use data processing.

Funding: This research was supported by the research grant from the Czech Science Foundation No. 22-02392S.

Keywords: compositional data, logratio, physical activity, time-use data

Author for correspondence: Paulína Jašková (paulina.jaskova@upol.cz)

PHYSICAL FITNESS IN POST-LEUKEMIA CHILDREN

Matěj Šifalda[1], Jiří Nechvátal[2], Martin Nosek[2], Pavel Prchal[2]

[1] Elementary school of Bílina, Czechia
[2] University J.E. Purkyně in Ústí nad Labem, Czechia

Purpose: The aim of this study was to determine the level of fitness of children and adolescents who have undergone treatment for leukemia using the 6 min walking test (6MWT) [1] and to compare this fitness with normal healthy populations. We assumed that the fitness of children after leukemia treatment would be significantly worse than the healthy normal population.

Material & Methods: A total of 28 children (16 boys, 12 girls) aged 11 to 17 years after leukemia treatment participated in the study. To determine the fitness of our subjects the 6 min walking test (6MWT) was used. The measurement was carried out as part of a recovery stay for children after oncological and hemato-oncological treatment. Comparison with the normal population was performed using percentile charts and correlation coefficient. Furthermore, we investigated the difference between age groups using Welch's T-test for independent samples at a significance level of $p < 0.001$.

Results: We found out that there is a strong relationship between the age of the test subjects and the distance measured at 6MWP, with $r = 0.704$ and $p < 0.001$. This correlation also suggests that the longer the time after leukemia treatment, the better their performance on the 6MWT, therefore their tolerance to physical stress is higher. The testing also revealed that if the entire study group of children aged 11 to 17 years was included, there is a statistically significant difference in 6MWT between the measured children and the average healthy population.

Conclusion: The results show that there is a significant difference in the level of fitness between the normal population and children who have had leukaemia. The results further suggest that there is a gradual increase in fitness with increasing age and there is a gradual increase to physical stress tolerance. Children aged 14–16 years already had comparable fitness to the general healthy population. With the help of appropriately adjusted physical activity, children after leukaemia can reach a comparable level of physical fitness to their peers within a few years.

Keywords: children, leukemia, physical fitness

References:

[1] Hooke, M. C., Garwick, A. W., & Neglia, J. P. (2013). Assessment of Physical Performance Using the 6-Minute Walk *Test in Children Receiving Treatment for Cancer. Cancer Nursing*, 36(5), E9. https://doi.org/10.1097/NCC.0b013e31829f5510

Author for correspondence: Jiří Nechvátal (jiri.nechavatal@ujep.cz)

MEANINGFUL TESTING AND ASSESSMENT IN CZECH SCHOOL-AGED CHILDREN IN PHYSICAL EDUCATION

Iva Šeflová

Department of Physical Education and Sports, Faculty of Science, Humanities and Education, Technical University of Liberec, Czech Republic

Purpose: Motor competence assessment in schools plays a crucial role in understanding and promoting the overall development of children. This study aimed to develop and validate a perceived motor competence questionnaire compatible with the short form of the Bruininks - Oseretzky Test of Motor Proficiency, 2nd Ed. (BOT-2). Additionally, relational recommendations for further development were created based on the measurement results of both actual and perceived motor competence levels.

Material & Methods: The study involved 254 children aged 6 to 11 years (M = 9.1 years, SD = 1.53), of whom 55% were boys, from a selected primary school in Liberec. To determine actual motor competence, we used the Czech adaptation of the BOT-2, which consists of 30 fine and gross motor test tasks. In the perceived motor competence questionnaire we developed for each of the eight subtest categories (I. Fine motor precision, II. Fine motor integration, III. Manual dexterity, IV. Bilateral coordination, V. Balance, VI. Running speed and agility, VII. Upper-limb coordination, VIII. Strength) 3 questions of graded difficulty, resulting in 27 questions in total.

Results: 70 % of the children were rated average in actual motor competence, 6.7 % were below average, and 23.3% were above average. In the assessment of perceived motor competence, 56% of children were rated as having a very high level, 40% as having a high level, and only 4% as having a low level of motor competence. No one was classified in the category of very low perceived motor competence. Based on a relational assessment of current and actual motor competencies, we formulated four categories of recommendations.

Conclusion: 4 categories of recommendations represent combinations of high and low actual and perceived motor competence. All categories provide positive feedback for children, emphasising that they are not judged as successful or unsuccessful but are engaged in a learning process where both teacher and child can reflect on progress and set future personal goals. This approach fosters motivation for further development of motor competencies and encourages lifelong engagement in physical activities. Identifying strengths contributes to developing a child's self-esteem and self-confidence, positively influencing their overall self-concept.

Keywords: Bruininks-Oseretzky Test of Motor Proficiency, motor competence, perceived moto competence, physical education, testing

Author for correspondence: Iva Šeflová (iva.seflova@tul.cz)

OPTIMAL TIME-USE COMPOSITION OF POSTURE-SPECIFIC BEHAVIORS FOR HEALTH OUTCOMES IN OLDER ADULTS

Jan Vindiš[1], Paulína Jašková[1,2], Jana Pelclová[1], Karel Hron[2]

[1] Faculty of Physical Culture, Palacký University Olomouc, Olomouc, Czech Republic
[2] Faculty of Science, Palacký University Olomouc, Olomouc, Czech Republic

Purpose: Physical activity guidelines often overlooks the role of specific postures in promoting health among young (65–70 years) and old (>70 years) older adults. This study aimed to determine the optimal 24-hour posture-specific composition—lying down, sitting, standing, moving, and walking—associated with obesity prevention, maintenance of physical fitness, reduced fall risk and fear of falling in older adults.

Material & Methods: The study analyzed data from 309 older adults (65+ years) recruited from Czechia. Participants wore accelerometers on the wrist, thigh, and hip for 7 consecutive days to measure 24-hour physical behaviors. Compositional data analysis was used to estimate the optimal time-use composition for a range of health outcomes, including BMI, Timed-up and Go Test (TUG), Falls Efficacy Scale International - questionnaire (FES), Short Physical Performance Battery (SPPB), usual gait speed, and the five-times sit-to-stand test (5TSST).

Results: In younger older adults, optimal BMI was associated with 10.0 hours of lying down, 6.9 hours of sitting, 3.6 hours of standing, 1.8 hours of moving, and 1.6 hours of walking. In old older adults, optimal BMI was linked to 10.3 hours of lying down, 7.1 hours of sitting, 3.6 hours of standing, 1.7 hours of moving, and 1.3 hours of walking. For both groups, increased standing and reduced sitting were associated with better physical fitness and reduced risk of falling.

Conclusion: Posture-specific behaviors are significantly associated with health outcomes in older adults, highlighting the need to include posture recommendations in physical activity guidelines. Optimal time spent standing and walking should be prioritized to improve physical fitness, prevent obesity, and reduce fall risk in the elderly population.

Funding: This research was supported by the research grant from the Czech Science Foundation No. 22-02392S.

Keywords: compositional data analysis, fall risk, obesity, physical behavior, physical fitness

Author for correspondence: Jan Vindiš (jan.vindis@upol.cz)

WHAT DOES THE IDEAL FAMILY SUPPORTING CHILDREN'S PHYSICAL ACTIVITY LOOK LIKE? RESULTS OF THE FAMIPASS STUDY ACROSS SEGMENTS OF THE SCHOOL DAY

Michal Vorlíček[1], Jan Dygrýn[1], David Janda[2], Jaroslava Voráčová[3], Erik Sigmund[1], Dagmar Sigmundová[1]

[1] Institute of Active Lifestyle, Faculty of Physical Culture, Palacký University Olomouc, Olomouc, Czech Republic
[2] Department of Natural Sciences in Kinanthropology, Faculty of Physical Culture, Palacký University Olomouc, Olomouc, Czech Republic
[3] Department of Social Sciences in Kinanthropology, Faculty of Physical Culture, Palacký University Olomouc, Olomouc, Czech Republic

Purpose: This study focuses on assessing family and environmental factors in the context of physical activity levels in children aged 3–8 years across different segments of the school day.

Material & Methods: Data were collected in 2022 and 2023 as part of the national FAMIPASS study [1], involving 502 families from 36 kindergartens and primary schools across Bohemia, Moravia, and Silesia. Movement behaviour was measured using ActiGraph devices over the course of one week (24/7). Additionally, parents completed a questionnaire covering family and environmental factors, along with an activity log, which allowed the data on movement behaviour to be divided into three segments (before, during, and after school/kindergarten).

Results: Regression analysis revealed several significant factors associated with children's moderate-to-vigorous physical activity (MVPA). Overall MVPA was related to maternal BMI, as well as both maternal and paternal MVPA. Before school, children's physical activity was significantly associated with paternal BMI, maternal activity levels, type of residence, and active transportation. During school hours, both maternal and paternal MVPA were significant predictors of children's activity levels. After school, maternal BMI and MVPA were identified as key factors associated with children's physical activity.

Conclusion: These findings highlight the critical role of both parental physical activity and specific family characteristics, such as BMI and active transportation, in shaping children's physical activity patterns throughout different segments of the school day.

Funding: This research was funded by Czech Science Foundation, grant number 22-22765S.

Keywords: 24-hour movement behaviour, accelerometry, recommendations for physical activity

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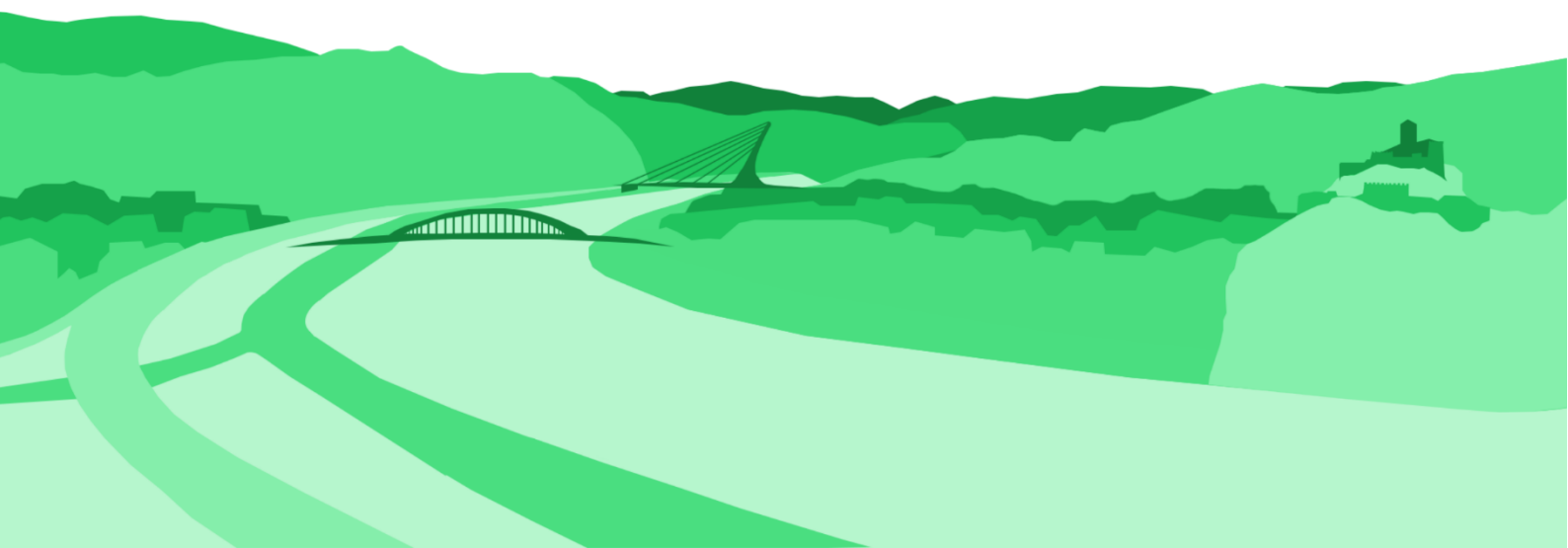
Author for correspondence: Michal Vorlíček (michal.vorlicek@upol.cz)

Session II



OUTDOOR EDUCATION AND THE TERM "FRILUFTSLIV" IN RELATION TO PHYSICAL LITERACY IN PHYSICAL EDUCATION PEDAGOGIES

Idar Lyngstad, Eivind Sæther

Nord University, Norway

Purpose: The aim of the study was to examine outdoor education and the term "friluftsliv", which has been used as both a Norwegian and English term in the research literature, in relation to physical literacy (PL) in physical education (PE) pedagogies. The term "friluftsliv" is associated to outdoor recreation and it relates to moving and being moved in nature over a specified period, changing one's environment, having experiences of nature and respect for the nature and its' sustainable future. The research question was: How can "friluftsliv" broaden the understanding of PL in PE pedagogies and include a "friluftsliv" – and nature perspective?

Material & Methods: We exemplified and elaborated on the concept of "friluftsliv literacy" through an analysis of textual data from a study of experiences of friluftsliv trips taken by students in an upper secondary school that offers a three-year education program in "friluftsliv" in Norway. 37 students took part in the study. The data analysis complied with the principles of qualitative interpretation of the content in textual data, which the students wrote in connection with their "friluftsliv" trips.

Results: A key point in the analysis is that "friluftsliv literacy" both support and refresh the concept of PL, which especially draws on existential and phenomenological perspectives. "Friluftsliv" may promote attributes of PL, such as identity formation, self-esteem and self-confidence. The analysis also revealed that "friluftsliv" have opportunities for meaningful experiences that can ultimately contribute to human flourishing.

Conclusion: Although the concept "friluftsliv literacy" need more research, we argue that it will broaden the understanding of PL in a useful way. At the same time, it will problematize the concept of PL, as the PL discourse should relate more to education for an environmentally sustainable future and for protection of life on earth both locally and globally.

Keywords: friluftsliv, outdoor education, physical education, physical literacy

Author for correspondence: Idar Lyngstad (idar.k.lyngstad@nord.no)

PROMOTING GOOD BODY POSTURE THROUGH "ACTIVE SCHOOL"

Elena Bendíková[1], Ricardo Ricci Uvinha[2]

[1] Department of Physical Education and Sports, Faculty of Education, Catholic University Ružomberok, Slovakia
[2] School of Arts, Sciences and Humanities, University of São Paulo, Brazil

Purpose: The current lifestyle of the school population has a hypokinetic and sedentary nature, which is reflected in their physical activity routines as well as in their health, with an increasing trend in chronic noncommunicable diseases. The school environment is one of the options that can respond to this societal problem, which concerns not only Slovakia and Europe. Such a space is created by the concept of the "Active School." This concept motivates, creates, and promotes interest in various physical activities among pupils from the perspective of primary health prevention, with an emphasis on health-oriented fitness, of which body posture is a partial component. The aim of the pilot study was to show the positive impact on the body posture of female pupils and the importance of exercise program within the framework of the Active School.

Material & Methods: A total of 32 female pupils in the pubescent age group (11.1 ± 0.5) voluntarily participated in the study, all of whom were in the 5th grade of elementary school. The experimental group (ES) consisted of 17 students, and the control group (CS) consisted of 15 students. The control group did not engage in any organized physical activities and did not participate in PE classes. As part of the Active School program, the ES group underwent a physical intervention for a period of 5 months, implemented 3 times a day, 3 times a week. In terms of data collection methods, we used standardized methods for physical education focusing on body posture. As far as data processing, we used standardized procedures.

Results: Based on the initial body posture tests, both the experimental group (ES, $n = 17$) and the control group (CS, $n = 15$) exhibited poor body posture, which corresponds to the third qualitative level (III) out of four. After the physical intervention within the Active School program, conducted over 5 months, we observed an improvement (W-test, $p < 0.01$) in the overall posture of the ES group ($n = 17$). Fifteen pupils from the ES group were reclassified to the second qualitative level (II), indicating good body posture. In the remaining 2 students from the ES group, qualitative changes were noted, but they were not reclassified to level II. The overall improvement was observed in the positioning of the head, the abdominal area, and spinal curvature in the sagittal plane. A significant difference between the ES ($n = 17$) and CS ($n = 15$) groups was found after the intervention (Mann-Whitney U-test, $p < 0.01$).

Conclusion: The presented research contributes to expanding knowledge on the potential of physical activity and health-oriented exercise programs in addressing a specific health-related fitness factor within the "Active School" framework, which in this case was the body posture. The findings show the importance of health-oriented intervention in the experimental group (ES) compared to the control group (CS). Additionally, these results carry not only health and preventive significance but also educational and informative value. The findings are particularly valuable due to the seriousness of the issue and the potential for preventing postural health problems.

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Keywords: active school, body posture, prevention, pupil

Author for correspondence: Elena Bendíková (bendikova.elena@gmail.com)

IS EFFECT OF THE PHYSICAL EXERCISE AFFECTS ON BODY COMPOSITION BY BODY MASS IN ADOLESCENT GIRLS?

