BOOK OF CONFERENCE ABSTRACTS

SCIENTIA MOVENS 2023

FACULTY OF PHYSICAL EDUCATION AND SPORT
AT CHARLES UNIVERSITY

XI. International Scientific Popularization Conference

16. - 17. 5. 2023

Prague, Czech Republic

BOOK OF CONFERENCE ABSTRACTS

Scientia Movens

–

XI. International Scientific Popularization Conference

16. - 17. 5. 2023

organized by

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Charles University

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Content

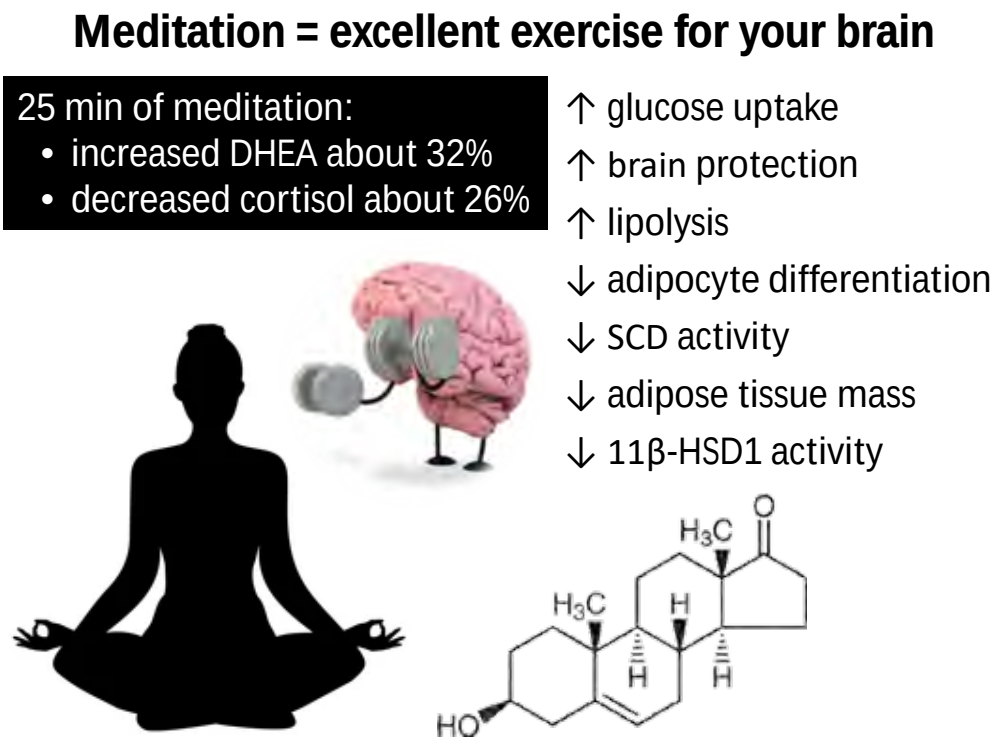
1. Movement as a Means of Maintaining Physical and Mental Health

Keynote lecture

DHEA AND BRAIN AGING

Jana Jaklová Dytrtová[a], Michal Jakl[b], Michal Šteffl[a], Radmila Dytrtová[c]
[a] Sport Sciences–Biomedical Department, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, dytrtova@ftvs.cuni.cz
[b] Department of Agroenvironmental Chemistry and Plant Nutrition, Faculty of Agrobiology, Food and Natural Resources, Czech University of Life Sciences Prague, Kamýcká 129, 165 00 Prague–Suchdol, Czech Republic
[c] Institute of Education and Communication, Czech University of Life Sciences Prague, V Lázních 3, 159 00 Prague 5, Czech Republic

Abstract
DHEA (dehydroepiandrosterone) is a steroid hormone produced by the adrenal glands. It has been suggested to have a number of potential effects on the brain, although the evidence for these effects is not entirely clear. Some studies have suggested that DHEA may have neuroprotective effects, meaning that it may help to protect the brain from damage. Other studies have suggested that DHEA may have cognitive-enhancing effects, such as improving memory and attention. However, the evidence for these effects is mixed, and more research is needed to determine the true effects of DHEA on the brain. We investigated the effect of meditation on the content of DHEA in saliva and found that 25 minutes of breathing meditation increases the content of DHEA by an average of 32%.
Keywords: dehydroepiandrosterone; meditation; saliva

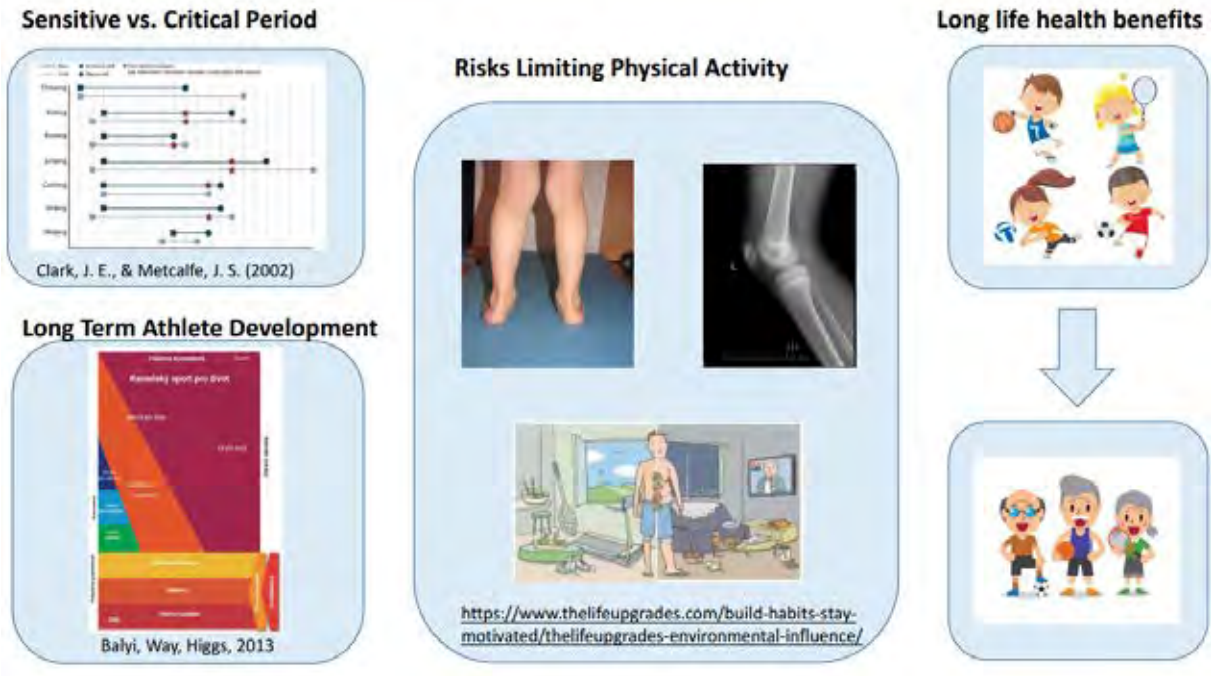


Acknowledgment
The contribution was processed within the project Cooperatio 120 015.

CRITICAL PERIODS AND SITUATIONS LIMITING PHYSICAL ACTIVITY AS A PREREQUISITE FOR FUTURE HEALTH BENEFITS IN CHILDREN AND ADOLESCENTS

Tereza Nováková
Department of Physiotherapy, Faculty of Physical Education and Sport, Charles University, J. Martího 31, Prague 6, 162 52, Czech Republic, tnovakova@ftvs.cuni.cz

Abstract
Research clearly shows that adequate fitness and physical activity results in significant health benefits for individuals as well as significant socio-economic benefits for society as a whole. The prerequisite is an adequate level of physical literacy, the acquisition of which is significantly influenced by physical experiences during development.
With knowledge of the sensitive and critical periods, movement programmes for children can be effectively designed. Individual assessment of the health limitations that restrict the acquisition of full physical literacy in childhood and the reduction of health risks for possible involuntary termination of a sporting career in adolescence is the basis for the lifelong use of physical activity as a health benefit.
Keywords: physical literacy; health limits; termination of sporting career