Václav Bunc

Faculty of Pedagogy, Charles University, Prague, Czech Republic

Purpose: Children obesity is a growing problem over the world. Overweight or obesity in adulthood usually begins in childhood. The overweight and obesity increase in the present population is caused by an energy intake non-adapting to its output. In western countries an energy intake has stagnated over the past two decades, the energy expenditure for the same period drop down by 30%. The study goal was to assess the effect of movement intervention in girls differing in the body mass (BM).

Material & Methods: Study was carried out in 82 adolescent girls with normal BM (mean age = 13.2 ± 2.9 years; BM = 45.3 ± 2.7 kg; height = 157.5 ± 4.0 cm; %BF = 21.8 ± 2.4 %, $VO2_{peak}$ = 42.3 ± 2.6 $ml \cdot kg^{-1} \cdot min^{-1}$), 59 overweight girls (13.4 ± 2.7; 54.0 ± 3.0; 159.3 ± 3.1; 26.6 ± 2.7, 36.1 ± 2.2) and 41 obese girls (13.3 ± 3.0; 64.2 ± 4.1; 159.6 ± 3.4; 30.5 ± 3.1, 30.6 ± 2.2). Body composition was assessed by whole body bioimpedance method using prediction equations that are valid for the Czech girls, functional variables were assessed in open system on a treadmill. The intensity of the mostly aerobic exercise intervention corresponded to an intensity of 75 to 85% HRpeak determined on the treadmill; each training unit lasted at least 60 minutes and was implemented with a frequency of at least three training units per week. The total duration of the movement intervention was 9 weeks.

Results: The energy content of weekly movement program for boys with normal BM ranged from 1450 kcal to 2650 kcal (mean 2050 ± 330 kcal) in overweight from 1591 kcal to 2390 kcal (1990 ± 290 kcal) and in obese from 1680 kcal to 2290 kcal (1986 ± 330 kcal). Reduction in %BF ranged from 13.9 % in obese to 15.0% in normal BM of starting value, ECM/BCM relationship decreased from 11.9 % in subjects with normal BM to 13.2 % in obese, and in $VO2_{peak}$ increased from 14.9% in normal BM to 15.8 % in obese. In girls differing in BM are absolute changes in adiposity and aerobic fitness like a result of imposed movement intervention substantively and statistically significant. On the contrary, differences in percentages of pre-intervention values are non-significant.

Conclusion: We can conclude that an exercise program with a similar energy content, form and intensity causes the similar changes in adiposity and in motor and functional performance in girls, differing in BM.

Keywords: adolescent girls, body composition, movement intervention, overweight and obesity, physical activity

Author for correspondence: Václav Bunc (vacl.bunc@gmail.com)

THE EFFECT OF METHYLPHENIDATE ON THE DOPAMINE AND GROWTH HORMONE RESPONSE TO EXERCISE IN CHILDREN WITH ATTENTION-DEFICIT HYPERACTIVITY DISORDER

Sigal Ben-Zaken[1], Dan Nemet[2], Alon Eliakim[2]

[1] Levinsky-Wingate Academic College, Israel
[2] Sport Center, Meir Medical Center, Israel

Purpose: Exercise typically stimulates the release of growth hormone (GH) and dopamine (DA) in the body. However, research has shown that children with Attention-Deficit/Hyperactivity Disorder (ADHD) exhibit an atypical response to physical activity in terms of these hormones. Specifically, children with ADHD tend to have significantly lower GH and DA responses to exercise compared to their non-ADHD peers. This blunted hormonal response may contribute to some of the symptoms and challenges associated with ADHD, including difficulties with attention, impulse control, and in some cases, potential growth impairments. The reduced GH and DA response to exercise in children with ADHD suggests that there may be underlying differences in their neuroendocrine systems, which could have implications for both the understanding and treatment of ADHD. This study aimed to evaluate how exercise affects growth hormone (GH) and dopamine (DA) levels in children with attention-deficit hyperactivity disorder (ADHD), both with and without methylphenidate (MP) treatment. The researchers predicted that MP would significantly reduce the GH and DA response to exercise.

Material & Methods: The study involved 20 children (12 boys and 8 girls, aged 9–13), including 10 with ADHD and 10 control subjects. ADHD participants underwent two exercise tests – one with MP and one without – while control subjects completed a single test. Blood samples were taken before exercise, at peak exertion, and at 30 and 60 minutes post-exercise to measure GH and DA levels.

Results: Children with ADHD, regardless of MP use, showed significantly lower GH ($p < 0.002$) and DA ($p < 0.01$) responses to exercise compared to the control group. Interestingly, when children with ADHD took MP before exercising, their GH response improved significantly ($p < 0.04$), though it remained lower than that of the control group.

Conclusion: The study reveals that children with ADHD have an impaired GH and DA response to exercise. MP partially mitigates the blunted GH response. These findings may explain the link between ADHD and growth issues in some children, and why long-term MP treatment typically doesn't affect final adult height in ADHD patients. The researchers suggest further investigation into the combined effects of exercise and stimulant medication as a potential therapeutic approach for ADHD.

Keywords: ADHD, dopamine, growth hormone, methylphenidate

Author for correspondence: Sigal Ben-Zaken (sigalbz@l-w.ac.il)

LONGITUDINAL CHANGES IN ADOLESCENTS SEDENTARY, LIGHT, MODERATE, AND VIGOROUS PHYSICAL ACTIVITY LEVELS

Hilde Kristin Mikalsen, Pål Lagestad

Nord University, Norway

Purpose: In recent years, sedentary behaviour (SB) has become a significant risk factor for health, alongside the decline of physical activity (PA) in the population. This study explored adolescents' PA and SB using a longitudinal design, from the age of 13 to 15, to elucidate any changes and when they potentially occur. Further, the study seeks to examine the role of meaning-making in shaping adolescent's explicit and implicit knowledge about PA, as well as its influence on their involvement in PA. The use of meaning-making as a framework for discussing the study's findings is expected to enrich educational perspectives and contribute to understanding factors influencing adolescent's engagement in PA.

Material & Methods: The data material from the accelerometer measurements was analyzed using the program SPSS, version 28. Repeated measures ANOVA (and follow-up test with Bonferroni corrections) were used to assess changes in the four activity levels during the three years. Independent t-tests were used to examine gender differences in each year and at each activity level and to determine differences in activity level between participants with valid data all three years and those with valid data only at 13 and/or 14 years of age.

Results: Statistical analyses of the accelerometer measurements revealed a significant increase in time in the lowest activity level and a decrease in light, moderate and vigorous intensity PA levels during the three years. These changes were larger from 13 to 14, than from 14 to 15, years-of-age. However, no significant interaction was found between time and gender. Analyses also showed a significantly higher time spent in SB and lower time spent in moderate activity among girls compared to boys at 13, but not at the age of 14 and 15.

Conclusion: The findings, which indicate a reduction in PA and increased sedentary time with increasing age, are discussed in light of the concept of meaning-making and meaningful experiences, which we argue are important to increase and solidify involvement in PA among adolescents. Emphasized here is the importance of communicating the diverse possibilities of movement and challenging understandings of what PA can be for youth at school and in their leisure time.

Keywords: accelerometer, movement behaviour, sedentary behaviour

Author for correspondence: Hilde Kristin Mikalsen (hilde.k.mikalsen@nord.no)

WHICH MUSCLES ARE MOST LOADED DURING SUDDEN ACCELERATION ON A TREADMILL?

Michalina Błażkiewicz-Janeczko

Józef Piłsudski University of Physical Education in Warsaw, Poland

Purpose: This study was designed to investigate the impact of external perturbations, in particular the acceleration of one treadmill belt during the pre-swing phase, on gait kinetics and determine which muscle generates the highest force.

Material & Methods: The study involved two older women (age: 64/62 years old; body weight: 59/58 kg; body height: 162/160 cm). The kinematic and kinetic parameters of perturbed gait were recorded using the Grail Motek Medical system, which includes an instrumented dual-belt treadmill, a Vicon motion capture system, and a synchronized virtual reality environment. Participants wore athletic shoes and walked at a constant speed of 1 $m \cdot s^{-1}$. Five unexpected perturbations, rated five on a scale of 1 to 5, were applied every 10 seconds during the pre-swing phase, accelerating the left treadmill belt. Muscle forces were calculated using OpenSim 4.4 [1] with the gait2392_simbody model.

Results: Of the 43 actuators controlling the left lower limb, 37 muscles showed an increase in maximum force during the presence of perturbation. Notably, eight muscles acting on the hip joint experienced force increases exceeding 100% compared to normal gait. The most significant force increase was in the gluteus maximus muscle, a key hip extensor, whose strength increased by 1385%. The soleus muscle generated the highest forces during normal gait (4155.65 N) and perturbed conditions (5291.77 N), though the perturbation led to only a modest increase of 27.34%.

Conclusion: As gait disturbances during walking are a leading cause of falls in the elderly, the results can help guide training protocols and identify key muscles to strengthen to reduce injury risks.

Funding: This research was funded by the Józef Piłsudski University of Physical Education in Warsaw, grant number UPB No. 2 (114/12/PRO/2023).

Keywords: muscle, perturbation, treadmill

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Author for correspondence: Michalina Błażkiewicz-Janeczko (michalina.blazkiewicz@awf.edu.pl)

LINEAR ONSET WHOLE BODY VO_2 KINETICS: A NEW METHOD FOR ASSESSING EXERCISE TOLERANCE IN SPORTS AND CLINICAL SETTINGS

Robert Robergs[1,2], Anais Dewilde[1], Bridgette O'Malley

[1] Queensland University of Technology, Brisbane, Australia
[2] Jan Evangelista Purkyně University, Ústi nad Labem, Czech Republic

Purpose: The traditional method used to quantify the rate of increase (kinetics) in whole-body oxygen consumption ($wbVO_2$) is over-simplistic and insensitive to differences in physical fitness and disease states. A new method of VO_2 data analysis that focusses on the initial linear segment of the VO_2 response to exercise transitions may be superior at revealing important physiology linked to multiple physiological systems.

Material & Methods: Fourteen subjects (12 males, 2 females), highly trained in triathlon or road cycling completed a ramp incremental cycling protocol for measurement of the maximal rate of $wbVO_2$ ($wbVO_2max$). Across three added test sessions on different days subjects completed eight additional exercise bouts at 43, 64, 93, 99, 110, 116, 134 and 148 % critical power (CP).

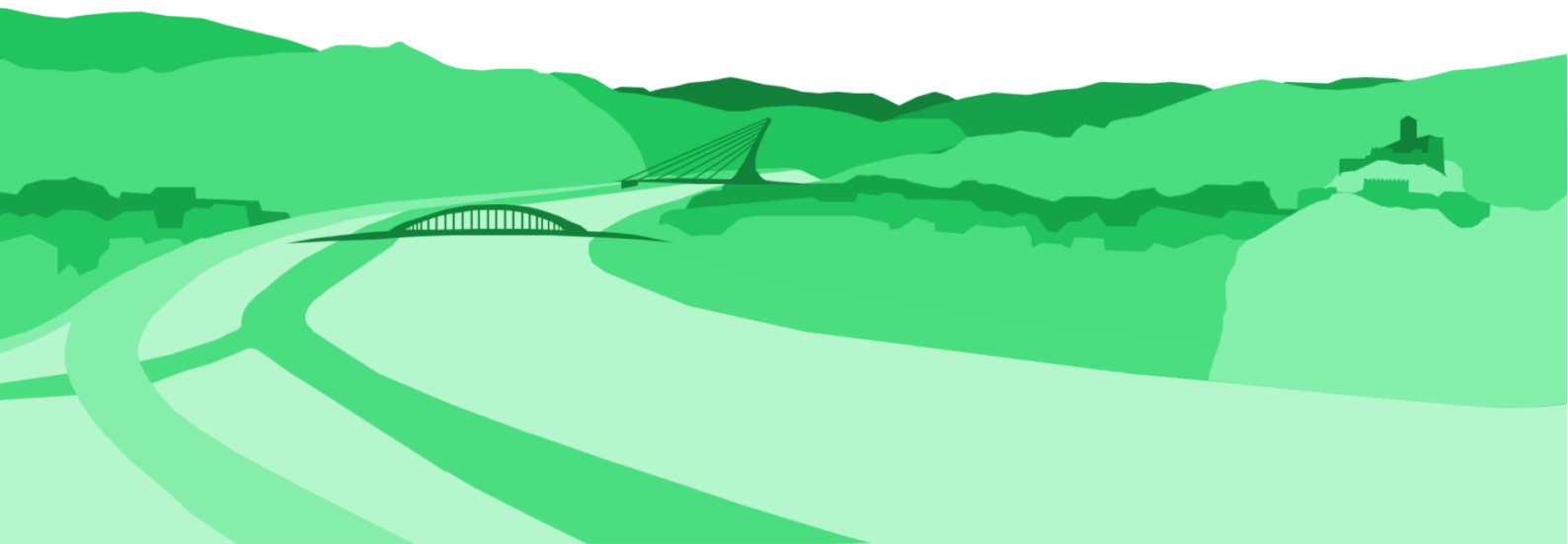
Results: For the initial five exercise bouts, the linear fit of the initial segment resulted in a superior fit (lower standard error of estimates; Sx.y) compared to the mono-exponential fit ($p < 0.001$). There were systematic (not random) profiles for the change in VO_2 slope with increasing exercise intensity. Such responses could be divided into two categories; 1) a sustained increase in VO_2 slope (increased kinetics) vs. 2) a plateau or decrease in the VO_2 slope (impaired kinetics). Grouping subjects in such a manner further revealed group differences in $wbVO_2max$ $L \cdot min^{-1}$ ($p = 0.014$), ventilation threshold (VT) Watts ($p = 0.017$), CP Watts ($p = 0.013$) and peak linear intensity ($p < 0.001$).

Conclusion: This new linear onset $wbVO_2$ kinetics method is superior to the traditional approach as it had physiological relevance across both steady and non-steady state exercise intensity, required less than 2 min of exercise per bout, and identified far more complex physiology than the traditional mono-exponential method. The new method may also have greater impact to assessing cardiorespiratory and muscular endurance in healthy populations, and the severity of detraining and/or disease in clinical populations.

Keywords: cycling, metabolism, oxygen consumption, respiration

Author for correspondence: Robert Robergs (rob@rrobergs.net)

Session III



INTERMITTENT FASTING CAN LEAD TO CHANGES IN MUSCLE MASS BY REDUCING SPONTANEOUS PHYSICAL ACTIVITY DUE TO EXCESSIVE FATIGUE

Erika Čermáková[1], Martin Forejt[1], Martin Čermák

[1] Department of Public Health, Faculty of Medicine, Masaryk University, Brno, Czech Republic

Purpose: Various intermittent fasting (IF) protocols are widely used as an effective weight loss tool. However, the results on body composition are still unclear. The aim of the study was to assess the effect of IF on the amount of muscle mass, which is a very important functional component of the human body, and its loss is always undesirable from many aspects during the weight reduction process.

Material & Methods: A total of 75 healthy adult participants completed the three-week intervention phase of the study. The participants were divided into three groups: IG1 (IF with 75% energy intake), IG2 (75% continuous energy intake – no time restriction) and IG3 (IF with 100% energy intake). Body composition was determined by BIA and meal plans were created using NutriPro software. Adverse events were continuously monitored throughout the intervention.

Results: The highest mean fat free mass loss was observed in the IG1 1.1 ± 1.0 kg group compared to the IG2 0.65 ± 0.91 kg group without statistically significant differences ($p = 0.48$). The lowest loss of fat free mass was observed in the IG3 0.2 ± 1.3 kg (IG1×IG3 $p = 0.027$; IG2×IG3 $p = 0.54$). Fatigue was statistically significant highest in IG1: $n = 14$; 51.9% compared to IG2: $n = 6$; 22.2% ($p = 0.0473$) and IG3: $n = 9$; 42,9%, without statistically significant differences between groups IG1×IG3 ($p = 0.5734$) and IG2×IG3 ($p = 0.2089$).

Conclusion: IF with energy restriction causes excessive fatigue, which may lead to a spontaneous reduction in physical activity in some individuals, with negative effects on muscle mass. The appropriateness of the timing of food intake will depend on the incidence of adverse effects, which will have a significant impact on long-term adherence to the chosen dietary intervention.

Funding: Supported by specific research at Masaryk University (MUNI/A/1623/2023).

Keywords: energy restriction, fat free mass, intermittent fasting, muscle mass

Author for correspondence: Erika Čermáková (211678@muni.cz)

DEVELOPMENT AND VERIFICATION OF THE IMPACT OF A ROPE SKIPPING MOVEMENT PROGRAM ON LOWER LIMB STRENGTH AND BALANCE ABILITIES IN BOYS AND GIRLS IN THE FIRST GRADES OF ELEMENTARY SCHOOL

Jana Černá, Roman Malíř

Faculty of Physical Education and Sport, Charles University, Prague, Czech Republic

Purpose: This study investigated the impact of a rope skipping movement program (RS-PP) on lower limb strength and balance in children aged 6–8 years. The primary objective was to determine whether an intervention-based movement program could enhance these physical abilities in early school-aged children, and whether regular PE classes could achieve fitness levels comparable to sports-focused programs through targeted intervention.

Material & Methods: A total of 116 participants from two elementary schools were divided into three groups: L1 (PE class only, $n = 25$), L2 (PE class plus 10–12 minutes of daily rope skipping, $n = 71$), and L3 (control group, $n = 20$). The program's effectiveness was assessed through a series of motor tests, including balance, standing long jump, Optojump (measuring jump height), handgrip strength, and body fat percentage.

Results: The results showed improvements in stability in both intervention groups. Group L2 improved by 17% in stability compared to Group L1 (OR = 1.172, $p = 0.008$), while Group L3 improved by 26% over L1 (OR = 1.263, $p = 0.003$). In the Optojump test, all participants achieved an average 2.5 cm higher jump when using arm swings (CMJF) compared to no arm swings (CMJ) ($p < 0.001$). However, handgrip strength slightly declined across all groups (pre-test = 10.5, post-test = 10.6). In the standing long jump, only L2 showed improvement, with an increase of 1 cm (pre-test = 107 cm, post-test = 108 cm). In terms of body composition, L2 had significantly higher body fat percentages in the pre-test but showed the only reduction post-intervention.

Conclusion: In conclusion, the rope skipping movement program (RS-PP) enhanced balance and showed potential in improving overall fitness, particularly when combined with daily practice outside of regular PE classes. These findings underscore the value of incorporating targeted interventions into school physical education to promote physical development in young children physical development in young children

Keywords: school physical education, physical activity program, early school age, movement intervention, rope skipping

Author for correspondence: Jana Černá (jana.cerna@ftvs.cuni.cz)

ANALYSIS OF STEP CYCLE IN XC SKIING USING IMUS

Tobiáš Goldschmidt, Pavel Korvas, Oliver Jaroš

Centre of Sports Activities, Brno University of Technology, Czech Republic

Purpose: In recent years, IMUs established a foothold in monitoring and analysis of kinematic variables in sports, especially in XC skiing. Their usefulness lies in precise analysis of movement which may help athletes and their coaches to improve moment technique. This study aims to automatically analyze the step cycle in XC skiing and establish systematic use of IMUs in XC skiing. This is achieved by examining the potential data yield of the system of multiple IMUs on a sportsperson's body and the usefulness of IMUs in conditions of outdoor winter sports. Detailed analysis of the step cycle, in terms of duration and start of take-off, swing and gliding phases, in XC skiing can create a path to easier perfection of skiing technique, possibly even automatization of coaching in terms of technique perfection.

Material & Methods: This study contains data from 6 participants of various skill levels in XC skiing – two experienced and four beginners. Measurement was done at 100 meters long flat racing track. Each participant underwent two measurements of skiing using the diagonal stride technique, one measurement at a subjectively slow and the other at a subjectively fast pace. In our research, we used 4 IMUs (Miniwave, Cometa, Milan, ITA), placed at the thighs and arms of both lower resp. upper limbs. Reference values of phases of the step cycle were acquired by pressure insoles (fy. Medilogic, GER) using of an algorithm developed at CESA VUT.

Results: Experienced XC skiers showed far better results (*MAE* = 0.048 sec for thigh sensor and *MAE* = 0.041 sec for arm sensors) than beginner skiers (*MAE* = 0.147 sec for thigh sensor and *MAE* = 0.195 sec for arm sensor). In addition, automatic detection from a thigh sensor failed for most beginners (8 out of 12 measurements).

Conclusion: Automatic detection of phases of step cycle in XC skiing using IMUs is possible, however it is far more precise in experienced skiers than in beginners because beginners' technique shows greater variability.

Keywords: inertial sensor, technique, XC skiing

Author for correspondence: Tobiáš Goldschmidt (220487@vutbr.cz)

DETERMINATION OF THE DEGREE OF INFLUENCE OF BALANCE ON THE POWER-DYNAMIC ABILITY OF THE LOWER LIMBS IN SOCCER PLAYERS IN THE AGE RANGE OF 20–22 YEARS

Václav Kundera, Marek Malata, Jan Šťastný

Brno University of Technology, Czech Republic

Purpose: The research deals with the relationship between balance and power-dynamic ability of the lower limbs in soccer players aged 20–22 years. The goal of the research was to find out if better balance skills lead to higher shot speeds in soccer players.

Material & Methods: We performed the measurements on a group of 16 right-foot dominant soccer players aged 20-22 years at the semi-professional level. The balance capabilities were expressed by the so-called sway index obtained from measurements with the Biodex Balance System device, and the Stalker ATS II radar was used to measure the force of the projectile.

Results: Based on the assumption that the shot speed is higher and the sway index is lower than the medians of these variables from the entire group, or conversely the shot speed is lower and the sway index is higher, we came to the conclusion that the assumption is met by 10 out of 16 tested shots with the non-dominant (left) lower leg persons, i.e. 62.5%, and when shooting with the dominant (right) lower limb, only 6 out of 16 tested persons, i.e. 37.5%, meet the requirement. The assumption that better stability leads to a faster shot is met by only 4 test subjects (25%) for both right and left footed shots.

Conclusion: When shooting with the dominant leg, the individual's level of balance does not have as much of a bearing on the resulting speed of the shot as the technique itself. On the contrary, when shooting with a non-dominant leg, where the technique is usually not that perfect, the level of balance has a greater share in the resulting speed of the shot.

Keywords: balance, postural stability, shooting in soccer, soccer

Author for correspondence: Václav Kundera (vaclav.kundera@vut.cz)

CHILDREN'S BEHAVIOUR IN THE CONTEXT OF HEALTH

Nora Halmová, Janka Kanásová

Department of Physical Education and Sports, Constantine the Philosopher University,
Faculty of Education, Nitra, Slovak Republic

Purpose: Children's lifestyles include many aspects that affect their health as well as their behaviour. The aim of this paper is to address the issue of how health affects children's behaviour and, conversely, how their behaviour affects their health. We identify factors that contribute to positive or negative health status, such as eating habits, physical activity, sedentary activity and their relationship to addictive substances.

Material & Methods: The study population consisted of 378 children aged 13–15 years in the Nitra region. A questionnaire focusing on health, diet, leisure and physical activity was used to collect data, consisting of 44 closed questions.

Results: From the overall results, we can conclude that only 24% of girls and 38% of boys do the WHO recommended 60 min of physical activity. The recommendations for fruit and vegetable consumption, drinking and regular diet are followed by 34% of girls and 28% of boys. On the issue of leisure time, we found that 63.4% of students spend their free time on social networks for more than 2 hours a day. We can also confirm that pupils prefer to spend their free time sitting at the computer rather than doing physical activity. We observed these results for 68.2% of girls and 74.2% of boys. Experience with alcohol is 31.8% of girls and 64.5% of boys. The differences in this area between boys and girls are statistically significant at the 1% level of significance.

Conclusion: The findings on these negative aspects of children's lifestyles allow us to focus on addressing them comprehensively. However, this requires a systematic and long-term approach that involves support from parents, schools and the wider community.

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Keywords: addictive substances, health, lifestyle, physical activity, sedentary activity

Author for correspondence: Nora Halmová (nhalmova@ukf.sk)

THE EFFECT OF ACTIVATION OF THE DEEP STABILIZATION SYSTEM ON SKATING SPEED IN ICE HOCKEY PLAYERS

Veronika Kvochová[1, 2], Dominika Kolmanová[2]

[1] Faculty of Physical Culture, Palacký University Olomouc, Czech Republic
[2] Faculty of Health studies, University of J. E. Purkyně in Ústí nad Labem, Czech Republic

Purpose: A deep stabilization system is essential for maintaining postural stability and efficient motor function. In ice hockey players, where speed and skating dynamics are necessary, proper activation of this system can significantly affect performance. This research evaluates the effect of exercises aimed at activating the deep stabilization system on skating function and speed in Czech ice hockey players.

Material & Methods: The study involved 20 ice hockey players (16 males, 4 females) aged 13–15 years. Participants were divided into two groups: experimental (n = 10) and control (n = 10). The experimental group completed a specific exercise program aimed at activating the deep stabilization system twice a week for eight weeks, along with regular hockey training. The control group continued regular training without specific exercises for the system. Skating speed was assessed using a standardized figure-eight test, and activation quality was evaluated using Kolář functional tests, both measured at the start and after eight weeks. Statistical analysis was conducted with Statistica 13.3.

Results: Both groups showed a statistically significant improvement in forward and reverse speed. The experimental group significantly improved in forward speed compared to the control group, while reverse speed results were similar in both groups. In deep stabilization system quality tests, the experimental group showed improvements across all areas, whereas the control group had no changes. Statistically significant improvements occurred only in the diaphragm test, trunk extension test, and tilt on all fours.

Conclusion: Integrating deep stabilization exercises into training can enhance on-ice performance. Conversely, the lack of change in the control group suggests traditional methods may be insufficient.

Keywords: deep stabilization system, ice hockey, skating speed

Author for correspondence: Veronika Kvochová (veronika.kvochova@ujep.cz)

RUNNING TECHNIQUE ANALYSIS WITH THE HELP OF WEARABLE TECHNOLOGY

Pavel Korvas, Barbora Pevná

Centre of Sports Activities, Brno University of Technology, Czech Republic

Purpose: The selection of a device for motion analysis is currently a fundamental problem for research methodology. Running technique has been described by a number of studies for which different types of data collection devices or systems were used [1, 2]. The aim of the study is to identify the basic running technique in relation to running speed using modern technology.

Material & Methods: Two groups (athletic runners-A, n = 10, orienteering runners-OB, n = 10) were tested on a 50m run track with increasing speed from 12 $km \cdot h^{-1}$ to personal maximum. Speed was maintained by a speedometer. Kinematic and kinetic variables were collected using pressure insoles (Medilogic). Variables monitored: pressure on insole, time of step cycle phase, area of load at contact phase.

Results: The values of the mean pressure increased significantly in both groups in the forefoot (OB by 13.3%, A by 8.1%), while a significant decrease was observed in the rearfoot (OB by 42.3%, A by 26.7%) up to maximum velocity. The maximum pressure increased significantly in the forefoot up to the highest velocity (OB by 29.5%, A by 27.5%). The relative size of the foot area under load in the support phase decreased significantly with increasing velocity in the rearfoot (OB by 6.7%, A by 19.7%), while the size remained approximately the same in the forefoot (change, OB by 1.5%, A by 0.4%). Step cycle time and contact phase decreased significantly in both groups with increasing speed (OB by 31.8%, 46.9% respectively, A by 31.4%, 47.0% respectively) with no significant difference between the groups (p = 0.93, p = 0.59 respectively).

Conclusion: The plantar pressure decreases and the reduction in the loaded area in the rearfoot document a transition to a swing running style that is more dynamic and faster. The differences in pressure and area values document a different running technique at the observed running speeds of both groups, which is influenced by training in different environments.

Keywords: kinematics, kinetics, technique, pressure insoles, run

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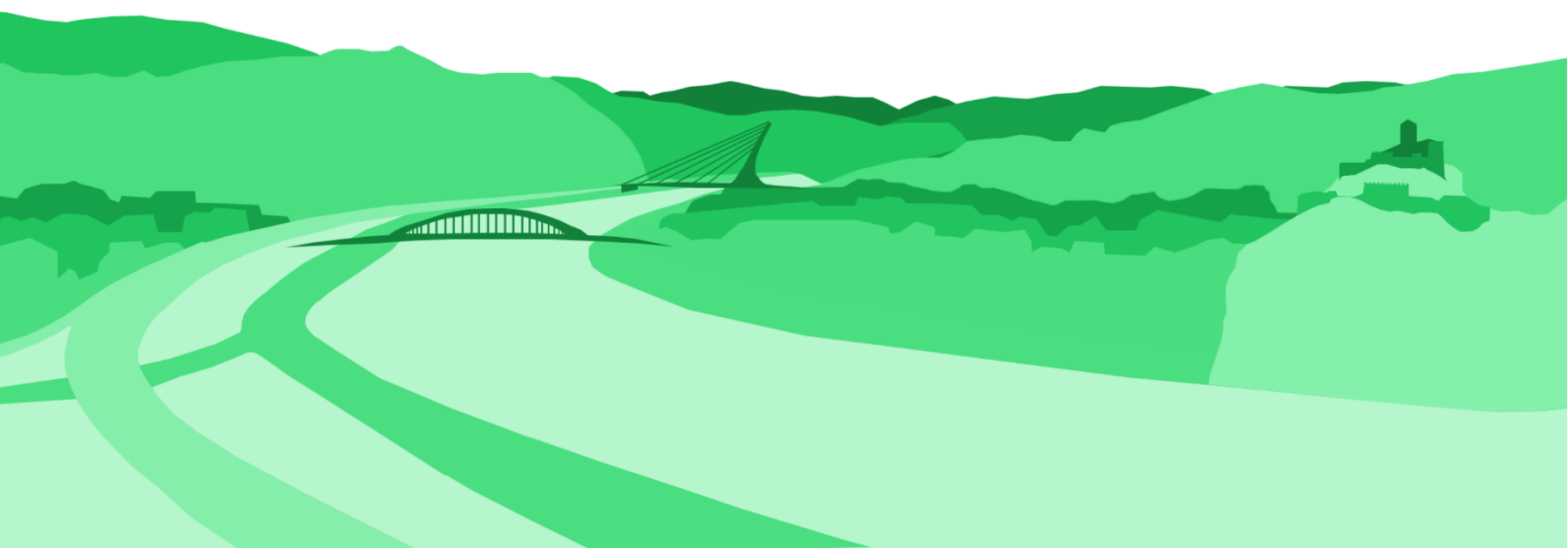
Author for correspondence: Pavel Korvas (pkorvas@vutbr.cz)

Session IV



THE EFFECTS OF COACH-CREATED MOTIVATIONAL CLIMATE ON ENGAGEMENT AND TEAM COHESION IN RHYTHMIC GYMNASTICS

Bianca Maria Laroëre[1], Jiří Mudrák[2], William Crossan[3], Vít Třebický[1]

[1] Department of Gymnastics and Combat Sports, Faculty of Physical Education and Sport, Charles University, Czech Republic
[2] Institute of Psychology, Czech Academy of Sciences, Czech Republic
[3] Department of Sports Management, Faculty of Physical Education and Sport, Charles University, Czech Republic

Purpose: Coaches play a crucial role in the training and development of athletes. Rhythmic gymnastics involves a complex and specific training process through which coaches can help shape athletes' gymnastics journeys and training atmosphere, either positively or negatively. This study aimed to investigate athletes' perception of the coach-created motivational climate in rhythmic gymnastics and its relation to the athletes' motivational and social outcomes. We hypothesised that an empowering climate would be positively related to athletes' engagement and team cohesion.

Material & Methods: A total of 88 adolescent rhythmic gymnasts (49% national, 43% international, and 8% recreation-level athletes) completed an online survey consisting of basic demographics and standardised questionnaires about athletes' perceptions of motivational climates, sports engagement, success, and social cohesion (e.g., Athlete Engagement Questionnaire).

Results: In two regression models, autonomy-supportive (β = 0.425, p < 0.001) and task-involving climates (β = 0.309, p = 0.004) were positively related to engagement. Autonomy-supportive (β = 0.310, p = 0.017) and socially supportive climates (β = 0.307, p = 0.022) were positively related to team cohesion. K-means clustering divided participants into two groups: Cluster 1 (n = 31) exhibited higher scores in ego-involving (0.839) and controlling coaching (0.696), while Cluster 2 (n = 57) had higher scores in task-involving (0.448), autonomy-supportive (0.588), and socially supportive climates (0.462).

Conclusion: Empowering climates with high autonomy support and task involvement were linked to higher engagement and team cohesion. Participants were categorised as "empowered" and "disempowered" gymnasts. Consistent with our predictions, coaches who emphasise autonomy and task orientation while avoiding social comparisons and control may enhance athletes' positive sports experience.

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Keywords: motivation, performance, psychology, training

Author for correspondence: Bianca Maria Laroëre (bianca.maria.laroere@ftvs.cuni.cz)

THE EFFECT OF INDIVIDUALIZED HIGH-VELOCITY RESISTANCE TRAINING ON FUNCTIONAL, NEUROMUSCULAR ADAPTATION, AND HEALTH OUTCOMES IN OLDER ADULTS

Itai Har-Nir[1], Jana Pelclová[1], Ayelet Dunsky[2]

[1] Palacký University Olomouc, Czech Republic
[2] Levinsky-Wingate Academic College, Israel

Purpose: The world population is ageing. which encloses many health challenges that related to decline in muscle mass, strength and power loss. Muscle power, considered an essential component positively affecting functional performance and well-being among older adults, is the result of Force-Velocity. Although improving muscle power through resistance training shows great promises in healthy and frail population, the exact prescriptions and individualized power training loads remains unclear. Previous research in young adults and athletes showed that prescribing power training loads according to individual force-velocity curve characteristic might be more effective than using generalized loading scheme (e.g., % of 1RM). However, findings in older adults may differ, likely due to limited training protocols and equipment. The main aims of this Doctoral thesis are 1) to evaluate the neuromuscular responses to individualized power training prescription; 2) to assess the ability of functional tests to identify the promised benefits of Power training; and 3) to identify interaction between the proposed training protocol and health-related behavioral outcomes.