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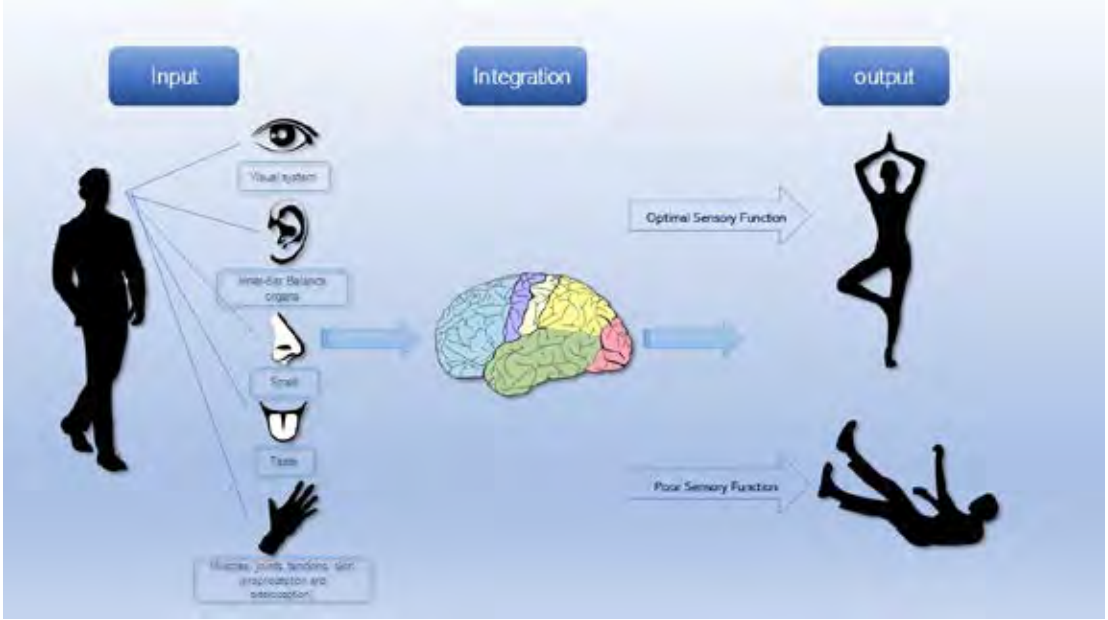
NEUROTRAINING AS A MEANS TO IMPROVE BALANCE AND COORDINATION ABILITIES IN SENIORS

Markéta Křivánková
Department of Adapted Physical Education and Sport Medicine, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, krivankova@ftvs.cuni.cz

Abstract
This PhD project aims to investigate the effectiveness of Neurotraining on improving stability and coordination abilities in seniors. Neurotraining will be implemented using a series of exercises designed to stimulate and strengthen the neural pathways involved in balance and coordination. The study will recruit a sample of 40 seniors aged 65 and above, who will be randomly assigned to either a Neurotraining group or a control group. Participants in the Neurotraining group will receive a 12-week training program, while those in the control group will receive no intervention. Data will be collected at baseline, post-intervention, and follow-up assessments to evaluate the effects of Neurotraining on various outcome measures, including balance, gait, and quality of life. The results of this study have the potential to inform the development of effective interventions for seniors to improve their stability and coordination abilities, thereby reducing the risk of falls and improving their overall quality of life.
Keywords: neuro-centric training; insular cortex; stability training; coordination



Acknowledgment
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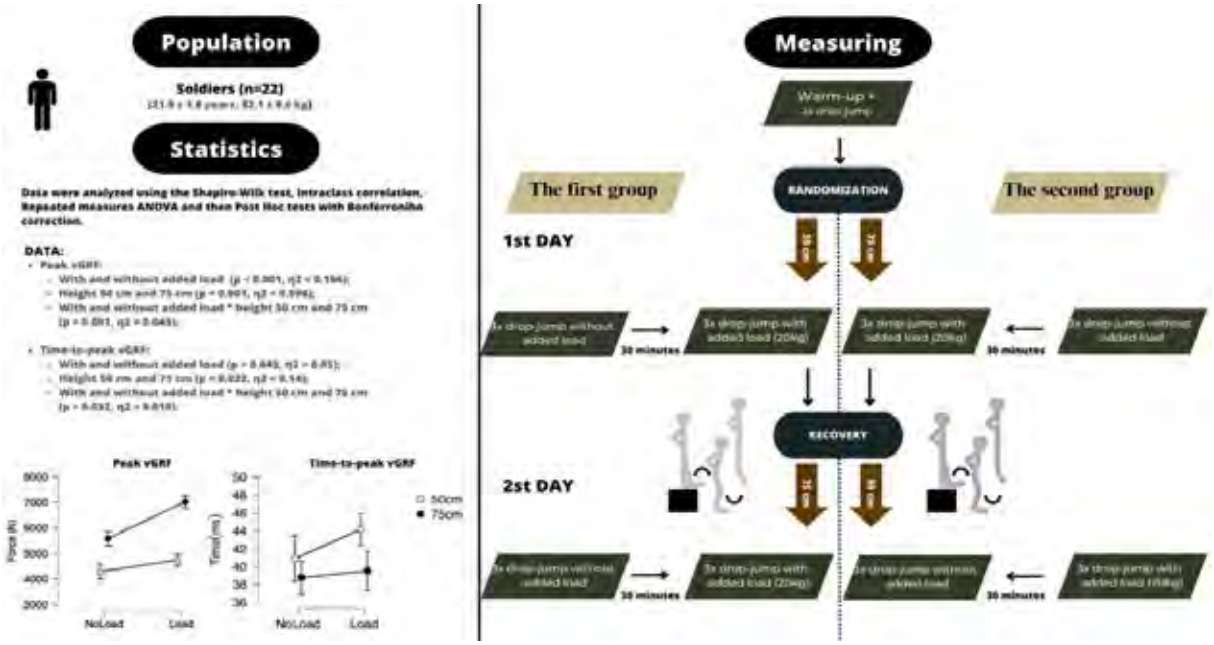
EFFECTS OF HEIGHT AND LOAD ON DYNAMIC DROP JUMP FORCES AT MILITARY PERSONNEL: A COMPARATIVE STUDY

Vladan Oláh, Jan Maleček, Tomáš Kohout, Zdeněk Didek, Michal Vágner
Department of Military Physical Education, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic

Abstract
The carrying load may increase soldiers' risk of musculoskeletal injuries. This research investigated how the added load affects vertical ground reaction forces (vGRF) in drop-jumps from different heights. Twenty-two cadets (21.9±1.8y; 82.1±9.6 kg) performed drop-jumps from 50 and 75 cm with (L) and without (NL) 20 kg of additional load. There was main effect of load ($p<0.001$, $\eta^2=0.166$; $p=0.045$, $\eta^2=0.050$) and height ($p<0.001$, $\eta^2=0.596$; $p=0.022$, $\eta^2=0.140$) for peak and time-to-peak vGRF, respectively. Which showed higher peak (28.33%, $p<0.001$, $d=1.628$) and longer time-to-peak (7.90%, $p<0.022$, $d=0.367$) vGRF at 75 compare to 50 cm, and higher peak (19%, $p<0.001$, $d=0.859$) and longer time-to-peak (5%, $p=0.045$, $d=0.219$) vGRF with load compare to without load. Aditionally, there was load×height interaction for peak vGRF ($p<0.01$, $\eta^2=0.045$) and time-to-peak vGRF ($p=0.032$, $\eta^2=0.019$). Demonstrating higher L75 peak vGRF than NL75 (20.39%, $p<0.001$, $d=1.304$) and L50 (32.41%, $p<0.001$, $d=2.074$), and lower NL50 than L50 (9.5%, $p<0.001$, $d=0.413$), and L75 (38.87%, $p<0.001$, $d=2.478$). Also. longer L50 time-to-peak vGRF than NL50 (7.4%, $p=0.031$, $d=0.356$) and L75 (10.4%, $p=0.015$, $d=0.504$). Increased vGRFs, have been positively linked to lower-body injuries. Therefore. to enhance safety, it is recommended to gradually increase the load in exercises related to drop jumps to facilitate adaptation.
Keywords: vertical ground reaction force; biomechanics; injury



Keynote lecture

COGNITIVE SUPERAGING AND PHYSICAL ACTIVITY

Hana Georgi
Prague College of Psychosocial Studies, Hekrova 805, 149 00 Prague 4, Czech Republic,
hana.georgi@pvsps.cz

Abstract
Healthy cognitive ageing has been an important research area for recent decades and an intrinsic personal desire of every individual. In addition to the absence of pathology, researchers have focused on the presence of above-average resilience to ageing and what observable phenomena this resilience is associated with, including lifestyle. In this invited talk, we will present one approach to supra-resilient cognitive ageing, called SuperAgeing, particularly in the context of physical activity. Physical activity is one of the known modifiable factors for dementia prevention, but can it also be associated with SuperAging?
Keywords: ageing; cognitive resilience; life-style