Material & Methods: A randomized controlled trial with 80 healthy subjects aged 65–75 will be conducted. Subjects will be divided into three resistance training groups: 1) maximal velocity with loads adjusted by RM (RM_{adj}); 2) maximal velocity with loads adjusted by individual force-velocity curve (V_{adj}); and 3) a control group. All subjects will undergo a battery of functional testing and force velocity curve analysis (Bench press & RDL). Moreover, approximately 10 subjects from each group will undergo neurophysiological and morphological testing (EMG, DEXA, Ultrasound) and follow-up tests will be conducted to evaluate health-related behavioral changes.

Results: It is anticipated that V_{adj} training will be superior in improving functional capabilities, Neuromuscular adaptation and Health outcomes in older adults.

Conclusion: The current Study's results might refine training prescription and clarify the neuromuscular and morphological characteristics needed to improve functional capacity and resist external balance perturbation.

Keywords: force-velocity, power, resistance training

Author for correspondence: Itai Har-Nir (itai.harnir01@upol.cz)

ARE THE SHOULDER JOINT FUNCTION, STABILITY, AND MOBILITY TESTS PREDICTIVE OF HANDSTAND EXECUTION?

Roman Malíř, Jan Chrudimský, Adam Provazník, Vít Třebický

Faculty of Physical Education and Sport, Charles University, Prague, Czech Republic

Purpose: The handstand is a basic element common across gymnastic disciplines and physical education classes, frequently evaluated for quality in competition or skill acquisition. The correct handstand execution relies on maintaining balance, for which the shoulders seem particularly important. This study explores the relationship between shoulder joint function and the quality of handstand execution.

Material & Methods: We assessed the shoulder joint function in novice college athletes (n = 111; aged 19–23 years) using standardized field tests (Upper Quarter Y Balance Test and Closed Kinetic Chain Upper Extremity Stability Test) and evaluated handstand execution on the E-score rating scale.

Results: Ordinal logistic regression models showed no statistically discernible relationship between the quality of handstand execution (E-score) and measures of shoulder joint stability (POR = 0.97 [0.91, 1.03]) or mobility (1.00 [0.91, 1.09]) in our sample.

Conclusion: Two major factors may have caused an observed pattern of results. Firstly, the standardized tests assess shoulder joints in different loads and ranges of motion compared to handstands. Secondly, our novice sample could not perform the handstand sufficiently well. In our sample of novice college athletes, shoulder function seems unrelated to handstand execution as other latent factors hindered their performance.

Funding: This study was supported by the Cooperatio Programme, research area Sport Sciences – Biomedical & Rehabilitation Medicine (SPOB) and by SVV 260 731/2023.

Keywords: gymnastics, quality of movement, physical education, upper extremity

Author for correspondence: Roman Malíř (roman.malir@ftvs.cuni.cz)

FRILUFTSLIV LITERACY – A CONTRIBUTION TO PHYSICAL LITERACY FOR HEALTH THROUGHOUT THE LIFE COURSE

Eivind Sæther, Idar Lyngstad

Nord University, Norway

Purpose: This presentation discusses the concept "friluftsliv literacy" (outdoor activity literacy) in relation to physical literacy for health throughout the life course.

Material & Methods: We obtained stories and interview data from elderly people who could help us by providing insights into friluftsliv literacy through a number of life phases. The research questions were: What can articulate aspects of friluftsliv literacy from the perspective of experienced friluftsliv practitioners and generate understandings of friluftsliv literacy from childhood to old age, and how can friluftsliv literacy contribute to the conceptualization of physical literacy for health throughout the life course? We designed the study according to a constructionist research tradition and followed six analytical steps of reflexive thematic analysis of the interview data. We developed four themes from the data material and argue that friluftsliv literacy includes an existential phenomenological and idealist dimension in the way it offers a view on the active subject in friluftsliv through the various life phases and promotes nature experiences through the whole life.

Results: Moreover, friluftsliv literacy promotes "pure" friluftsliv experiences based on internal motivation and desire, voluntariness, and freedom. We also argue that throughout the life course friluftsliv literacy promotes important social values, especially within family contexts, social values that enhance the quality of life. Friluftsliv literacy also includes a pragmatic dimension and contributes to the conceptualization of physical literacy for health in the way that it promotes people learning to like friluftsliv at a young age, an attitude that can then be nurtured and maintained throughout one's entire life by practicing friluftsliv and adapting to individual capacities and life phases.

Conclusion: We conclude by stating the following: Nature can be experienced almost everywhere in the world, it is accessible around the clock, and adventures in nature combined with physical activity are free for all.

Keywords: friluftsliv, health throughout the life course, physical literacy

Author for correspondence: Eivind Sæther (eivind.sather@nord.no)

THE DIFFERENCE IN THE MAXIMUM FORCE OF THE ROUNDHOUSE KICK BETWEEN FREE EXECUTION AND REACTION TO A VISUAL STIMULUS

Radim Pavelka, Tereza Cvingerová, Vít Třebický

Department of Gymnastics and Combat Sports, Faculty of Physical Education and Sport, Charles University, Czech Republic

Purpose: An important factor in combat sports is the force used to deliver strikes. The roundhouse kick, a prominent technique in full-contact combat sports, can score points or lead to knockouts when executed with high force. Several variables impact the peak force of a roundhouse kick, including lower limb position or distance from the target. Previous studies have typically measured forces in laboratory conditions, where participants perform at their own pace. However, in actual fights, techniques are performed in response to opponents' actions. This study aims to examine the differences in roundhouse kick peak forces when performed freely and in response to a visual stimulus.

Material & Methods: 42 full-contact combat sports athletes (27 men) performed five roundhouse kicks with maximal force into an Aqua training bag with a force sensor. The athletes performed under two randomized conditions: in the control condition, they kicked freely at their own pace, and in the experimental condition, they reacted to a visual stimulus (BlazePod). They rated their perceived exertion (RPE) between each trial.

Results: Using two-way RM ANOVA, we found statistically discernible main effects of the condition and athletes' sex. Kicks under the free condition reached a higher peak force than the reaction condition, and men reached a higher peak force than women. The RPE between the conditions differed discernibly, with the free condition reaching higher exertion. The RPE was discernibly positively correlated with peak forces only in the free condition.

Conclusion: Our findings indicate that when performing roundhouse kicks under conditions simulating a real fight, the maximum forces exerted are reduced. Athletes and trainers should consider incorporating striking technique training that focuses on responding to stimuli, as this can enhance consistency and effectiveness in combat.

Funding: Supported by the Cooperatio Program, research area SPOB.

Keywords: combat sports, high kick, martial arts

Author for correspondence: Radim Pavelka (radim.pavelka@ftvs.cuni.cz)

MCARDLE DISEASE AND CARBOHYDRATE INGESTION BEFORE EXERCISE: TIMING ON EXERCISE TOLERANCE, CLINICAL RELEVANCE, AND APPLICATION TO REAL WORLD SETTINGS

Sam L. Torrens[1,2], Evelyn Parr[3], Craig Mcnulty[1], Lynda Ross[1], Helen L. MacLaughlin[1], Robert A. Robergs[1]

[1] Queensland University of Technology, Brisbane, Australia
[2] University of Jan Evangelista, Usti nad Labem, Czech Republic
[3] Mary Mackillop Institute for Health Research, Australian Catholic University, Melbourne, Australia

Purpose: McArdle disease (MD) is a rare (1:100,000) genetic myopathy whereby the enzyme glycogen phosphorylase is not expressed in skeletal muscle, resulting in the blockage of glycogenolysis and presents as physical activity intolerance. To circumvent the blockage in glycogenolysis, current clinical practice guidelines advise individuals with MD (IWMD) to ingest 37 g of sucrose 5–10 minutes before undertaking exercise to alleviate exercise induced symptoms. More recent research suggests that this management method has poor correlation with positive outcomes when transferred from lab-based settings to real world settings (RWS).

Material & Methods: Following dietary and exercise controls five IWMD undertook randomized repeated measure clinical exercise trials to compare exercise tolerance under different timing of sucrose ingestion before exercise (carbohydrate ingestion 5-minutes before exercise, 25-minutes before exercise, and a placebo zero carbohydrate condition).

Results: Results showed significantly higher plasma glucose availability at the beginning of exercise when sucrose was ingested 25-minutes before exercise (7.5 ± 0.8 mmol·L^{-1}) compared to 5-minutes before exercise (5.6 ± 0.3 mmol·L^{-1}, $p = 0.024$) or a placebo (5.3 ± 0.4 mmol·L^{-1}, $p = 0.017$). Peak heart rates we significantly lower when sucrose was ingested 25-minutes before exercise (117 ± 14 beats·min^{-1}) compared to 5-minutes before exercise (129 ± 14 beats·min^{-1}, $p = 0.022$) or a placebo (135 ± 20 beats·min^{-1}, $p = 0.039$) which contrasts with recommendations in current clinical practice guidelines.

Conclusion: The ingestion of sucrose (carbohydrate) before exercise for IWMD may provide statistically significant improvements in exercise tolerance in lab-base settings, but its clinical relevance and application to RWS is likely negligible based on the extremely low power outputs achieved by IWMD during lab studies.

Keywords: carbohydrate ingestion, clinical relevance, exercise, McArdle disease

Author for correspondence: Sam Torrens (sam.torrens@qut.edu.com)

THE EFFECT OF CAFFEINE ON THE MAXIMUM STRENGTH OF COMPLEX EXERCISES

Vít Třebický, Daniel Šťastný

Department of Gymnastics and Combat Sports, Faculty of Physical Education and Sport, Charles University, Czech Republic

Purpose: Caffeine is a stimulant commonly used to enhance sports performance, including maximal strength in both aerobic and anaerobic exercises. While research indicates caffeine's positive effects on both upper- and lower-body strength, evidence of its impact on full-body exercises and maximal intermittent strength remains inconclusive. This pre-registered study investigated the effects of caffeine (3 $mg \cdot kg^{-1}$) on maximal isometric strength in complex exercises, including isometric bench press, isometric mid-shin pulls, and maximal intermittent strength in isometric mid-thigh pulls.

Material & Methods: Thirty-six men completed three sessions: baseline, caffeine, and placebo. Peak force was measured for each exercise in all sessions.

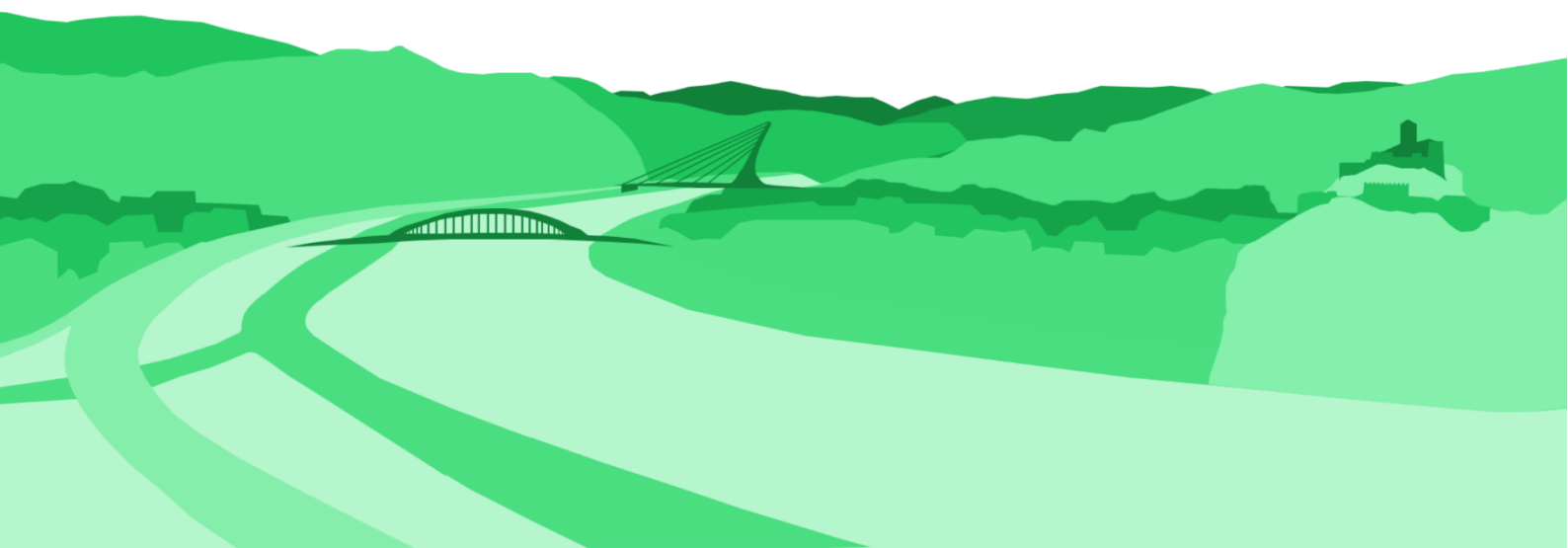
Results: Sixty-nine percent of participants correctly identified the caffeine condition. The results showed no statistically discernible difference between caffeine and placebo for the isometric bench press, while for isometric mid-shin pulls, we found a statistically discernible improvement in performance (Cohen's $d = 0.3$, $p < 0.001$). For isometric mid-thigh pulls, caffeine had a statistically discernible positive effect on the peak force compared to placebo (Cohen's $d = 0.17$, $p < 0.001$) but no effect on the rate of performance decline across repetitions. No statistically discernible differences in caffeine's ergogenic effects were found between upper-, lower-, and full-body exercises ($p > 0.05$).

Conclusion: Our findings suggest limited ergogenic benefits of caffeine for acute maximal isometric strength gains, particularly in complex movements, thus challenging the assumption of its universal effectiveness. The study underscores the need for research based on larger samples to verify caffeine's ergogenic effects. The small samples in current studies probably lack the sensitivity needed to observe caffeine’s true effects, thus limiting the generalizability of the findings.

Keywords: deadlift, isometric strength, sports supplement, stimulant, pre-workout

Author for correspondence: Vít Třebický (vit.trebicky@ftvs.cuni.cz)

Session V



EFFECT OF CONCENTRATED OXYGEN (99.5%) ON VISUAL SIMPLE AND CHOICE REACTION TIME IN SPORT ACTIVE STUDENTS

Štefan Balkó[1], Josef Heidler[2], Lukáš Vavřinec[1], Denisa Černá[1], Iva Balkó[1]

[1] Department of Physical Education and Sport, Jan Evangelista Purkyně University in Ústí nad Labem, Czech Republic

[2] Department of Sports Science and Clinical Biomechanics, University of Southern Denmark

Purpose: Athletic performances across different sports are drawing near the peak of human potential. However, especially in sports where small margins determine the outcome, it is essential to keep pushing boundaries and seek ways to improve performance. This study aims to determine if inhaling concentrated oxygen impacts the reaction time of sports students.

Material & Methods: 16 male student-athletes (22.2 ± 2.2 years old) participated in the study. The Fitronic Reaction Check system (Fitronic, s.r.o., Slovakia) measured visual simple reaction time (SRT, one stimulus) and visual choice reaction time (CRT, two stimuli). The study involved a double-blind experiment to determine the values of SRT and CRT when inhaling concentrated oxygen at 99.5% or a placebo. The measurements were conducted in two sessions with a three-week interval to minimise the mpact of practice.

Results: Based on the input and output tests comparison, it was found that concentrated oxygen significantly improved the SRT values ($p < 0.01$, rrb = 0.74). Even though CRT was also improved, the difference was not considered as significant. When the test subjects inhaled from a vessel without concentrated oxygen (placebo), no significant difference in SRT and CRT values was found between the input and output tests.

Conclusion: The research indicates that inhaling concentrated oxygen can enhance SRT, which is crucial in combat sports such as fencing and boxing, where athletes must rapidly process visual information from the environment. However, improving CRT, which involves quick decision-making based on environmental information or multiple stimuli, requires more than inhaling concentrated oxygen. These findings are significant for athletes and coaches, especially in sports where the response to a simple stimulus is crucial.

Keywords: decision making, information processing, sport performance

Author for correspondence: Štefan Balkó (stefan.balko@ujep.cz)

METHODOLOGY FOR EXAMINING PLAYER DECISION-MAKING SKILLS IN TEAM SPORTS – A SYSTEMATIC REVIEW

Pavol Horička, Bianka Bodnárová, Ľubomír Paška, Andrea Paprancová

Department of Physical Education and Sport, Faculty of Education, Constantine The Philosopher University in Nitra, Slovakia

Purpose: Decision-making, a perceptual-cognitive process, is a fundamental element of athlete performance in many team sports, especially in open, dynamic sports where decision-making is limited in time. While there are no systematic and comprehensive methods to evaluate an athlete's decision-making skills, several methodological procedures can be applied to sports games. This study aims to provide an overview of these applied methodological procedures for examining athlete decision-making skills.

Material & Methods: The primary method of research was content analysis of data. A systematic search was conducted in the month of 6/2024 using the following databases: Web of Science (all databases), Scopus, and PubMed. The "advanced search" option was performed in these databases using article titles, abstracts, and keywords. The search terms included: "sports games," "referee," "decision-making," "performance and decision-making," "assessment of decision-making skills." The general English search term was "Decision making," and the German term was "Entscheidung." To be included in the analysis, the articles had to be primary studies and examine the qualitative aspects of decision-making skills. The remaining articles were integrated into the report.

Results: The methods of investigation were primarily limited to a few common measurement protocols: 1) Observation and video analysis: The performance indicator, accuracy of decision-making, was assessed using a multi-point scale assigned by experts. 2) Simulations (video simulations, CoR assets) and model situations: Evaluation of decisions based on defined conditions of the game situations. 3) Questionnaires and interviews (MDMQ) and self-assessment tools. 4) Perceptual-cognitive tests: Tests of visual attention, anticipation, and memory (Vienna Test System). 5) Sensory and biometric recordings: Biomechanical and localization sensors, environmental sensors. 6) Eye-tracking analysis. 7) Experimental methods with controlled conditions: Application of nonlinear pedagogy and training scenarios. 8) Multidisciplinary approach.

Conclusion: Sport should be viewed as a behavioral context that reveals how athletes transform information into decision-making actions in specific situations. Currently, there is no uniform and comprehensive method for evaluating decision-making applicable across all sports disciplines, considering the specific conditions of each sport and combining the primary factors examining the nature of decisions. Future research on decision-making in sports must consider both dynamic and deterministic perspectives regarding knowledge and action.

Funding: This paper was supported by the VEGA scientific grant No. 1/0140/22 entitled "Evaluation of the decision-making functions of an athlete in selected team and individual sports."

Keywords: decision making, methodology, sport games

Author for correspondence: Pavol Horička (phoricka@ukf.sk)

COOPER'S TEST AS A PREDICTOR OF HANDGUN SHOOTING PERFORMANCE UNDER THE INFLUENCE OF ACOUSTIC STRESS

Roman Markovič, Peter Žiška, Peter Melek, Andrea Handlovská

Department of Physical Education and Sport, Armed Forces Academy of General Milan Rastislav Štefánik in Liptovský Mikuláš, Slovakia

Purpose: is to determine if there is a relationship between performance in the Cooper test and shooting accuracy under the influence of acoustic stress, and to evaluate to what extent aerobic detection ability can predict the ability to maintain accuracy and shooting stability under stressful conditions.

Material & Methods: In a pilot study, we used a simple pedagogical experiment with 30 cadets (23 men and 7 women). The experiment consists of two parts. In the first part, the cadets completed two shooting exercises with a pistol vz. 82 for target no. 4, while the shooting was conducted while standing without support from a distance of 15 meters. The first round was conducted under conditions of minimal stress, the second round took place under the influence of acoustic stress in the form of firing from a long gun Sa vz. 58 at a distance of 3 meters. In the second part, we determined the level of aerobic abilities using the Cooper test (12-minute run), while the cadets were divided into 2 performance groups based on the minimum performance in the evaluation of the Physical Education subject, which is the performance of 2600 m.

Results: In the 1st performance group (2230–2600 m), we noted a significant deterioration by 31.5% in shooting accuracy with a large effect size ($p \leq 0.01$, $d = 1.02$), after exposure to acoustic stress. In the 2nd performance group (2610–3380 m), there was no significant change in shooting accuracy under the influence of acoustic stress, deterioration was 5.8%.

Conclusion: Research results that better performance in the Cooper test is associated with higher resistance to acoustic stress and retention of accuracy. Cadets with low aerobic stability (1st performance group) experienced a significant decrease in shooting accuracy under the influence of acoustic stress, while cadets with higher aerobic fitness (2nd performance group) were able to maintain shooting accuracy even under stressful conditions. This points to the importance of aerobic performance as a predictor of the stability of shooting performance in stressful situations.

Keywords: acoustic stress, shooting, endurance, cadets

Author for correspondence: Roman Markovič (roman.markovic@aos.sk)

COMPARATIVE ANALYSIS OF CURRICULAR ASPECTS OF HEALTH LITERACY IN SELECTED EUROPEAN COUNTRIES

Daniel Příhoda

Jan Evangelista Purkyně University in Ústí nad Labem, Czech Republic

Purpose: The reason for this research is the deteriorating level of health of children which, according to preliminary research, is occurring on a global scale, including in the Czech Republic. This comparative analysis aims to find out how the health literacy standards in the chosen countries' curricula differ from the Czech Republic.

Material & Methods: Research in the field of children's health literacy in European countries determined a list of countries based on results. For this analysis 4 countries were chosen, the top 2 countries with the best health literacy Macedonia and Finland, and the bottom 2, including the Czech Republic. Firstly, a textual analysis of the Czech national curriculum was performed and from this, categories of specific topics were created. On this basis, textual analysis and the other countries' curricula were also carried out.

Results: The Czech curriculum has the most curriculum content and focuses on the safety of all chosen countries. Turkey and Finland focus more on critical thinking and environmentalism because they do not separate it from health in their curriculum. However, except for Macedonia, none of the countries surveyed have health education as a specific subject and thus it is not possible to determine with certainty whether the health topic is sufficiently addressed in the schools of the other countries. The Macedonians have the subject of health linked to physical education thematically and in the title of the subject itself.

Conclusion: Overall, it can be said that the Czech curriculum has the best-developed curriculum content with a wide range of curriculum content covering important aspects of health. Thus, further research is needed to find out what is the actual situation of teaching health topics at lower primary school levels in the Czech Republic and other countries. However, the Czech curriculum could be more focused on mental health, work with emotions, and linking health with movement, following the example of selected countries with better results.

Keywords: health education, health literacy, national curriculum

Author for correspondence: Daniel Příhoda (prihodadany@gmail.com)

HEALTH AND HEALTH-ORIENTED FITNESS OF STUDENTS IN PRIMARY EDUCATION IN THE HORNÁ NITRA REGION

Robert Rozim

Department of Pre-School and Elementary Pedagogy, Faculty of Education, Catholic University Ružomberok, Slovakia

Purpose: Horná Nitra is considered a region with significantly disrupted environmental conditions, which poses an environmental burden and represents a serious risk to human health, the effects of which persist to this day. The environment is a key determinant of human health. According to estimates from the World Health Organization (WHO), nearly one in four deaths globally (approximately one in six in Slovakia) is associated with an environment that is unsuitable for human health. The aim of the study is to determine the opinions of 4th-grade students on health issues as well as their current level of health-oriented fitness and body posture.

Material & Methods: The research sample consisted of 292 4th-grade elementary school students (172 boys and 120 girls) from 8 elementary schools (5 urban and 3 rural). Based on the responses from the questionnaire, we assessed the students' opinions on health and a healthy lifestyle. The health-oriented fitness of the students was evaluated based on the results of the BMI index and the Ruffier test. We assessed body posture using a standardized method for school practice.

Results: Overweight and obesity affect 37.5% of girls (39.56% in urban areas and 37.93% in rural areas) and 31.39% of boys (38.91% in urban areas and 17.14% in rural areas). We recorded obesity and overweight (BMI index) and insufficient health-oriented fitness (Ruffier test) in 35.83% of girls and 26.37% of boys. Additionally, 27.61% of boys and 12.33% of girls from urban elementary schools do not enjoy sports activities. We also found poor and incorrect body posture in 69.8% of pupils.

Conclusion: Based on the results of the study, we can confirm an increase in the body weight of 4th-grade elementary school students in the Horná Nitra region and a decrease in health-oriented physical fitness. We also confirm body posture problems in schoolchildren. These findings require increased attention, especially considering the environmental burden of the region.

Funding: The listed study is part of the research project VEGA 1/0427/22 Prevention of pupils' postural health by physical activity.

Keywords: BMI index, body posture, health-oriented fitness, Ruffier test, school population

Author for correspondence: Robert Rozim (robert.rozim@ku.sk)

USE OF EYE TRACKING GLASSES IN JUNIOR ORIENTEERING TRAINING

Jan Šťastný, Marcel Skřivánek, Václav Kundera

Brno University of Technology, Centre of Sports Activities, Czech Republic

Purpose: In orienteering, there are limited opportunities to provide feedback and correct athletes' mistakes during the training process. An example of this is individual map training, which often takes place in obscure terrain out of the direct line of sight of the coach. The evaluation of the training session is usually done by plotting route choices on maps, using 'shadowing' by the coach, or recording trajectories using GPS technology. In our research, we tested the use of eye tracking goggle technology in the training process. This can now be used without a computer connection and can be worn outside the laboratory, i.e. during outdoor sports. We expected this training method to be most effective in the age groups where athletes are already moving independently, practising more challenging off-road techniques and strengthening basic skills.

Material & Methods: The research was conducted on 10 participants of one training group (6 girls and 4 boys), 10–12 years old, with at least 3 years of orienteering experience. Pupil Labs Invisible goggles were used for data collection and Garmin Forerunner 945 watch was used for route recording.

Results: We found that it is possible to observe map and compass handling (map manipulation, map orientation, map tracking efficiency), spatial orientation (route and environment observation) landmark search, route choice, and intensity of movement (running/walking/standing). It is also possible to evaluate time parameters and delays, the proportion of map tracking with compass, path (terrain and obstacles), landmarks, distractions (e.g. animals, opponents, …).

Conclusion: The use of eye tracking in orienteering has been very successful in our research. Eye tracking can provide detailed information that a coach would not normally be able to easily obtain. It can be linked with other tools to assess error correction performance – for example, integration with visualization of GPS tracks on a map (Livelox and similar apps), or tracking physical performance using heart rate.

Keywords: eye tracking, junior, kids, orienteering, training

Author for correspondence: Jan Šťastný (jan.stastny@vut.cz)

MOVEMENT PERFORMANCE AND BODY FAT OF PROFESIONAL SOLDIERS

Peter Žiška, Roman Markovič, Peter Melek

Department of Physical Education and Sport, Armed Forces Academy of General Milan Rastislav Štefánik, Liptovský Mikuláš, Slovakia

Purpose: Movement performance is a complex of movement skills that are a key determinant of physical fitness. In our research, we investigated the influence of body fat (BF) percentage on the physical performance of professional soldiers. The movement performance evaluation scale for our age category and classification is 200 pts. = 1, 150 pts. = 2, 120 pts. = 3, under 120 pts. = 4 failed.

Material & Methods: During the years 2021–2024, we tested 435 male cadets (MC) (age: 21.30 ± 1.54 years; height: 1.81 ± 0.07 m; weight: 80.9 ± 9.9 kg) and 130 female cadets (FC, age: 20.80 ± 1.30 years; height: 1.68 ± 0.06 m; weight: 63.7 ± 8.0 kg), who are cadets at the Armed Forces Academy (AFA). We divided the set into 4 groups according to the percentage of BF in men and 3 groups in women, in which we compared performance in the Cooper test. For evaluation, we used an unpaired parametric T-test for the normal distribution of the file, we set the level of significance to $p \leq 0.01$. We used Cohen's d to verify significance.

Results: MC with a level of BF of 10–15% achieved an average performance 198.28 pts compared to cadets who had more than 20% BF, whose performance was lower at 167.98 pts, this difference 30.30 pts (18.03%) we confirmed by statistically ($p \leq 0.01$, $d = 1.14$). FC with a level of BF up to 20% achieved an average performance of 201.29 pts compared to FC who had more than 25% BF, whose performance was lower at the level of 22.39 pts, this difference pts (12.52%) we confirmed by statistically ($p \leq 0.01$, $d = 0.97$).

Conclusion: Research has shown a negative effect of excess BF on the movement performance of cadets. Maintaining a BF level of 10–15% for MC and below 20% for FC predisposes professional soldiers to meet the lower limit of 200 pts. assessment (grade 1) of movement performance. A higher percentage of BF reduces performance, and MC with a value above 20% and FC above 25% of BF are only able to achieve a rating (grade 2), which is still sufficient to meet the criteria for the physical performance of professional soldiers in Slovakia.

Funding: This research was carried out under the auspices of the Ministry of Defense of the Slovak Republic in cooperation with AFA within the framework of contacts (NI4200).

Keywords: armed forces, anthropometrics, condition, physical tests, soldiers

Author for correspondence: Peter Žiška (peter.ziska@aos.sk)

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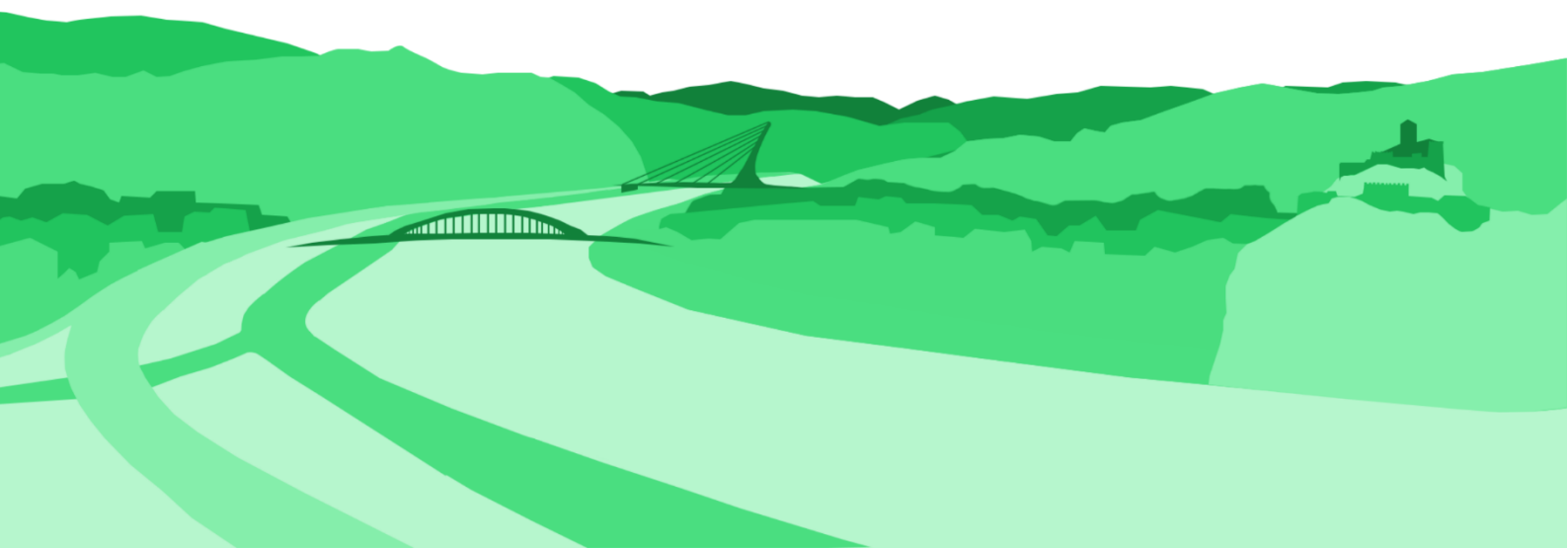

STUDENTS' EXPERIENCE OF BEING SEEN BY THEIR PHYSICAL EDUCATION TEACHERS AND GENDER DIFFERENCES

Marthe Bjerkan Næss, Pål Arild Lagestad

Nord University, Norway

Purpose: Previous research shows that there are five factors that need to be covered for the pupils to experience being seen; (1) the importance that the teacher cared; (2) feedback from the teacher; (3) that the student could show what he or she could do; (4) good dialogue with the teacher; and (5) pupil participations in evaluations and goals [1]. The aim of the study was to examine gender differences in experiencing the pedagogical term of being seen in physical education.

Material & Methods: The study included 412 students aged 16–19 (208 boys, 200 girls, and 4 student who did not report their gender), from different study programs. To achieve the purpose of the study, a questionnaire was developed, and factor analysis and correlation analysis were used to identify significant factors related to being seen. The questionnaire comprised 51 questions.

Results: The findings indicate very small variations between girls' and boys' answers, and the analysis showed no significant difference between girls and boys according to the experience of being seen (z = -0.3, p = 0.803). However, there were a significant difference between girls and boys experience of good dialogues with the teacher (z = -2, p = 0.047), where girls report higher levels. This factor stands out as the only factor where girls report higher levels than boys.

Conclusion: The findings show that there was no significant difference between girls and boys experience related to the pedagogical term of being seen. The analyses showed that there were no significant differences between girls and boys according to the experience of four of the five factors that earlier research has proven to constitute the phenomenon of being seen.