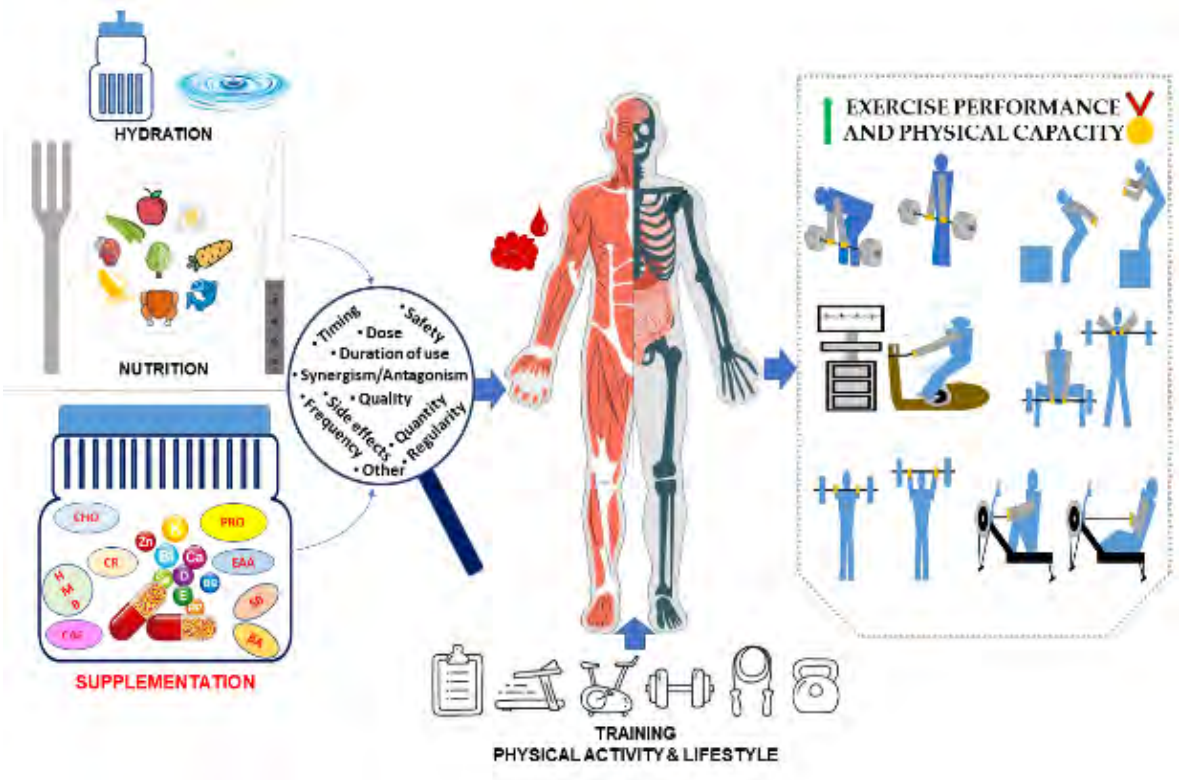
Acknowledgment
The study is supported by the research project COSACTIW – Cognitive SuperAging in Physically Active Women (GA22-24846S).

Keynote lecture

APPLIED SPORTS SUPPLEMENTATION IN PHYSICAL TRAINING

Krzysztof Durkalec-Michalski[a,b,c]
[a] Department of Sports Dietetics, Poznan University of Physical Education, Królowej Jadwigi 27/39, 61-871 Poznan, Poland**,** durkalec-michalski@awf.poznan.pl
[b] Sport Sciences–Biomedical Department, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic
[c] Centre for Sport Research, Deakin University, 221 Burwood Hwy, Burwood VIC 3125, Australia

Abstract
Nutrition is a key determinant of nutritional status, physical capacity, and performance, as well as good health and well-being in professional and recreational sports. However, in practice, it may be difficult to adequately cover the increased energy and nutrients' requirements, and thus targeted and individually tailored supplementation, can be considered as a particularly valuable support. It should be underlined that the use of supplements and their dosing strategies must be supported by strong and reliable scientific knowledge according to evidence-based supplementation standards, as well as recommended and implemented exclusively under the supervision of experienced experts.
In the case of sports dietetics, crucial factors are the proper selection of supplements and personalized adjustment of the supplementation protocols. For this purpose, adequate evaluation of body composition, physiological, biochemical, and molecular markers - conducted in laboratory and field conditions, is invaluable.
The increase in broadly-understood exercise performance may depend on the efficiency of energy processes, the balance between muscle protein synthesis and breakdown, buffering capacity regulation, as well as recovery and immune resistance. In the above-mentioned aspects, the number of preparations may be important, in which supplementation of HMB, colostrum, or sodium bicarbonate could have valuable and worth further research, scientific and practical potential.
Keywords: sports nutrition; supplements; ergogenic support; dietetics; nutritional status; exercise performance



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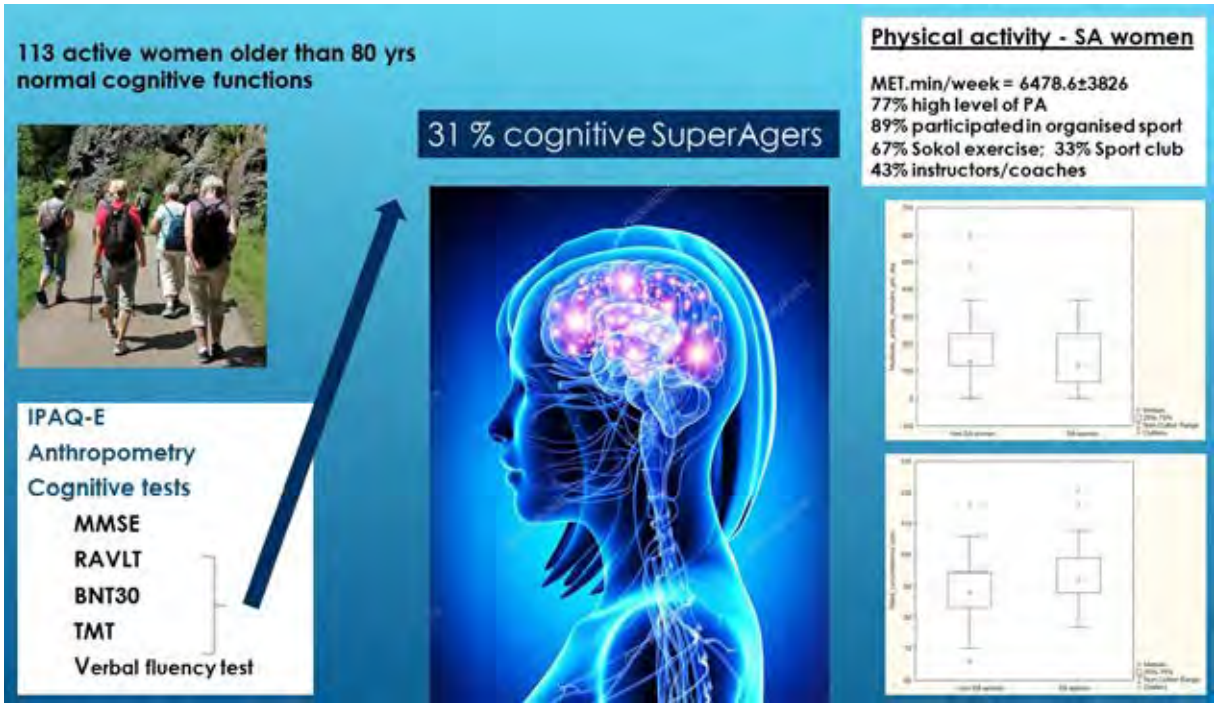
PHYSICAL ACTIVITY PROFILE IN COGNITIVELY SUPERIOR WOMEN OVER 80 YEARS OF AGE

Klára Daďová
Faculty of Physical Education and Sport, Charles University, J. Martího 31, 162 52 Prague 6, Czech Republic, dadova@ftvs.cuni.cz

Abstract
Health-related quality of life in the elderly is currently an important topic in the ageing research as well as searching the ways how to age well and stay physically and cognitively independent. The aim of the lecture is to present results from a pilot data set (N=113) of the COSACTIW study which is aiming to reveal a relationship between physical activity (PA) and cognitive SuperAging (SA). In the lecture, PA level and anthropometric measures will be compared between active women with SA and non-SA status using data from IPAQ-E, body mass index (BMI), waist circumference (WC), and interview. The first results show significantly different amount of moderate physical activity, total MET-min/week scores, BMI, and WC between SA and non-SA active women older than 80 years of age.
Keywords: ageing; cognitive resilience; life-style; sport

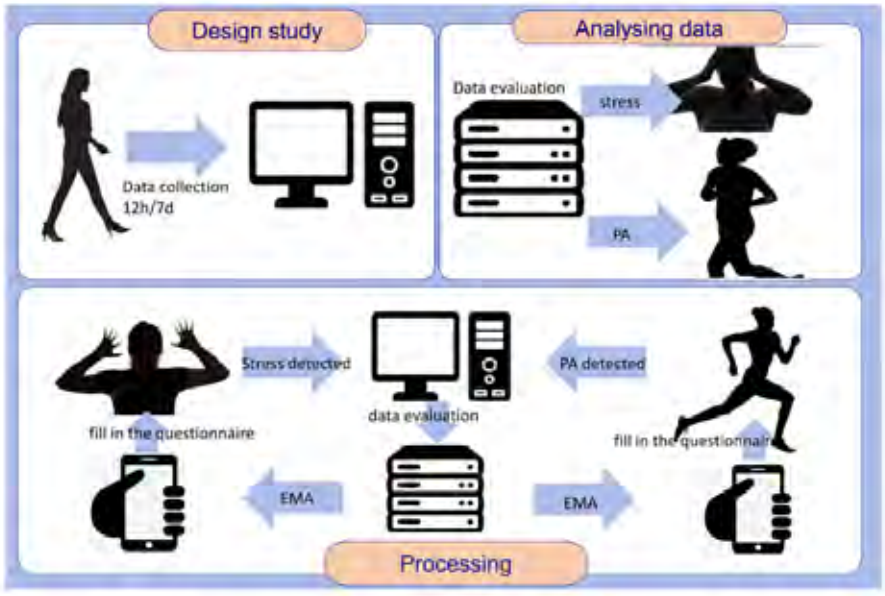


Acknowledgment
The study is supported by the research project COSACTIW – Cognitive SuperAging in Physically Active Women (GA22-24846S).