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Keywords: being seen, gender, high school, physical education, students

Author for correspondence: Idar Lyngstad (idar.k.lyngstad@nord.no)

HEART RATE DEFLECTION AND VARIABILITY CHANGES AS AN INDICATOR OF VENTILATORY THRESHOLD: INSIGHTS FROM SHUTTLE RUN TEST MEASUREMENTS

Jan Hnízdil, Martin Škopek, Lenka Vojtíková

Faculty of Education, University of J. E. Purkyně in Ústí nad Labem, Czech Republic

Purpose: The aim of this study was to investigate the relationship between heart rate deflection point (HRDP) and heart rate variability (HRV) changes during the shuttle run test and the ventilatory threshold (VT). Previous research has indicated a potential link between heart rate responses and ventilatory thresholds, prompting this exploration. The hypotheses tested were that a significant correlation exists between the point of deflection from linearity in heart rate and the ventilatory threshold, while no correlation would be found with heart rate variability (HRV) changes.

Material & Methods: The research sample consisted of 35 students (mean 22 years, *SD* = 0.45) who participated in the shuttle run test, during which heart rate deflection was measured using the Conconi method. Heart rate variability parameters were also recorded. Following the beep test (1 week), participants underwent a treadmill test to determine their ventilatory threshold.

Results: The results showed a strong correlation between the point of deflection from linearity in heart rate and the ventilatory threshold. Conversely, no significant correlation was found between heart rate deflection and changes in heart rate variability.

Conclusion: These findings suggest that heart rate deflection may serve as a useful indicator of the ventilatory threshold, while it does not encompass the complex changes in HRV. This highlights the importance of differential analysis of these parameters in assessing physical performance.

Keywords: Conconi method, heart rate deflection, heart rate variability, physical performance, ventilatory threshold

Author for correspondence: Jan Hnízdil (jan.hnizdil@ujep.cz)

ASSESSMENT FOR LEARNING, MOTIVATION AND PERFORMANCE IN PHYSICAL EDUCATION AT UPPER SECONDARY SCHOOL

Svein Olav Ulstad, Knut Skjesol

Nord University, Norway

Purpose: The purpose of the present study was to answer the following questions: What is the relationship between perceived assessment for learning (AFL) and satisfaction of the three basic psychological needs, autonomous motivation and performance in physical education?

Material & Methods: 237 students (99 boys and 138 girls) in 12 classes attending two different upper secondary schools answered on a questionnaire. Perception of Assessment for learning was measured with five items from Leirhaug, 2016. Need satisfaction was measured with The Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS). Motivation was measured with BREQ-2. Effort was measured with Motivated Strategies for Learning Questionaire (MSLQ) and performance in PE was measured by self-reporting grades.

Results: The results supported the process model in which students' perception of AFL positively predict their needs satisfaction, which positively predict students' self-report of autonomous motivation, which positively predict students' grades and effort in PE.

Conclusion: It is important that teachers use AFL as recommended by the Directorate of Education, which highlights that students should 1) understand what they are going to learn and what is expected of them, 2) receive feedback about the quality and performance of their work, 3) receive advice on how to improve, and 4) be involved in their own learning. On this study, we see that AFL based on these principles satisfy students' need for competence, autonomy and relatedness, which, in turn, is essential for promoting autonomous motivation in PE. Students who have autonomous motivation are more likely to have positive experiences related to PE, like showing more effort and performing better.

Keywords: assessment for learning, motivation, physical education

Author for correspondence: Svein Olav Ulstad (svein.o.ulstad@nord.no)

QUANTIFYING PHYSICAL ACTIVITY INTENSITY IN CZECH PRESCHOOLERS

Lenka Vojtíková[1], Jan Hnízdil[1], Martin Škopek[1], Hana Janošková[2]

[1] University of J. E. Purkyně in Ústí nad Labem, Faculty of Education, Czech Republic
[2] Department of Physical Education and Health Education, Faculty of Education, Masaryk University, Brno

Purpose: The promotion of physical activity in early childhood is essential for healthy growth and development. Preschools provide unique opportunities for physical activity through structured lessons and outdoor free play. However, the intensity of typical preschool activities has seldom been objectively quantified. This study aimed to analyze the physical activity intensity among Czech preschoolers aged 2–5 years, utilizing heart rate monitoring to provide evidence-based recommendations for early childhood physical activity programs.

Material & Methods: The study included 63 Czech preschool children aged 2–5 years. Physical activity intensity was monitored using the Polar Team2 system, which allows for efficient group measurement and recording of heart rate. The system comprises a chest strap and sensor that transmit real-time data wirelessly to a PC for detailed analysis. This methodology provided a precise, objective measure of the intensity of physical activities performed by the children during structured lessons and outdoor play.

Results: The analysis showed that the average heart rate during physical activities ranged from 130 to 150 beats per minute (bpm), indicating moderate-intensity physical activity. The highest heart rates were recorded during outdoor free play (mean 150 bpm), classifying this as vigorous-intensity activity. Younger preschoolers (aged 2–3 years) had significantly higher heart rates compared to older children (aged 4–5 years) ($p = 0.021$). Additionally, heart rates were significantly higher in girls than in boys ($p = 0.033$). These findings suggest that younger children and girls are more likely to engage in vigorous-intensity activity during outdoor play.

Conclusion: The study emphasizes the importance of incorporating daily outdoor free play in preschool routines to promote high-intensity physical activity, which is crucial for preschoolers' physical and developmental health. By providing an evidence-based assessment of activity intensities, this research supports the design of early childhood programs that prioritize vigorous physical activity, fostering significant developmental and health benefits during this critical growth period.

Keywords: early childhood, health and development, heart rate monitoring, outdoor free play, physical activity, preschool, vigorous-intensity activity

Author for correspondence: Lenka Vojtíková (lenka.vojtikova@ujep.cz)

PROGRESSIVE MUSCLE RELAXATION TRAINING EFFECT ON SPORTS PERFORMANCE OF INTERNATIONAL PARA-ATHLETES

Chanderkant Dhiman, B. C. Kapri

Department of Physical Education, Banaras Hindu University, Varanasi, India

Purpose: This research aimed to examine the effect of Progressive Muscle Relaxation training on the athletic performance of international para-athletes specializing in kayaking and canoeing. Progressive Muscle Relaxation is a method that focuses on alternating between muscle tension and relaxation.

Material & Methods: The study includes 20 international para-athletes in different para categories i.e., (KL3 and KL2 for Kayaking), and (VL2 for Canoeing), aged 25 to 32, who were randomly assigned to either an experimental group (EG) or a control group (CG), each consisting of 10 athletes. While both groups maintained a regular training routine, the EG also participated in Progressive Muscle Relaxation training five times per week for six weeks. The Repeated Measures Design was applied to monitor performance changes, and the data was evaluated using Repeated Measures ANOVA, with a level of significance set at $p < 0.05$.

Results: The analysis revealed a significant improvement in the performance of the experimental group compared to the Control Group in both sports. For kayaking, the F-value was 158.3 ($p < 0.001$), showing a significant enhancement in the performance of the experimental group. In canoeing, the F-value was 555.8 ($p < 0.001$), further proclaiming the positive influence of Progressive Muscle Relaxation. Weekly improvements were observed, with an interaction effect yielding F-values of 63.0 for kayaking and 67.2 for canoeing, indicating that the positive effects of Progressive Muscle Relaxation accumulated over time.

Conclusion: The research concluded that Progressive Muscle Relaxation training significantly boosts the performance of international para-athletes. Regular PMR practice led to improved focus, better stress management, and greater muscle relaxation, proving it to be a valuable supplementary training technique for athletes looking to enhance their performance.

Keywords: para-canoeing, para-kayaking, PMR, repeated measure design, sports performance

Author for correspondence: Chanderkant Dhiman (dhimanchandu@bhu.ac.in)

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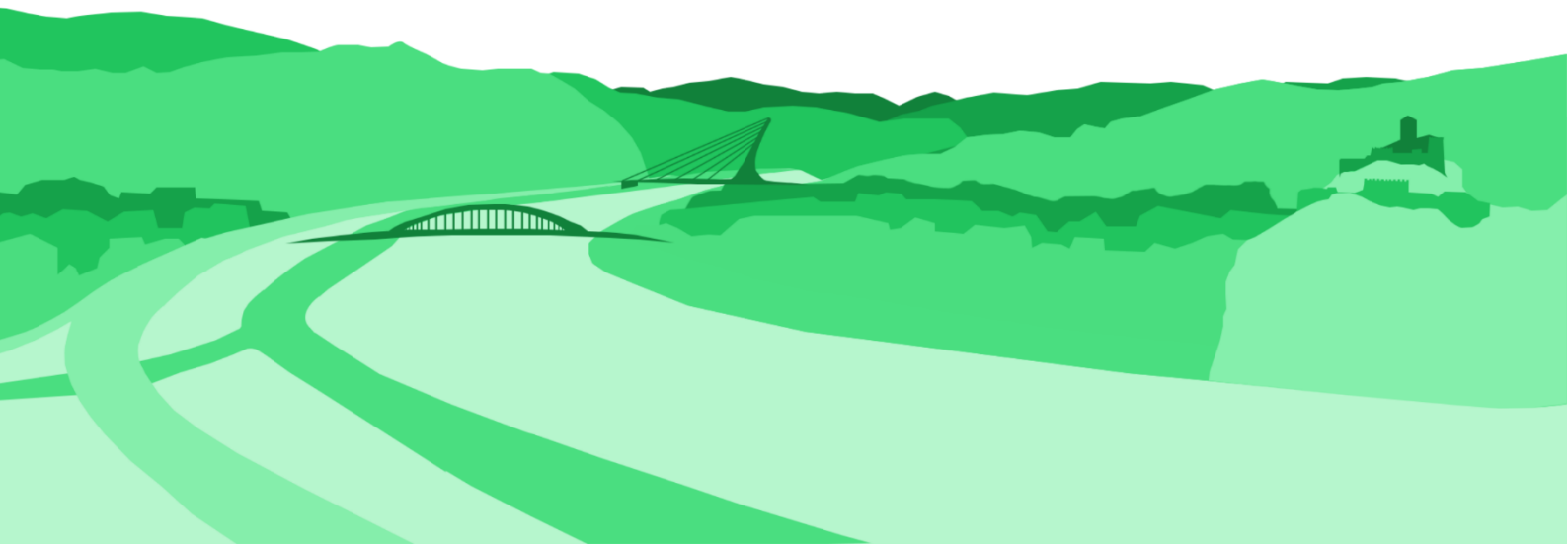

THE EFFECTS OF FOAM ROLLING ON LUMBAR MOBILITY RESTORATION FOLLOWING TRUNK MUSCLE FATIGUE IN SEDENTARY EMPLOYEES

Banafsheh Amiri, Erika Zemková

Department of Biological and Medical Sciences, Faculty of Physical Education and Sport, Comenius University in Bratislava, Slovakia

Purpose: This study investigates 1) the effect of foam rolling exercises on the recovery of fatigue-induced reduced lumbar mobility in sedentary employees, and 2) the relationship between lumbar curvature and mobility variables after fatigue and subsequent recovery.

Material & Methods: Eighteen sedentary adults (36.2 ± 8.1 years) participated in the study. Their sedentary behavior was assessed using the International Physical Activity Questionnaire. Participants performed Abt's fatigue protocol consisting of 8 core muscle exercises. Following this protocol, they underwent two types of recovery in separate sessions, active involving foam rolling and passive in the form of lying on a bed. Lumbar curvature in the upright position and the range of motion from extension to flexion were assessed using the Spinal Mouse before and after the fatigue protocol, immediately and 15 minutes after recovery modalities.

Results: After fatigue, lumbar mobility decreased from 75.86° to 68.41° (mean difference 7.45°, $p = 0.002$), and lumbar curvature from -35.66° to -34.83° (mean difference -0.825, $p = 0.004$). Foam rolling restored these values almost to pre-fatigue levels (mobility to 72.11° and curvature to -36), while passive recovery showed no significant changes. After 15 minutes, values slightly changed but did not differ significantly from those immediately post-recovery. The lumbar lordosis angle was highly correlated with the reduction in lumbar mobility under fatigue ($r = 0.63$) and moderate with its improvement after recovery ($r = 0.46$).

Conclusion: Foam rolling effectively restores lumbar mobility in sedentary employees from fatigue-induced impairment to almost pre-fatigue levels. Interestingly, individuals with higher lumbar lordosis experience more significant declines in lumbar mobility after fatigue and demonstrate greater improvements following foam rolling compared to those with lower lumbar lordosis.

Keywords: prolonged sitting, recovery modality, spinal mouse, workplace

Author for correspondence: Banafsheh Amiri (amirib1392@gmail.com)

TREND CHANGE ANALYSIS IN THE GAIT FOLLOWING UNICOMPARTMENTAL KNEE ARTHROPLASTY UTILIZING CAREN EXTENDED VIRTUAL ENVIRONMENT

Monika Błaszczyszyn[1], Agnieszka Szczęsna[2], Magdalena Pawlyta[3], Jarosława Szyszka[4], Zbigniew Borysiuk[1]

[1] Faculty of Physical Education and Physiotherapy, Opole University of Technology, Opole, Poland
[2] Department of Computer Graphics, Vision and Digital Systems, Faculty of Automatic Control, Electronics and Computer Science, Silesian University of Technology, Gliwice, Poland
[3] Polish-Japanese Academy of Information Technology, Warsaw, Poland
[4] Department of Orthopedics Surgery, Opolskie Center of Rehabilitation, Korfantów, Poland

Purpose: Unicompartmental knee arthroplasty (UKA) forms a recognized method that find common application in treating degenerative changes of the knee joint [1, 2]. Some researchers state that successful UKA procedure leads to the improvement of overall physical performance, but this is not synonymous with the improvement of gait patterns [3, 4]. The aim of the study was to perform functional gait assessment in patients following UKA with the use of a movable polyethylene insert and to analyze gait parameters using three-dimensional (3D) kinetic and kinematic parameters.

Material & Methods: Following the clinical study, 10 subjects were randomly selected for the analysis of kinetic and kinematic parameters during gait. Gait assessment was executed using virtual reality CAREN Extended system. In the scenario applied in this research, subjects performed a level walk through a virtual forest. The following synchronized time series was acquired during each pass for lower body: markers trajectories, joints angles, joints powers, forces, moments and ground reactions forces.

Results: The kinematic and kinetic gait analysis demonstrated differences in the distribution of forces, moments and angles in both lower limbs. In addition, each of the subjects was characterized by a different motion pattern and gait cycle in terms of body positions during walk.

Conclusion: Detailed biomechanical analysis of the lower extremities during gait activity showed differences between gait patterns, indicating the presence of an acquired, chronic gait pattern. The observations made make it possible to implement an individualized improvement program toward gait correction to return to daily activities.

Keywords: gait, knee arthroplasty, motion capture, virtual reality

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Author for correspondence: Monika Błaszczyszyn (m.blaszczyszyn@po.edu.pl)

THE ALARMING PREVALENCE OF SHOULDER INJURIES IN FEMALE CANOE SLALOM ATHLETES

Jan Busta[1], Adriana Morenová[2]

[1] Faculty of Physical Education and Sport, Charles University in Prague, Czech Republic
[2] Faculty of Education, Charles University in Prague, Czech Republic

Purpose: In the context of the scientific and methodological project Women in Canoe Sport, funded by Erasmus+ Sport, shoulder joint problems in top female canoe slalom athletes were detected as a critical issue. The study aimed to determine the prevalence of shoulder injuries in women and the type of injury.

Material & Methods: A research sample of all 25 Czech female canoe slalom athletes (K1 and C1 categories) of the highest performance level completed a detailed online questionnaire compiled by coaches and physiotherapists. The athletes with detected shoulder joint injuries were analysed for paddling technique and posture was assessed by a physiotherapist.

Results: Out of 25 Czech elite female canoe slalom competitors, serious shoulder joint problems were detected in 64% of them (16 competitors). Even 68% of them had to consult a doctor with shoulder joint problems, 4 racers (16%) even needed to have surgery with a subsequent recovery period of 6–12 months. The average age of the female athletes studied was only 20.3 ± 4.8 years, however, the average athletic age was already 12.1 ± 5 years. The most frequent problems were SLAP lesions, biceps tendon injuries, impingement syndrome, long head biceps tendonitis, rotator cuff ruptures and shoulder luxations. Postural deficits as well as improper paddling technique were detected in all the females with shoulder joint injuries.

Conclusion: The reason for the high prevalence of chronic, acute and combined shoulder problems is most often due to unilateral intense loading from an early age combined with improper paddling technique, faulty posture and improperly structured or no strength training. Therefore, we recommend intensive preventive cooperation with physiotherapists for female athletes from an early age with emphasis on posture, joint centration and optimal function of the shoulder complex. Furthermore, we recommend refinement of the paddling technique, where the main propulsive force should be generated mainly by the back muscles. We also point to the importance of systematic strength training with emphasis on strengthening the back and shoulder complex muscles. The alarming prevalence of shoulder injuries is highly the responsibility of youth coaches - their education in this area is necessary.