COMBINING EVENT-BASED ECOLOGICAL MOMENTARY ASSESSMENT AND AMBULATORY HEART RATE VARIABILITY MONITORING TO EXPLORE ASSOCIATIONS BETWEEN SUBJECTIVE FEELINGS OF STRESS AND THEIR BIOLOGICAL CORRELATES

Tomáš Mika[a], Agustín Manresa-Rocamora[b], Julie Delobelle[c], Jitka Kuhnová[d], Michael Janek[a], Richard Cimler[d], Delfien Van Dyck[c], Tomáš Větrovský[a]
[a] Faculty of Physical Education and Sport, Charles University, Prague 6, Czech Republic
[b] Institute for Health and Biomedical Research of Alicante (ISABIAL), Alicante, Spain
[c] Department of Movement and Sports Sciences, Ghent University, Ghent, Belgium
[d] Faculty of Science, University of Hradec Kralove, Hradec Kralove, Czech Republic

Abstract
Chronic stress is associated with numerous negative health outcomes, necessitating a better understanding of the relationship between subjective stress levels and biological markers. This study aims to examine the connection between momentary stress levels and autonomous nervous system (ANS) activity in individuals in their natural environments. Forty healthy participants, aged 18-40, will be monitored for one week using Ecological Momentary Assessment (EMA) and the real-time heart rate sensing platform HealthReact. Heart rate variability (HRV) will be assessed to measure ANS activity. Multilevel modeling will be used to explore the associations between momentary stress levels, preceding stressful events, context, and HRV parameters. Leveraging wearable sensor technology, this study will provide valuable insights into the relationship between stress levels and ANS activity, informing the development of ambulatory stress-monitoring methods.

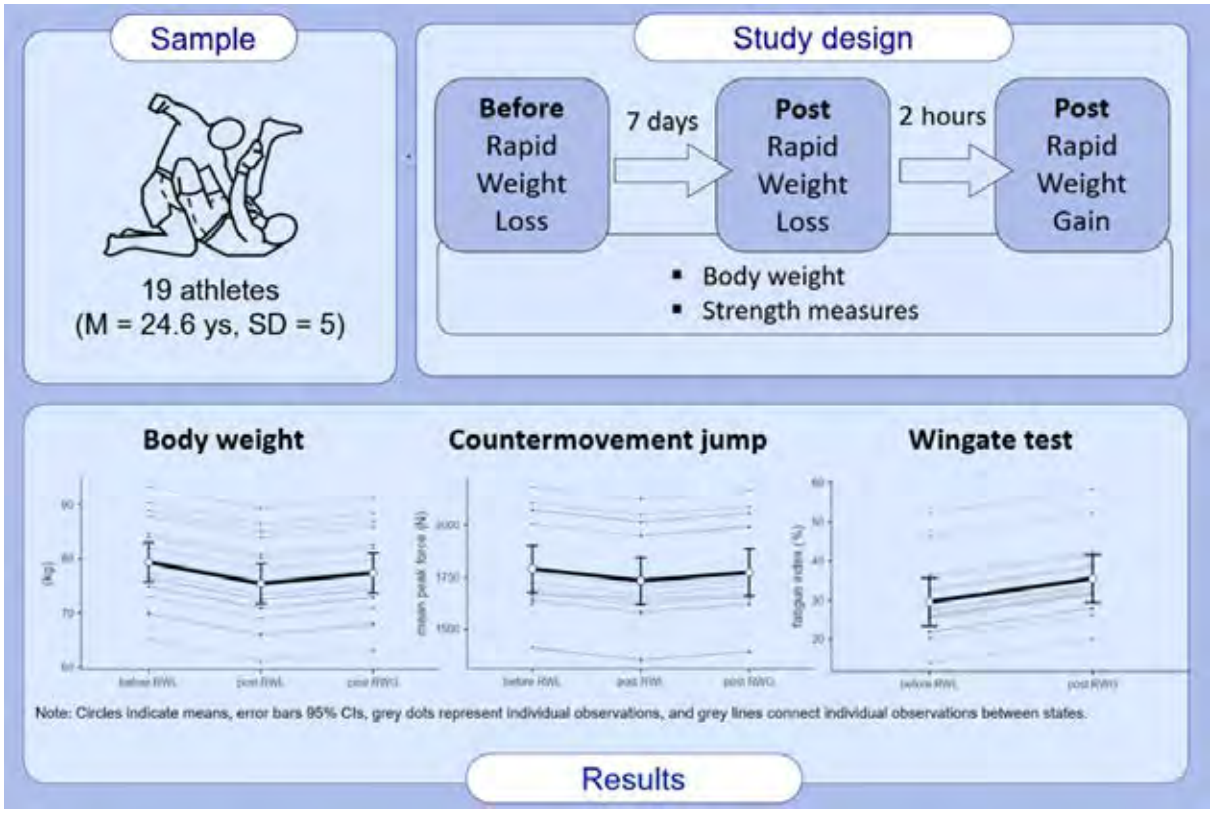


Acknowledgment
The project will be carried out in collaboration with the Center for Advanced Technologies at the University of Hradec Králové under the leadership of Mgr. Richard Cimler, Ph.D.

THE EFFECT OF RAPID WEIGHT LOSS ON STRENGTH IN COMBAT SPORTS

Vojtěch Nesvadba and Vít Třebický
Department of Technical and Combat Sports, Faculty of Physical Education and Sport, Charles University, José Martího 31, Prague 6, 162 52 Czech Republic,
vojtech.nesvadba@seznam.cz

Abstract
Rapid weight loss (RWL) followed by rapid weight gain (RWG) are common practices among combat sports athletes to gain a competitive advantage. However, the impact of weight manipulation on physical performance remains unclear.
19 male athletes (M = 24.6 ys, SD = 5) underwent baseline strength assessments, followed by a 7-day RWL and a 2-hour RWG. We measured their physical strength using a battery of dynamic and anaerobic tests, including the countermovement jump (CMJ) and upper limb Wingate test. On average, participants reduced 5% and gained 2.6% of body weight during RWL and RWG, respectively. Using mixed-effects models, we observed statistically significant decreases in peak forces (1.5 – 9.3%) post RWL across dynamic tests and increased fatigue index (6%) in the Wingate test. We observed statistically significant increases in peak forces (1.8% - 7.4%) Post RWG, compared to post RWL. Our findings suggest that RWL negatively impacts physical performance in combat sports athletes, but RWG may partially reverse these effects.
Keywords: Wingate test; isometric; countermovement jump; weight gain



HUNGRY RUNNERS: LOW ENERGY AVAILABILITY IN ENDURANCE TRAINED MEN AND ITS IMPACT ON PERFORMANCE AND HEALTH

Martin Čupka and Milan Sedliak
Department of Biological and Medical sciences, Faculty of Physical Education and Sport, Comenius University in Bratislava, Nábr. arm. gen. L. Svobodu 9, 811 02 Bratislava, Slovakia, martin.cupka@uniba.sk

Abstract
A consistent hypocaloric diet can affect multiple body systems. This is less studied in male athletes compared to women. The main objective of our study was to determine the dependence between energy balance and nutritional, biochemical, anthropometric and performance parameters of endurance trained men (n=31; age: 28±4 yrs.; weight: 72.4±8.7 kg; body fat: 12.3±3.2 %; BMI: 22.3±1.7 kg/m^2; VO_{2max}: 59.89±7.9 ml/kg/min). Correlation analysis showed a positive relationship between BMI and femoral neck z-score ($\rho = 0.525$; $p < 0.01$). Negative relationship between VO_{2max} and body fat ($\rho = -0.499$; $p < 0.01$). As for total testosterone there was negative dependence with body weight ($\rho = -0.581$, $p < 0.01$) and also fat-free mass ($\rho = -0.614$, $p < 0.01$). After that subjects were divided based on the energy balance. Selected findings are presented in the table below. A significant relationship between reduced bone density and energy deficiency was not confirmed. It seems that body fat is not a relevant indicator of energy deficiency. We pointed out the specifics of the dietary and biochemical parameters in athletes with insufficient energy intake. We recommend further improvement of questionnaires-based screening tools and more long-term experimental studies.
Keywords: energy balance; endurance; sports performance; nutrition; testosterone

ENDURANCE TRAINED MEN (age: 28±4 yrs.; weight: 72.4±8.7 kg; BMI: 22.3±1.7 kg/m2)

LEAM-Q (n=300) LOW ENERGY AVAILABILITY MALE QUESTIONNAIRE

↑ RISK OF RED-S (n = 31)

CROSS-SECTIONAL STUDY:

ENERGY BALANCE VS. ANTHROPOMETRIC, NUTRITIONAL, PERFORMANCE BIOCHEMICAL, PARAMETERS

	NEGATIVE EB (n=18)		POSITIVE EB (n=13)		
Body fat (%)	12,9 ± 2,80		11,2 ± 3,71		n.s. p=0,159
Z-score lumbar spine (SD)	-0,467 ±1,079	n=5 ≤-1,00*	-0,660 ±0,854	n=2 ≤-1,00*	n.s. p=0,623
Carbohydrates (g/kg/day)	3,80 ± 0,40		5,28 ± 1,04		p = 0,002
Exercise energy expenditure (kcal/day)	1126,70 ± 491,49		675,42 ± 101,42		p = 0,021
VO2max (ml/kg/min)	59,58 ± 8,74		59,34 ± 8,28		n.s. p= 0,825
Total testosterone (nmol/l)	17,55 ± 4,34	n = 5**	20,14 ± 6,33	n = 2**	p=0,246
Glucose (mmol/l)	4,17 ± 0,78	n = 3*	4,16 ± 0,32	n = 0*	p=0,825
Red blood cells (10^12 / l)	4,86 ± 0,43	n = 3*	5,03 ± 0,24	n = 0*	p=0,251
Haemoglobin (g/l)	148,0 ± 8,91	n = 3*	153,1 ±9,21	n=0*	p=0,159

* below reference values;** below subclinical values (<14,8 nmol/l)

Acknowledgments
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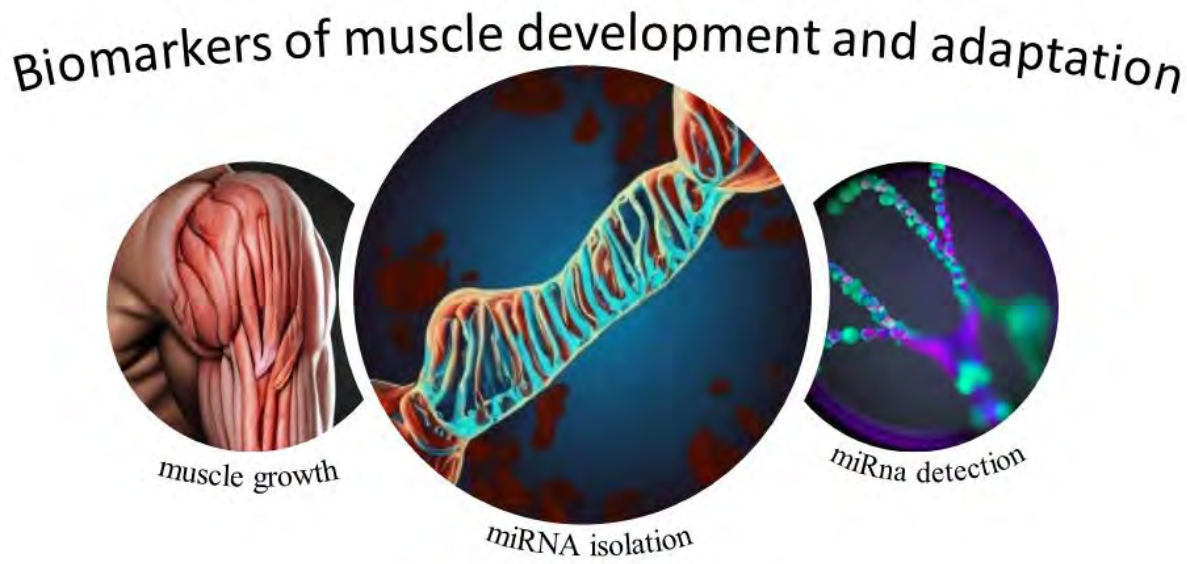
2. Physical Fitness of the Current Population

Keynote lecture

miRNA AND PHYSICAL PERFORMANCE

Ishak Kovač[a], Farwa Baber[a], Jana Jaklová Dytrtová[a], Michal Jakl[b]
[a] Sport Sciences–Biomedical Department, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, ikovac@ftvs.cuni.cz
[b] Department of Agroenvironmental Chemistry and Plant Nutrition, Faculty of Agrobiology, Food and Natural Resources, Czech University of Life Sciences Prague, Kamýcká 129, 165 00 Prague–Suchdol, Czech Republic

Abstract
While miRNAs have been extensively studied in the context of human health and disease, their association with physical performance and exercise response is an emerging area of research. Certain miRNAs have been found to be differentially expressed in response to exercise and may influence skeletal muscle remodeling, angiogenesis, inflammation, and energy metabolism. Several, muscle-specific miRNAs have been linked to and regeneration. Several other miRNAs are involved in cardiac muscle function and have been associated with endurance exercise capacity. These miRNAs might be upregulated in response to endurance training and may contribute to the physiological changes that occur in the heart during aerobic exercise.
Keywords: miRNA; genes; sport; physical performance



Acknowledgment
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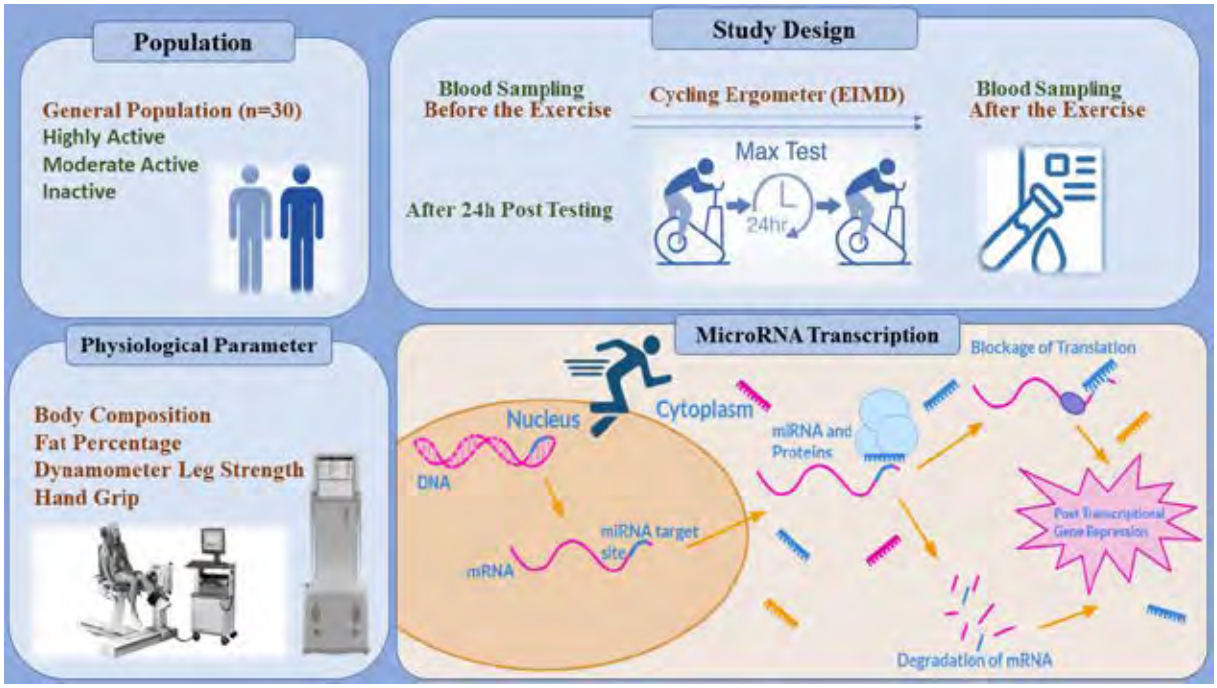
PROSPECTS OF miRNA AS EARLY-STAGE MUSCLE DAMAGE BIOMARKERS

Farwa Baber, Ishak Kovač, Jana Jaklová Dytrtová
Sport Sciences – Biomedical Department, Faculty of Physical Education and Sport, Charles University, José Martího 269/31, 162 52 Prague 6, Czech Republic,
babarfarwa1@gmail.com

Abstract
The microRNAs are small non-coding RNA molecules, whose measurement is rapidly increasing in basic as well as applied research for a variety of clinical applications including diagnostics of cancers and cardiovascular disease. An identified subset of micro RNAs (miRs), comprised of miR-1 miR-133, miR-206, and miR-434-3p, are explicitly expressed in muscular tissue, subsequently they are presently classified as muscular miRs (myomiRs). The study aims to identify the expression of the miRNAs together with specific inflammatory biomarkers in response to early-stage muscle damage. The participants will be from age 20 to 35 years old. The data will be gathered as blood sampling for biomarkers and physiological parameters such as dynamometer for lower and upper limbs, body composition and fat percentage will be measured. The result of the study can bring valuable data and contributes to the literature for future research into the problem of muscle damage which can be beneficial for athletes or any individual who engages in vigorous exercise as a part of their healthy lifestyle.
Keywords: miRNA; inflammatory biomarkers; muscle damage; physical stress; exercise