Keywords: canoeing, kayaking, white-water

Author for correspondence: Jan Busta (jan.busta@ftvs.cuni.cz)

EFFECTIVENESS OF SPEED-STRENGTH LOAD ON CHANGES IN SELECTED MOTOR SKILLS IN MEMBERS OF SLOVAK ARMED FORCES

Monika Czaková, Andrea Paprancová

Department of Physical Education and Sport, Faculty of Education, Constantine the Philosopher University in Nitra, Slovakia

Purpose: We report no studies regarding the effectiveness of speed-strength load on changes in motor skills of professional soldiers yet. Our work deals with the current topic of the exercise based on 90% of maximum power load and therefore we want to point out the importance of the inclusion of speed-strength load in the training process in members of Slovak Armed Forces. By involving the speed-strength load into the training, we can improve the functional and physical condition as well as soldiers´ efficiency and performance for example in the tactical shooting training. The aim was to determine effectiveness of speed and strength load on changes of dynamic parameters of the lower limbs in members of Slovak Armed Forces. A specialized program of speed-strength load has a significant effect on positive gains in dynamic parameters of the lower limbs in squat jump test with an Olympic bar.

Material & Methods: The research group consisted of 15 professional soldiers as an experimental group in 37.4 ± 5.6 average age, 174.8 ± 5.4 average height and 90 ± 10 kilograms. In the experimental set, we monitored the effectiveness of 6-week speed-strength load on the dynamic parameters of the lower limbs. The speed-strength load consisted of exercise with an olympic bar in the zone of 90% of the maximum power in 8 reps - 4 series with 2 minutes rest. We applied this load twice a week. Before the experiment, we performed the pre-test measurement using Tendo power analyser to calculate the power $P = W \cdot t^{-1}$ [W].

Results: In the test of maximal lower limb power in the squat-jump with an Olympic bar exercise, we recorded average values 996.53 ± 56.84 W in the pre-test measurement. At the end of the experiment, we performed the post-test measurement after 6 weeks and recorded the average values 1233.33 ± 80.07 W. We observed statistically significant differences between the pre-test and post-test measurements at the 1% level of statistical significance ($p = 0.00$; $p < 0.01$). We also observed a high material effect between the measurements ($d = 3.410$).

Conclusion: Our contribution is directed to the training of the armed forces in the context of improving the dynamics of the lower limbs, which can form the basis for special exercises in tactical shooting. Based on our results, we would like to point out the importance of the inclusion of speed-strength load in the context of enhancing the performance of members of Slovak Armed Forces, as a part of their physical training.

Funding: This research is part of the UGA V/2/2024 – Effectiveness of speed-strength load on changes in selected motor skills in members of Slovak Armed Forces.

Keywords: explosiveness, motor skills, Slovak Armed Forces, speed-strength load

Author for correspondence: Monika Czaková (mczakova@ukf.sk)

INTERNATIONAL EXPERIENCE IN IMPLEMENTING KEY STRATEGIES FOR IMPROVING PHYSICAL ACTIVITY OF THE WORKING POPULATION

Svitlana Indyka[1], Nataliia Bielikova[1], Anatolii Tsos[2]

[1] Sports & Health, Faculty of Physical Culture, Lesya Ukrainka Volyn National University, Lutsk, Ukraine
[2] Lesya Ukrainka Volyn National University, Lutsk, Ukraine

Purpose: The military aggression of russia has posed extremely difficult challenges for Ukraine. The situation in the country remains dynamic and unstable. Therefore, Ukraine requires a systematic strategic approach that will allow for minimizing risks, mitigating existing threats, and ensuring the long-term regeneration of human capital and the workforce. This is essential for post-war economic recovery and strengthening the country's resilience in the long term. Based on research results it is determined that a lot of things, in particular, direction and pace of further transformations in Ukraine in the post-war period, depend on the level and quality of life of the population. The quality of life in the human health context is determined by certain factors, among which the physical activity is as the leading one. Its lack is considered as the fourth leading factor risk of global mortality. The purpose of the study is to carry out an analysis of the international key strategies experience for improving physical activity of the working-age population.

Material & Methods: A semantic bibliography method followed by content analysis of research papers and e-resources have been used.

Results: Investigating the negative impact of physical activity lack on public health, World Health Organization (WHO) and the European Union (EU) reported global efforts to improve the situation by developing national programs and recommendations on the issue of increasing the levels of physical activity and reducing a sedentary lifestyle. Most of the member states already have, or currently have, physical activity recommendations, or some of them are being at the development stage.

Conclusion: There is a general trend the use of the WHO Global Recommendations, which indicates a common scientific consensus on the importance of physical activity and sustainable nature of these recommendations in the global health context. In addition, coordination of national health monitoring programs will allow monitor progress towards both national and global goals of physical activity and reduction of the sedentary lifestyle. It a significant component of assessment the effectiveness of national view and programs on solving issues related to the health of the nation.

Keywords: health, physical activity, recommendations, working population

Author for correspondence: Svitlana Indyka (indyka.svitlana@vnu.edu.ua)

AN INFLUENCE OF THE LEARNING PROGRAM FOR TEACHING THE SPORT OF FLOORBALL ON GAME SKILLS OF ELEMENTARY SCHOOL STUDENTS

Martin Izrael, Miroslav Holienka

Comenius University in Bratislava, Slovakia

Purpose: This research was conducted because of the growing interest in floorball in elementary schools in Slovakia, despite the fact that floorball is still on the curriculum as an optional sport. The aim of this research was to verify the influence of the learning program for teaching floorball on game skills of elementary school students. We set the following hypotheses: 1) Pupils in the experimental group will experience a significant increase in their performance in the area of gaming skills; 2) Pupils in the experimental group will experience significantly higher gains in gaming skills than pupils in the control group.

Material & Methods: The experimental group consisted of 20 boys and the control group consisted of 18 boys from the eighth and ninth grades of elementary school. The experimental factor in the form of learning program consisted of twelve lessons. The following control exercises were used to test the hypotheses: ball guidance, passing accuracy, shooting accuracy, shooting from the move. To test the hypotheses, we used the Mann-Whitney U test for independent samples and the non-parametric Wilcoxon test.

Results: In the outcome measures in the experimental group, we observed an average improvement of 0.81 [*s*] in the ball guidance; 1 [*n*] in the passing accuracy; 0.75 [*n*] in the shooting accuracy; 1.2 [*n*] in the shooting from the move. Under the first hypothesis, significant differences were found in 3 of the 4 control exercises. Under the second hypothesis, significant differences were found in 2 of the 4 control exercises.

Conclusion: The results of the research show that the designed learning program positively influenced the level of gaming skills and knowledge of the students in the experimental group and positive gains were recorded in all tests.

Keywords: floorball, game skills, older school age, learning program

Author for correspondence: Martin Izrael (martin.izrael@uniba.sk)

EVALUATION OF MOVEMENT ABILITIES OF MODERN GYMNASTS FROM THE GSK ÚSTÍ NAD LABEM SECTION

Hana Kabešová, Kateřina Křesánková

Department of Physical Education and Sport, Jan Evangelista Purkyně University, Czech Republic

Purpose: The research was conducted to determine whether there are differences between the performance classes of modern gymnastics. The aim of the work is to evaluate the movement abilities of modern gymnasts from the GSK Ústí nad Labem section. Four hypotheses were established in our work: 1) there is a significant difference in strength level tests between the free and combined program; 2) there is a significant difference in tests for mobility level between the free and combined program; 3) there is a dependency between the performed performance program and the level of running speed and acceleration; 4) there is a dependency between the performance program performed and the level of agility skills

Material & Methods: 20 modern gymnasts of younger school age engaged in the combined program were tested and 20 modern gymnasts of younger school age engaged in a free program of modern gymnastics were tested. Were tested using the Battery of Tests for the Assessment of Movement Skills in Sports Gymnastics. The battery of tests for the assessment of movement abilities in sports gymnastics is represented by a comprehensive overview of the movement abilities of female gymnasts. We started by comparing the results between combined program and free program in terms of strength and mobility. We then focused on tests of agility and speed, in which we investigated whether there was a relationship between these tests and the performance class performed by the gymnasts. To determine the difference, we chose mathematical-statistical methods that determine the difference between groups. We used the Mann Whitney U test for the calculation. Furthermore, substantive significance was calculated using Cohen's d. To analyze the effect of performance class on agility and speed tests, we used the Chi-square test. Material significance was calculated using Cramer's V.

Results: From the strength level results, we can state that no difference was demonstrated between the groups in tests dealing with strength levels. From the mobility results we can state that a difference between the groups was demonstrated in the mobility tests. Running speed and acceleration are related to the type of execution of the modern gymnastics program. Dexterity does not depend on the type of execution of the modern gymnastics program.

Conclusion: Assessment of movement skills should be carried out in every section of modern gymnastics. Based on the results of movement skills, we can correctly classify modern gymnasts into performance classes, which is very important for their future training process.

Keywords: flexibility, gymnastics, hypermobility, modern gymnastics, younger school age

Author for correspondence: Kateřina Křesánková (katerina.kresankova@seznam.cz)

IMPACT OF STRENGTH AND DANCE TRAINING ON ANTHROPOMETRIC, COGNITIVE, AND FUNCTIONAL FITNESS IN OLDER FEMALES

Matúš Krčmár, Matúš Guzman, Bohumila Krčmárová, Dominika Mokrá

Department of Physical Education and Sport, Faculty of Education, Constantine the Philosopher University in Nitra, Slovakia

Purpose: The aging population faces challenges in maintaining physical function, cognitive abilities, and overall health. While exercise promotes healthy aging, the optimal type of training for older adults is still under research. Strength training has been extensively studied for its positive effects on muscle mass, functional fitness, and body composition [1, 2], while dance training is increasingly recognized for its unique combination of physical and cognitive engagement [3, 4]. This study evaluates the effects of these two training modalities on various performance metrics in older females.

Material & Methods: Eighty participants were divided into strength training (ST, n = 40) and dance training (DT, n = 40) groups. The ST group had a mean age of 67.4 ± 4.56 years, weight 74.0 ± 14.7 kg, and height 1.63 ± 0.06 m. The DT group had a mean age of 65.3 ± 4.50 years, weight 76.9 ± 12.3 kg, and height 1.61 ± 0.06 m. The 12-week training program involved sessions twice a week for both groups. Participants were tested before and after the program on body composition (muscle mass, fat mass, visceral fat mass, phase angle, and waist-to-hip ratio), functional fitness (chair stands, arm curls, 8-Foot Up and Go, and 2-minute step test), and cognitive function (MoCA test). Statistical analyses included paired and independent T-tests with effect sizes (d).

Results: Both groups significantly decreased body weight and fat mass ($p < 0.01$) and improved MoCA test scores ($p < 0.05$), 2-minute step test, and 8-Foot Up and Go ($p < 0.01$) with medium to large effect size. The DT group showed significant improvements in the chair stand and arm curl tests ($p < 0.01$). Group comparisons revealed that the DT group achieved significantly greater improvements in the chair stand test compared to the ST group (12.6% vs. 0.30%, $p < 0.01$, d = -0.60).

Conclusion: This study demonstrates that both strength training and dance training significantly enhance body composition, functional fitness, and cognitive function in older females. Over 12 weeks, participants in both groups showed notable reductions in body weight and fat mass, along with improvements in cognitive performance and certain functional fitness tests.

Keywords: cognitive performance, dancing, physical fitness, resistance training

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Author for correspondence: Matúš Krčmár (mkrcmar@ukf.sk)

IMPACT OF AN MHEALTH INTERVENTION ON MOVEMENT BEHAVIOR AND HEALTH IN PREDIABETES AND TYPE 2 DIABETES PATIENTS

Kateřina Mališová[1], Jana Pelclová[1], Tomáš Větrovský[2]

[1] Faculty of Physical Culture, Palacký University Olomouc, Olomouc, Czech Republic
[2] Faculty of Physical Education and Sport, Charles University, Prague, Czech Republic

Purpose: The number of patients with prediabetes and type 2 diabetes is increasing [1], posing a public health challenge. Regular physical activity is an effective prevention and treatment [2], but patient compliance is low. The ENERGISED project has therefore developed an mHealth intervention that combines behavioral therapy, a mobile app, and monitoring devices. This PhD project evaluates its impact on patients' movement behaviors and cardiometabolic health and explores factors affecting its effectiveness.

Material & Methods: A 12-month multicenter randomized trial was conducted to promote physical activity in 340 patients with prediabetes and diabetes. Participants were randomized into control or intervention groups. Both groups received Fitbit devices; the intervention group also received six months of counseling and text messaging, followed by six months of automated text support. Movement was objectively measured using the Actigraph wGT3X-BT, worn continuously for seven days, with assessments at baseline, six months, and twelve months.

Results: We expect improvements in daily activity, reduced sedentary behavior, and enhanced cardiometabolic profiles.

Conclusion: If effective, the intervention could be integrated into primary care for Czech (pre)diabetes patients, offering potential public health benefits.

Funding: Funded by the Czech Health Research Council, Ministry of Health (grant number NU21–09–00007).

Keywords: behavioral therapy, prevention, walking

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Author for correspondence: Katerina Malisova (katerina.malisova01@upol.cz)

THE IMPACT OF RUNNING STEPS AND EXPLOSIVE POWER ON ACCELERATION SPEED IN YOUNG BASKETBALL PLAYERS

Peter Mitašík, Miroslav Vavák

Department of Athletics and Conditioning Training, Faculty of Physical Education and Sports, Comenius University in Bratislava, Slovakia

Purpose: The aim of this study is to verify the importance of running stride parameters and lower limb explosive power in increasing acceleration speed in young basketball players. It focuses on the first six running strides, as the literature emphasizes the importance of the 1st and 2nd strides and attempts to shorten the support phase of the running stride and lengthen the running stride [1]. Hypotheses: 1) A statistically significant relationship exists between running acceleration speed and contact time during the first six steps in U13 players. 2) A statistically significant relationship exists between running acceleration speed and step length during the first six steps in U13 players.

Material & Methods: The study involved 14 U13 basketball players with a minimum of two years in specialized speed training. Key metrics assessed included age, height, body mass index (BMI), running stride parameters, vertical jump, and acceleration speed. Kinematic data were collected using the OptoJump Next optical measuring system.

Results: There was a statistically significant correlation between mat contact time during the six strides and performance in a 15 m acceleration race. The relationship between stride length and acceleration speed was significant only for the first two strides.

Conclusion: The OptoJump Next device effectively captures kinematic data relevant to an athlete's running stride. This study emphasizes the need to focus on contact time and stride length when evaluating running parameters in basketball, an area that has received limited attention in existing literature.

Keywords: acceleration speed, biomechanics, OptoJump Next, track and field

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Author for correspondence: Peter Mitašík (peter.mitasik@uniba.sk)

COMBINED EVENTS AS ONE OF THE FACTORS OF SUCCESS IN ATHLETICS

Jiří Nechvátal, Martin Nosek, David Cihlář, Pavel Prchal

Department of Physical Education and Sport, Jan Evangelista Purkyně University, Czech Republic

Purpose: The success of Czech athletics at top events in the adult category has been on a downward trend in the last few years. The Czech Athletic Association is reacting to this and is trying to develop athletics for preschool children within the Athletics for Children project, as well as developing athletics for younger school-age children. The main topic is to increase the inclusion of combined events in the youth categories. Zuzana Hejnová, Barbora Špotáková, Nikola Ogrodníková and Jan Kudlička – all of them have devoted themselves to combined events in their youth categories. Are combined events an important factor for success in athletics? Our study aimed to investigate whether non-specialized sports training in youth categories, represented by competitive involvement in athletic combined events, has a positive effect on high performance in the adult category, i.e. participation in top sport events. Similarly, the study examined whether medals from youth peak events predicted participation in peak events in the adult category.

Material & Methods: The longitudinal research was based on the analysis of the database of the Czech Athletic Association, World athletics and European athletics. A total of 230 athletes from the Czech Republic who participated in youth top competitions (European or World Championships in the U16, U18 and U22 categories) during their sport career between 2007 and 2021 were included in the research. We analyzed in which discipline they were successful and at the same time we investigated whether they competed in athletic combined events in the youth categories. We defined success by participating in the top adult event (European Championships, World Championships, Olympic Games). On the other hand, we analyzed only participants in the top events in the adult category from 2014 to 2024 and investigated whether they participated in athletic combined events in the youth categories, whether they were successful and when they started athletics. We defined success as winning a medal from a peak event.

Results: Our study did not show a direct link between an all-round combined events training in youth categories and participation in top competitions. On the contrary, we found an association between winning a medal in youth categories and participation in a top event. Finally, we found that an early start of athletic training is not related to success at top events.

Conclusion: The results of our study show that early versatility implemented in athletic training does not play a primary role in athlete's success. The main role is represented by the all-round sports training implemented in other sports.