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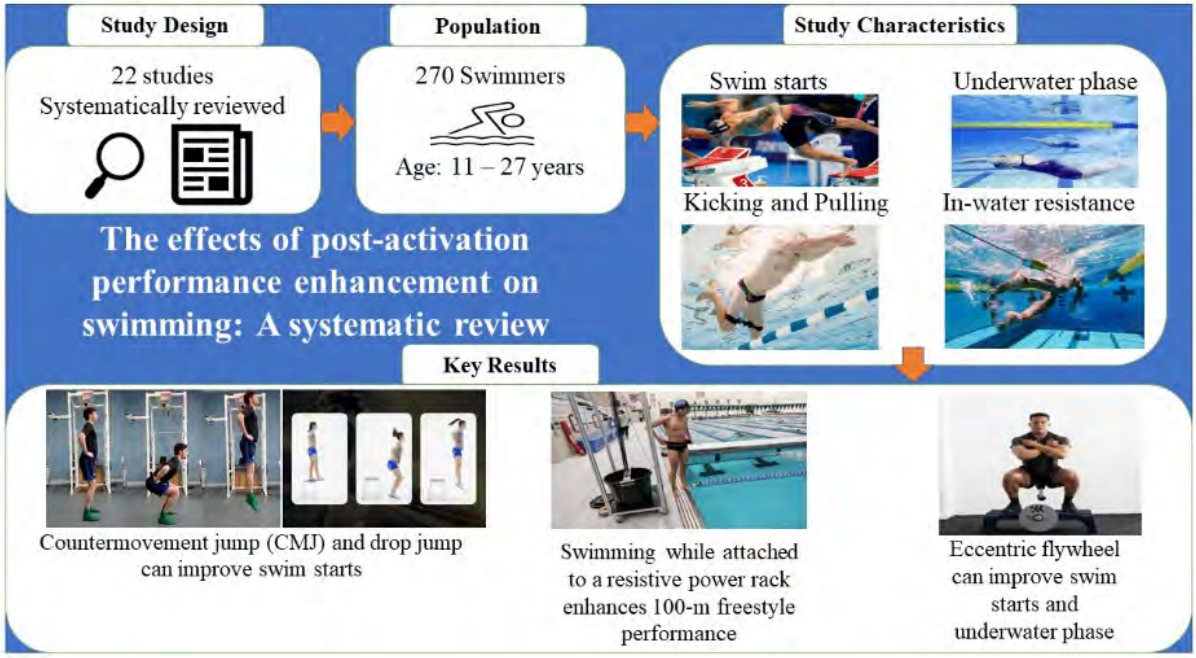
THE EFFECT OF POST-ACTIVATION PERFORMANCE ENHANCEMENT (PAPE) ON SWIMMING PERFORMANCE: A SYSTEMATIC REVIEW

Cagatay Inalli
Department of Physiology and Biochemistry, Faculty of Physical Education and Sport, Charles University, José Martího 31, Prague 6, 162 52, Czech Republic, inalli@ftvs.cuni.cz

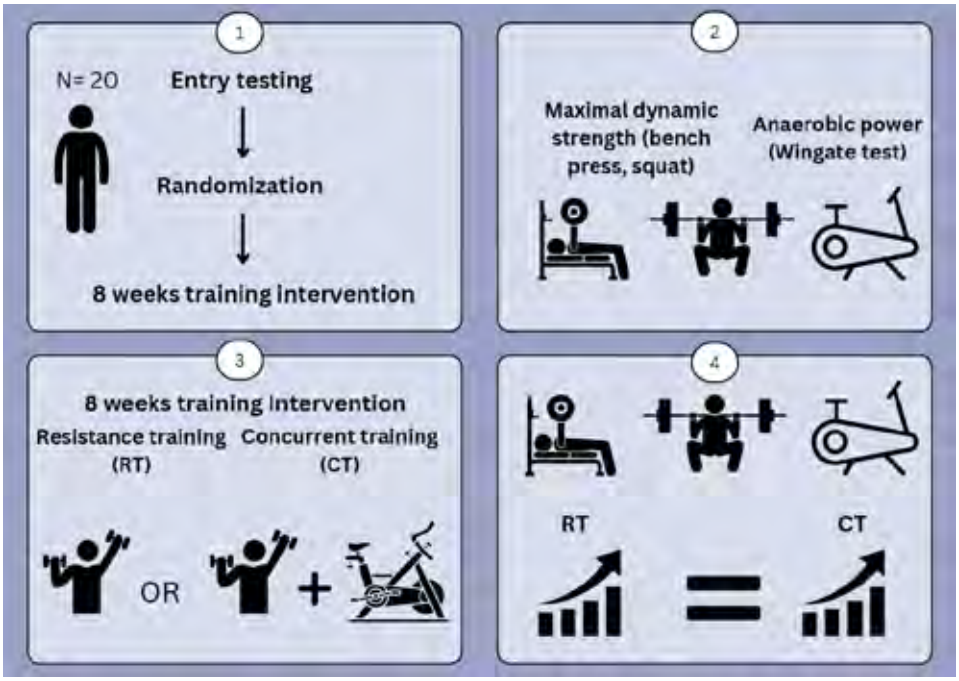
Abstract
This systematic review examines the effect of post-activation performance enhancement (PAPE) protocols on swimming performance. Different protocols including maximal swimming sets with resistance training tools, isotonic repetition with eccentric flywheel, bodyweights workouts (squats, lunges, and pull-ups), and jumps (box, drop, countermovement, and squat) have been used to enhance performance in swimmers. While some studies report non-significant or negative results, others show positive effects and trends. The researchers who suggested positive effects of PAPE on swimming performance have found that performing PAPE protocols (drop jumps, loaded box jumps, countermovement jumps, swimming with resistive power racks, doing half-squats on an inertial flywheel) improve swim starts (take off, peak vertical/horizontal forces and jump heights), 10m underwater swim parameters, arm pull/kicking thrusts, and 50/100m freestyle swimming time. The most effective PAPE protocol appears to be eccentric flywheel exercises. Other protocols may improve specific phases of swimming events or performance components. The effect of PAPE protocols on swimming performance may vary depending on athletes' strength level, training experience, and protocol implementation. Future studies should focus on swimming-specific PAPE protocols, such as isotonic exercises with an eccentric flywheel or assembling swimming movements in dry-land sessions, to further investigate their impact on swimming time and performance parameters.
Keywords: performance enhancement; post-activation; swimming



NO EVIDENCE OF THE INTERFERENCE EFFECT IN HEALTHY RECREATIONALLY ACTIVE MEN

Dominik Puda[a], Ivan Struhár[a], Tamara Barusová[b]
[a] Department of Physical Activities and Health Sciences - Faculty of Sports Studies, Masaryk University, Kamenice 753/5, Brno 625 00, Czech Republic, dominik.puda@mail.muni.cz
[b] Institute of Biostatistics and Analyses Ltd., Poštovská 68/3, 602 00 Brno, Česká republika

Abstract
Concurrent strength and endurance training is widely performed by recreationally active people as well as professional athletes. This type of training is often accompanied by a negative effect of endurance training on strength training-related outcomes, termed an Interference effect. We examine whether concurrent training attenuates strength training adaptation compared to strength training alone. Twenty recreationally active men were included in the study and randomized to concurrent training or resistance training groups. Fifteen participants completed the 12-week study protocol (mean age 23.4 ± 3.0, mean weight 79.9 ± 10.0, mean height 180.8 ± 7.0). Both groups improved maximal dynamic strength (1 repetition maximum squat +16.1 % vs. +16.9 % for concurrent and strength training groups, respectively (p = 0.954), and bench press +8.5 % vs. +9.8 % for concurrent and strength training groups, respectively (p = 0.602)). Maximum anaerobic power was also improved to a similar extent (+9.2 % vs. +7.8 % for concurrent and strength training groups, respectively (p = 0.862)). The results did not show statistically significant differences between groups regarding adaptation improvement. These results suggest that in recreationally active young men, concurrent endurance and strength training can be as effective as strength training in improving strength-related outcomes.
Keywords: concurrent training; interference effect; strength; power



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Keynote lecture

THE MENSTRUAL CYCLE AND ITS IMPACT ON WOMEN'S LIVES

Vendula Pánková
Pelvic floor specialist, somatic coach, dance teacher - www.vendulka.eu, info@vendulka.eu

Abstract
The menstrual cycle is still an underestimated topic, although it has a great influence on the life, health, and mental state of women. It affects women's bodies (hormone levels, pain threshold, inflammation, voice, mucous membranes, blood markers, ...), as well as mental skills, productivity, self-image, self-acceptance, relationships, work performance, and overall wellbeing. Menstrual pain is still perceived as normal, even though it indicates some problems worth looking into. The questionnaire survey I conducted, filled out by more than 1200 female respondents, focuses primarily on the menstrual phase of the cycle and how it is experienced by Czech women. It shows that 50% of respondents experience menstrual pain and other problems associated with menstruation each cycle, 46% of respondents rate the pain as severe (16.5% very severe to crippling). The main symptoms are pain and cramping in the lower abdomen, intestinal problems, and fatigue. The survey also deals with the functional ways to relieve painful menstruation (p.e. its connection to pelvic floor muscles), its association with other medical conditions (p,e. endometriosis), the sociological aspect of menstruation (relation to menstruation, and how the knowledge about it is passed down from mothers) and the connection between menstruation and sex.
Keywords: menstrual cycle; menstruation; pelvic floor

HORMONAL CYCLES AND THEIR IMPACT ON PHYSICAL EXERCISE – INTRODUCTION OF THE PROJECT

Jana Jaklová Dytrtová[a], Vendula Soukupová[a], Ishak Kovač[a], Jitka Žurmanová[b], Lucie Korecká[c], Michal Jakl[d], Michal Šteffl[a], Tomáš Mika[a], Tomáš Navrátil[e]
[a] Sport Sciences–Biomedical Department, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, dytrtova@ftvs.cuni.cz
[b] Department of Physiology, Faculty of Science, Charles University, Viničná 7, 128 44 Prague 2, Czech Republic
[c] Department of Agroenvironmental Chemistry and Plant Nutrition, Faculty of Agrobiology, Food and Natural Resources, Czech University of Life Sciences Prague, Kamýcká 129, 165 00 Prague–Suchdol, Czech Republic
[d] Department of Agroenvironmental Chemistry and Plant Nutrition, Faculty of Agrobiology, Food and Natural Resources, Czech University of Life Sciences Prague, Kamýcká 129, 165 00 Prague–Suchdol, Czech Republic
[e] Institute of Medical Biochemistry and Laboratory Diagnostics, First Faculty of Medicine, Charles University, Kateřinská 1660/32, 121 08 Prague 2, Czech Republic

Abstract
The menstrual cycle is a natural process that occurs in females of reproductive age. It involves hormonal fluctuations and prepares the body for a potential pregnancy. The cycle is typically divided into 4 phases: the follicular phase, ovulation, luteal phase, and menstruation. The menstrual cycle can have various effects on physical activity and athletic performance due to hormonal changes. Here are some key points to consider: (i) During menstruation, the shedding of the uterine lining, some women may experience discomfort such as cramps, bloating and fatigue. These symptoms can potentially impact physical activity and may require adjustments in training intensity or rest periods. (ii) Hormonal fluctuations: The levels of estrogen and progesterone fluctuate throughout the menstrual cycle. Estrogen levels generally rise during the follicular phase and peak just before ovulation, while progesterone levels rise during the luteal phase. These hormonal changes can affect energy levels, metabolism, and mood. (iii) Energy availability: The menstrual cycle can influence energy availability, which is the amount of energy (calories) available for bodily functions and physical activity. Some women may experience increased hunger or food cravings during certain phases of the cycle. It is important to maintain a balanced diet to support energy needs and overall health. (iv) Strength and endurance: Research suggests that strength and endurance may vary during different phases of the menstrual cycle. For example, some studies have shown that muscle strength and power might be higher during the follicular phase, while endurance capacity could be improved during the luteal phase. However, individual variations exist, and not all women experience these effects. (v) Injury risk: Hormonal fluctuations, particularly in estrogen levels, can affect ligament and tendon laxity. This increased laxity may potentially raise the risk of injury to the musculoskeletal system, such as sprains or strains, during certain phases of the menstrual cycle. Proper warm-up, stretching, and strength training can help mitigate this risk. (vi) Recovery and adaptation: The menstrual cycle can impact recovery and adaptation to training. Some studies suggest that the body may respond differently to training stimuli during different phases of the cycle. It is important to listen to your body, adjust training as needed, and allow for adequate recovery periods. It is worth noting that every woman's experience with the menstrual cycle is unique, and individual variations exist. Some women may not notice significant effects on physical activity or athletic performance, while others may experience more pronounced

changes. Tracking your menstrual cycle, symptoms and performance can help identify patterns and make informed decisions about training and self-care.
Keywords: menstrual cycle; hormone levels; training; musculoskeletal system

Acknowledgment
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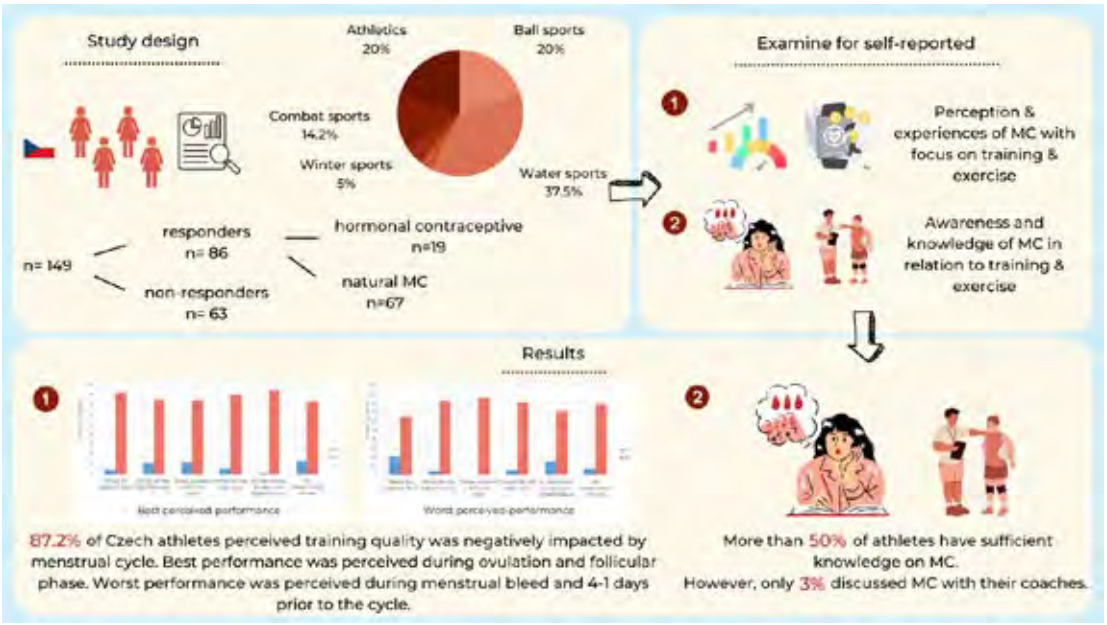
IMPACT OF MENSTRUAL CYCLE ON PERFORMANCE IN CZECH ATHLETES

Tereza Hybská[a], Jiří Dostal[b]
[a] Centre of Sports Medicine, Sokolská 35, Prague 2, Czech Republic,
tereza.hybska@gmail.com
[b] Centre of Sports Medicine, Sokolská 35, Prague 2, Czech Republic

Abstract
The purpose of this study was to (1) examine the perception and experiences of the Czech female athletes about their menstrual cycles with a focus on training and performance and to (2) understand their knowledge about the topic via a questionnaire. A total of 86 out of 149 Czech female athletes from multiple sports completed the questionnaire. Results revealed that athletes' experiencing natural menstrual cycles reported more negative, cycle-related side-effects compared to athletes on hormonal contraceptives. Interestingly, training adaptations (increased intensity, frequency, or duration) triggered disturbances to the standard menstrual cycles to 57.0% of all athletes. While the majority (62.8%) of athletes indicated sufficient knowledge about the menstrual cycles, its purpose, and effects on everyday life, only 10.5% adapted their training based on the menstrual cycle phases. Overall, the findings highlight the need to educate athletes and coaches on the menstrual cycle, considering it in the same light as other physiological functions in sport to improve health, well-being, and performance. Furthermore, providing education on how to construct trainings around the menstrual cycle, willingness to communicate this topic openly and support athletes suffering from the negative symptoms associated with the menstrual cycles is essential and should improve general perception about this topic.
Keywords: female athletes; menstrual cycle and performance; sex hormones; hormonal contraceptives

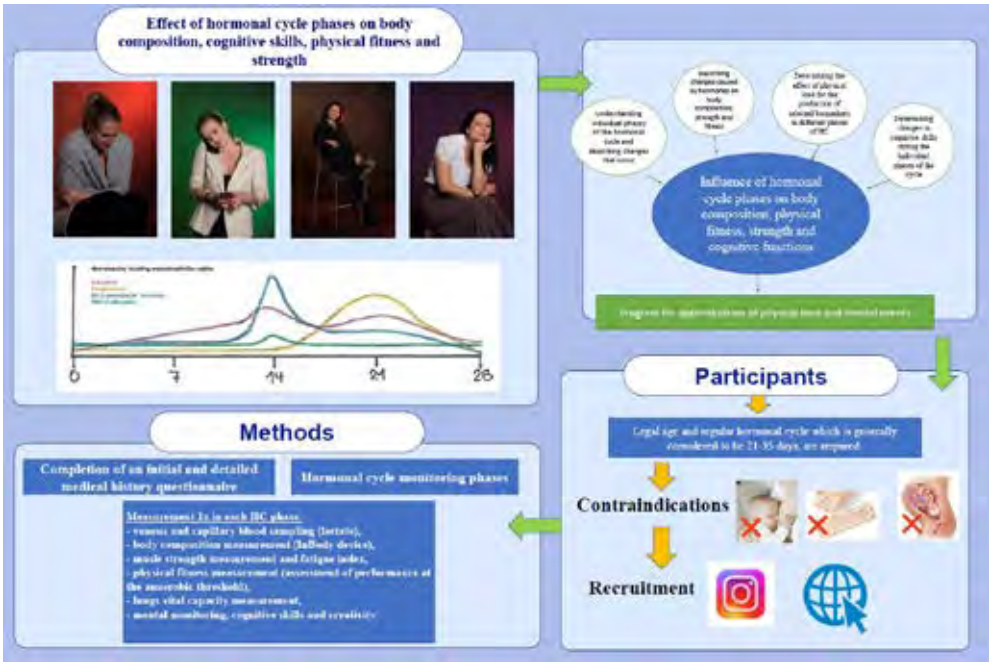


Acknowledgment
The contribution was processed within the project FEMALE PHYSIOLOGY AND ITS IMPACT ON ATHLETES' PERFORMANCE.