Keywords: athletics, combined events, success, versatility, youth

Author for correspondence: Jiří Nechvátal (jiri.nechvatal@ujep.cz)

DETERMINING FACTORS OF REACTIVE AGILITY IN MALE FOOTBALL PLAYERS

Andrea Paprancová, Ľubomír Paška, Matúš Krčmár, Natália Czaková, Filip Novotka

Department of Physical Education and Sport, Faculty of Education, Constantine the Philosopher University, Nitra, Slovakia

Purpose: This study aimed to determine the factors using correlation analysis between reactive agility (RAG), speed performance, strength, and flexibility in young male football players.

Material & Methods: The research group consisted of 34 young male football players from the Topolčany football club, divided into two categories: U15 and U19. Various physical performance tests were realized, including 5m, 10m, 30m sprint test, flexibility, RAT-O and RAT-D reactive agility tests, and lower limbs strength. The evaluation of the obtained data took place as follows: we performed the normality of the sample distribution using the Shapiro-Wilk test. Subsequently, we continued with the correlation analysis (Pearson). We performed the correlation analysis from the available data.

Results: In the U15 group, significant negative correlations were found between flexibility and sprint test (5m, 10m, 30m), highlighting the importance of flexibility for sprint performance. Additionally, positive correlations were observed between 5m sprint and RAT-D (r = 0.521, p = 0.019), as well as between 10m sprint and both RAT-O (r = 0.480, p = 0.032) at the 5% significance level and RAT-D (r = 0.601, p = 0.005) at the 1% significance level. For the U19 group, CMJ showed significant negative correlations with 10m (r = -0.494, p = 0.044) and 30m sprint (r = -0.764, p = 0.000). Sit-ups were positively correlated with RAT-O (r = 0.523, p = 0.031), and RAT-D was significantly correlated with both 5m (r = 0.523, p = 0.031) and 10m (r = 0.601, p = 0.005) sprint performance.

Conclusion: This study emphasizes the distinct roles of flexibility, reactive agility, and strength in the performance of young male football players. For U15 athletes, flexibility and reactive agility are crucial for enhancing sprint performance, while U19 athletes benefit more from a focus on lower limb strength and core strength. Tailoring training programs to these developmental needs can optimize performance and support the overall growth of young players. By addressing the specific physical attributes relevant to each age group, coaches can better prepare athletes for the demands of competitive football, ultimately enhancing both individual and team success.

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Keywords: flexibility, football, reactive agility, speed performance, strength, youth athletes

Author for correspondence: Andrea Paprancová, (apaprancova@ukf.sk)

CHANGING THE ENVIRONMENT TO INTEGRATE AND SUPPORT RECREATIONAL AND HEALTH-ENHANCING PHYSICAL ACTIVITY FOR OLDER ADULTS

Iuliia Pavlova

Ivan Boberskyj Lviv State University of Physical Culture, Ukraine

Purpose: Due to unsatisfactory socio-economic conditions, the aging of the Ukrainian population has been accompanied by a significant deterioration of health and an increase in the number of people who need state assistance. Understanding the factors that improve the well-being of the population, and contribute to involvement in public life, will help preserve labor potential, reduce financial expenses for medical and social assistance, and extend the life expectancy of Ukrainians. This study aimed to substantiate the approaches to the creation of special environment for active implementation and realization of health-enhancing physical activity for Ukrainian older adults.

Material & Methods: The study involved 2,500 older adults, among whom 200 (65.2±4.3 years) took a direct part in testing of special environment and experimental programs. Changes in the quality of life (SF-36) and the level of physical activity (IPAQ) were assessed after the implementation of programs with health-enhancing and recreational or cultural activities. The indicators were evaluated before and after the one-year programs.

Results: An increase in the level of physical activity and quality of life was observed in all participants. Older adults who participated in health-enhancing and recreational activities improved the quality of life indicators by 1.3–1.6 times. After a year of study, 22.0% of respondents noted an improvement in their health; by 2 times decreased the number of older adults the number of participants who indicated that the mental state interferes with daily motor or social activity decreased by 2 times.

Conclusion: The principles of the environment for older adults were developed and implemented in practice. Among them are autonomy (preserving independence in making lifestyle decisions), integration (ensuring full participation in social life), and assistance (creating support systems that help develop new competencies that meet the challenges of the modern world, and contribute to the health and physical activity).

Keywords: health, older adults, PhysAgeNet, physical activity, quality of life

Author for correspondence: Iuliia Pavlova (pavlova.j.o@gmail.com)

EFFECTIVENESS OF THE INVOLVEMENT OF SELECTED MUSCLES DURING THE PRE-JUMP AND WIND-UP PHASE DURING THE EXECUTION OF A SPIKE IN U16–U18 FEMALE BEACH VOLLEYBALL PLAYERS

Tomáš Polívka, Martin Škopek, Lucie Lebrušková

Department of Physical Education and Sport, Jan Evangelista Purkyně University, Czech Republic

Purpose: Laterality manifests itself in beach volleyball mainly in the individual's attacking activities (serving, spiking). Functional asymmetry affects the player's movement expression in all movement situations, and laterality is also important for the specialization of individual players. The study aims to assess the lateral involvement of selected muscles (deltoideus, biceps femoris semitendinosus) and their effectiveness in the phases before the spike jump and in the wind-up phase of the spike.

Material & Methods: The research group consisted of 12 female players average age 16.17 (*SD* = 1.5). The main method used for data collection was measurement by surface electromyography. We entered the transformed data into Microsoft Excel. To evaluate the data, we used descriptive (frequency, percentage) and inferential (Shapiro-Wilk test, T-test, Man Whitney U test and correlation) statistics methods.

Results: We tested using a two-sample t-test. We conclude that there is no difference between the right and left sides in the evaluated muscle groups (*deltoideus* = 0.206; *biceps femoris* = 0.569; *semitendinosus* = 0.792) The high correlation between the left deltoideus and the right biceps is interesting (0.812). The efficiency is higher in the wind-up phase for all the assessed muscles. The highest difference in efficiency is in the biceps femoris on the left leg, where the difference in the efficiency of involvement in the individual phases is over 25%. Conversely, the lowest difference is for the left semitendinosus (5.5%).

Conclusion: We confirm that the effectiveness of muscle activity is more effective in the wind-up phase, at the same time we add that in this phase the muscles work more symmetrical.

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Keywords: contralateral patterns, hamstrings, laterality, surface EMG

Author for correspondence: Tomáš Polívka (tomas.polivka@ujep.cz)

COMPARISON OF PHYSICAL FITNESS IN DANCE SPORT ACROSS PERFORMANCE LEVELS AND AGE CATEGORIES

Hana Anna Šišková, Karel Hůlka, Jana Pelclová

Faculty of Physical Culture, Institute of Active Lifestyle, Palacký University Olomouc, Czech Republic

Purpose: Dance sport encompasses three primary disciplines: standard dances, Latin American dances, and the ten-dance combination. Success in dance sport is influenced not only by aesthetic factors but also by physical fitness, which plays a crucial role in determining competition outcomes. This study aimed to compare physical fitness between dancers at the TOP and STANDARD performance levels, as well as across the categories of JUNIOR I, JUNIOR II, and YOUTH.

Material & Methods: A specifically designed test battery consisting of 8 tests was used. These tests were: Frequency Speed Test, Hexagon, Y Balance, Two-Handed Overhead Medicine Ball Throw Backward, Brace Test, Triple Jump from a Standing Position, Competitive Endurance Test and Beep Test. A total of 96 participants (boys and girls, age = 14.05 ± 1.69 years, BMI = 18.78 ± 2.26 kg·m²) were contacted to collect the required data. The Junior I category included 32 dancers, Junior II had 25 dancers, and the Youth category had 20 dancers. Of these, 28 were enrolled in the talent center program for dance sport (TOP performance level), and 49 belonged to the dance club Olymp Olomouc (STANDARD performance level).

Results: In the motor frequency speed test, a significant difference was found between levels ($F = 12.481$, $p = 0.005$), but not between categories ($F = 0.438$, $p = 0.726$). The hexagon motor test showed a significant difference between categories ($F = 4.537$, $p = 0.005$), but not between levels ($F = 7.510$, $p = 0.007$). The Y balance motor test revealed no significant differences for levels ($F = 3.18$, $p = 0.077$) or categories ($F = 0.74$, $p = 0.531$). The triple jump test showed significance between categories ($F = 27.056$, $p < 0.001$), but not levels ($F = 0.481$, $p = 0.490$). Significant results were also found in competitive endurance and medicine ball throw tests for both levels and categories ($p < 0.05$).

Conclusion: The results show a statistically significant difference between levels in the frequency speed test, competitive endurance test, and beep test. No statistically significant difference was found in the remaining tests. On the other hand, a significant difference between categories was found in all tests except for the Y balance and Brace tests.

Keywords: age categories, ballroom dance, dance sport, Latin-American dance, motor tests, performance categories,

Author for correspondence: Hana Anna Šišková (hanaanna.siskova01@upol.cz)

THE IMPACT OF THE OLYMPIC FESTIVAL AND OLYMPIC GAMES ON YOUTH PARTICIPATION IN SPORTS IN THE CZECH REPUBLIC

Martin Škopek[1], Jan Hnízdil[1], Jakub Ševcovic[1], Jan Kresta[1], Tomáš Mirovský[2], David Cihlář[1]

[1] Department of Physical Education and Sports, Jan Evangelista Purkyně University, Czech Republic
[2] Palestra College of Physical Education and Sport, Czech Republic

Purpose: This study evaluates the influence of the Olympic Games and the Olympic Festival on youth sports participation in the Czech Republic. Conducted in collaboration with Olympic Festival s.r.o., the research aims to investigate potential shifts in youth membership in sports clubs, overall physical activity levels and motivation to explore new sports disciplines.

Material & Methods: The research was conducted in two phases. The initial survey, in June 2024, involved 4,726 students from primary and secondary schools across the Czech Republic. The second survey, in September 2024, followed the conclusion of the Olympic Games and the Olympic Festival, yielding 953 paired responses. Statistical analysis employed descriptive statistics and Pearson's chi-square test ($p < 0.05$) to determine significant changes between phases. A third phase of data collection will take place in November 2024, targeting the sports base in the Ústí nad Labem region.

Results: Preliminary findings suggest a positive impact of the Olympic Games and the Festival on youth sports engagement. In primary schools, a slight increase in sports club membership was recorded post-Olympics, from 51.3% to 53.9% (+2.6%), alongside a rise in physical activity outside of organized clubs, from 38.4% to 41.5% (+3.1%). Membership rates among secondary school students remained stable at 44.6% ($p < 0.01$). Attendance at the Olympic Festival exceeded expectations, with 19.6% of respondents participating, compared to the 11.0% initially anticipated. Notably, 23.3% of primary school students attended, far exceeding the 8.8% originally planned ($p < 0.01$).

Conclusion: Preliminary data indicate that the Olympic Games and the Olympic Festival may have had a positive influence on youth attitudes toward physical activity, particularly among primary school students. A modest increase in sports club membership and unorganized physical activity was observed. Furthermore, actual participation in the Olympic Festival surpassed initial intentions, especially among primary school students. Additional analysis, scheduled for November 2024, will further assess the long-term impacts, particularly in the Ústí nad Labem region.

Keywords: Czech Republic, Olympic festival, sports clubs, youth physical activity

Author for correspondence: Martin Škopek (martin.skopek@ujep.cz)

THE NEGATIVE STRESS COPING STRATEGIES OF RECREATIONAL FEMALE RUNNERS

Vladimíra Trulíková, Tomáš Gregor

University in Bratislava, Slovakia

Purpose: Recreational running is an effective way to reduce stress and enhance coping skills [1–3]. Our previous research showed significant differences in negative stress coping strategies between runners and non-athletes. This study aimed to investigate whether short-term and long-term female runners differ in their use of negative coping strategies, hypothesizing that long-term runners would use these strategies less frequently.

Material & Methods: The study included 57 female recreational runners, averaging 40.72 ± 5.23 years, who ran at least three times a week for minimum 20 minutes. Participants were divided into short-term runners (1 to 5 years of experience) and long-term runners (5 or more years). We conducted an inter-individual quantitative ex post facto research using the Stress Coping Style Questionnaire, focusing on negative coping strategies, with the Mann-Whitney U-test to identify significant differences between groups.

Results: The research results indicated a significant difference in negative stress coping strategies between short-term and long-term female runners. Our hypothesis was confirmed, showing that long-term runners utilized negative coping strategies less frequently than short-term runners, with a statistical significance of 5% (p = 0.040). We also compared specific strategies, finding that long-term runners exhibited lower resignation levels than short-term runners (p = 0.043). While differences in escape tendency, perseverance, and self-blame were not statistically significant, they were still noticeable.

Conclusion: This study confirms that long-term female recreational runners use negative stress coping strategies less frequently than short-term runners (p = 0.040), with significantly lower resignation levels (p = 0.043). These findings highlight the mental well-being benefits of long-term engagement in recreational running.

Keywords: female runners, physical activity, stress coping strategies

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Author for correspondence: Vladimíra Trulíková (vladimira.trulikova@uniba.sk)

CHARACTERISTIC FEATURES OF INDIVIDUAL FITNESS PROGRAMS FOR WOMEN IN THE FIRST PERIOD OF MATURE AGE

Liudmyla Vashchuk, Olena Demianchuk, Venera Krendeleva

Lesya Ukrainka Volyn National University, Lutsk, Ukraine

Purpose: One of the priority ways to improve women's health, according to specialists, is through activities aimed at fostering motivation and skills for a healthy lifestyle. One of the most effective means of enhancing their functional state is wellness fitness. The issues of differentiating physical loads during wellness fitness activities based on individual characteristics of physical development, physical fitness, and the level of physical activity of mature women remain underexplored.

Material & Methods: The research utilized the following methods: analysis and synthesis of data from scientific, methodological, and specialized literature, systematization, anthropometry, and methods of mathematical statistics.

Results: The issue of the necessity of accounting for the motivational priorities of the women aged 21–35 years in the process of the physical culture and health activities and their significance for the design of the physical culture and health related sessions has been addressed in the article. The first period of mature age (21–35 years) of the women is characterized by the beginning of the evolutionary processes in the body and a decrease in the motor abilities of the women, and the solution to this problem is possible by optimizing their motor activity. Dance-fitness classes today are one of the most important types of the physical activity for the women. They have a positive effect on the psycho-emotional state of women and their physical preparedness. We conducted a survey of women aged 21–35 who are engaged in dance-fitness in clubs and studios in Lutsk. We compared the training motives of the women of different age groups (21–25 years old, 26–30 years old, and 31–35 years old) and found out how the motivation of the women changes during the first period of adulthood.

Conclusion: We found that the priority motives of their classes are mastering of the aesthetic dance movements, improving of the figure parameters and improving of the improving well-being and health.

Keywords: body types, fitness, women of the first period of mature age

Author for correspondence: Liudmyla Vashchuk (vaschuk.liuda@vnu.edu.ua)

NEW PERSPECTIVES ON DIGITAL ANTHROPOMETRY IN THE CONTEXT OF SPORTS TALENT SELECTION

Vladimír Zlatoš, Jaromír Šimonek

Department of Physical Education and Sports, Faculty of Education, Constantine the Philosopher University in Nitra, Slovakia

Purpose: We are dealing with a problematic question: do we choose sport, or does it choose us? In the project, we are dealing with 50-year-old typologies of characters (Sheldon), which have not been updated so far. We see room for the emergence of a new typology of figures, which better identifies the biomechanical advantages of a given type of figure, which predisposes the selected person to movement dominance or, on the contrary, "failure" in selected sports disciplines

Material & Methods: We use our own digital anthropometry (3D cameras and our own developed analysis software) on a group of athletes, in which we identify the dominant typology of the figure with respect to the sports specialization. The final product of the research will be a digital database of characters, which we will offer to sports experts for the effective selection of talents in sports. The research sample will consist of performance and elite athletes, in the initial phase of the research mainly athletic disciplines. Specifically, running disciplines (100m, 400m, 800m, 3000m, marathon), jumping disciplines (distance, height, triple jump), power throwing disciplines (shot put, discus, hammer, javelin), pure strength disciplines (powerlifting, gymnastics) or combat sports (wrestling, judo). Later, the character database will be expanded to include other sports disciplines.

Results: The research is expected to provide important insights into the relationship between anthropometric characteristics and sports performance. The identification of dominant typologies of figures within various sports and the creation of a digital database of typologies of figures, which will lay new foundations for the investigation of movement dominance in various sports disciplines, are expected. Currently, we have measured 333 adepts from the general population and athletes.

Conclusion: We found that the priority motives of their classes are mastering of the aesthetic dance movements, improving of the figure parameters and improving of the improving well-being and health.

Keywords: 3D cameras, athletes, biomechanical advantages, digital anthropometry, sports talents

Author for correspondence: Vladimír Zlatoš (vlado@vladozlatos.com)