EFFECT OF HORMONAL CYCLE PHASES ON BODY COMPOSITION, COGNITIVE SKILLS, PHYSICAL FITNESS, AND STRENGTH

Vendula Soukupová
Department of Physiology and Biochemistry, Faculty of Physical Education and Sport, Charles University, José Martího 31, Prague 6, 162 52, Czech Republic,
soukupova@ftvs.cuni.cz

Abstract
The menstrual cycle is an integral part of the reproductive phase of a woman's life unless she chooses to influence it pharmacologically or suffers from health problems. Women perceive emotionally that their body goes through psychological or physical changes during the cycle. Hormone levels that influence and control the cycle are responsible for these changes. It is possible to read quite a lot of information about the menstrual cycle, however, the majority of these studies focus only on the menstrual (secretion) phase or on the qualitative research. It is important that a woman is able to recognize the individual phases on her own. A woman experiences approximately 450 cycles in her lifetime, yet for tens of millions of women around the world, the cycle regularly disrupts their physical, mental and social well-being. We want to focus on optimizing movement activities with hormonal changes related to the menstrual cycle. An increased or, conversely, decreased level of some hormones that change during the cycle affects physical fitness, muscle strength, endurance, or movement coordination. The results of this work will contribute to a better understanding of the changes that occur during the menstrual cycle in relation to movement and the entire healthy lifestyle.
Keywords: menstrual cycle; strength; hormone level; progesterone; estrogen

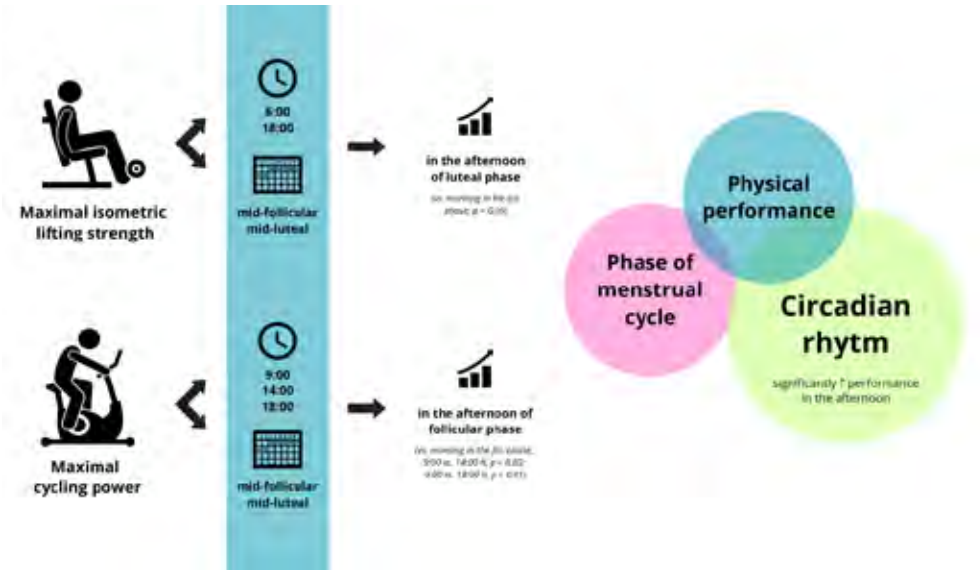


Acknowledgment
The article was processed as a part of the doctoral project for the academic year 2023/2024.

EFFECT OF CIRCADIAN RHYTHM AND MENSTRUAL CYCLE ON PHYSICAL PERFORMANCE IN WOMEN: A SYSTEMATIC REVIEW

Michaela Beníčková[a], Marta Gimunová[b], Paludo[c]
[a] Department of Physical Activities and Health Sciences, Faculty of Sport Studies, Masaryk University, Kamenice 5, 625 00 Brno, Czech Republic, michaela.benickova@mail.muni.cz
[b] Department of Physical Activities and Health Sciences, Faculty of Sport Studies, Masaryk University, Kamenice 5, 625 00 Brno, Czech Republic
[c] Incubator of Kinanthropology Research, Faculty of Sports Studies, Masaryk University, Kamenice 5, 625 00 Brno, Czech Republic

Abstract
The area of physical performance in women is attracting growing attention due to the increased participation of women in sports. On the contrary, women are still under-represented in sport science research. Several reviews have examined the effect of the menstrual cycle or circadian rhythm on physical performance in women. However, none have focused on the combined effect of circadian rhythm and menstrual cycle on physical performance. This work aims to expand our understanding of the possible relationship between the menstrual cycle, circadian rhythm, and physical performance in women. This systematic review is conducted according to the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). A bibliographic search was carried out in the Web of Science, PubMed, Scopus, SPORTDiscus, and Google Scholar databases. A total of 4 articles met the inclusion criteria. Only two studies find a significant interaction between the time of day and phase of the menstrual cycle with physical performance. The isometric strength increased in the afternoon in the luteal phase (versus the morning in the luteal phase, $p < 0.05$), and the maximum cycling power was higher in the afternoon in the follicular phase (versus the morning in the follicular phase, $p < 0{,}01$). Although it is not clear from the articles which phase of the menstrual cycle is more "favorable" for physical performance, the study agrees that the afternoon is more optimal for performance than the morning.
Keywords: circadian rhythm; time of day; menstrual cycle; physical performance; endurance; strength; power; women; sportswomen

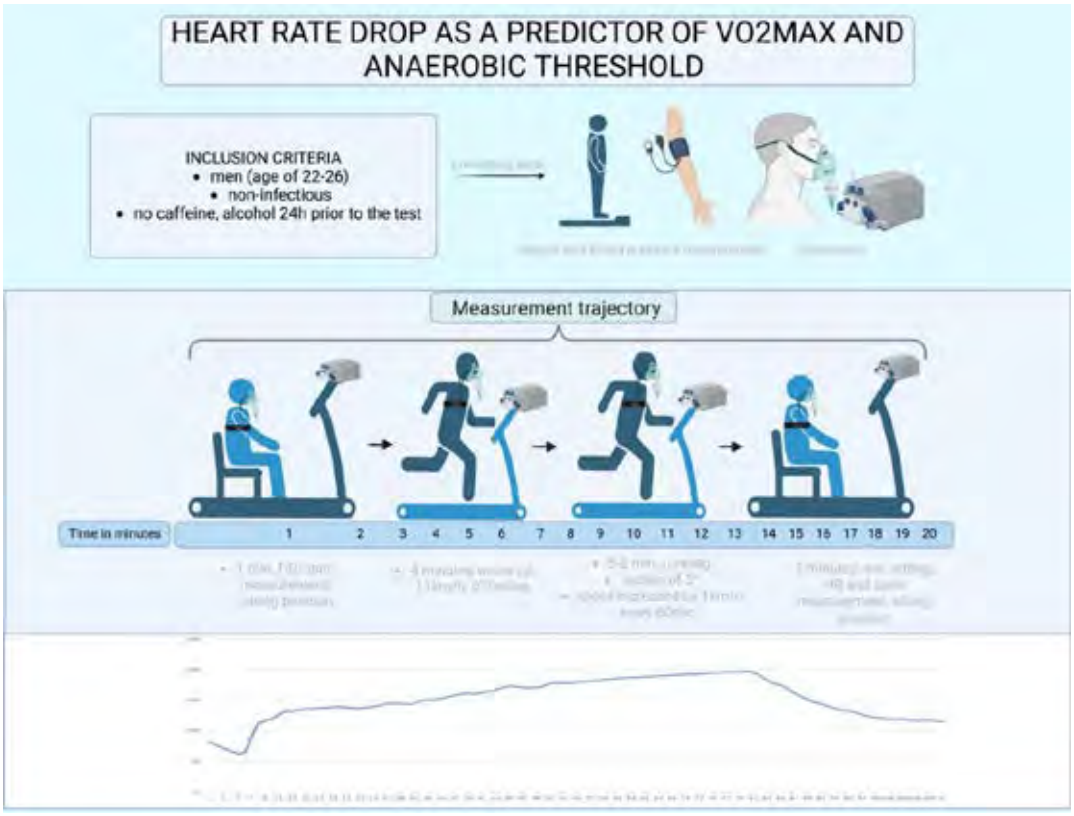


HEART RATE RECOVERY AS A PREDICTOR FOR VO_2MAX AND ANAEROBIC THRESHOLD

Bohuslav Cabrnoch and Pavel Hráský

Department of Human Movement studies, Faculty of Physical Education and Sport, Charles University, José Martího 31, Prague 6, 162 52, Czech Republic, bcabrnoch@gmail.com
LSM UK FTVS, José Martího 31, Prague 6, 162 52, Czech Republic

Abstract
Ten healthy men, aged 22-26 years, participated in the testing. The probands had their blood pressure, weight, and height measured before testing. Subsequently, they were fitted with a silicone spiro-ergometric mask and chest belt to measure heart rate. After stepping on the treadmill ergometer, standing spirometry (FEV1/FVC) and minute ventilation in sitting were performed. In the warm-up, probands completed a run for 4 minutes (11 km/h, 0° incline). In the 5th minute the incline was set to 5°. From the 6th minute onwards, the speed of the treadmill ergometer was increased by 1 km/h every minute until the proband could not continue. After the run, the proband was seated and heart rate was measured for 5 minutes along with spirometry.
The rate of decline in heart rate was significant up to 120 s, after which the rate of decline slowed. The average of the maximum values achieved SF_{max} equal to 190,8 ± 7,6, the decrease after 120 s was 59,7±6,3 bpm and the decrease after 300 s was 79.2 ± 4.2 bpm. The highest correlation with VO_2max was after 30 s for the decrease in absolute values r^2=0,51. In percentage terms, the highest correlation was also after 30 s, but it reached the value r^2=0,47.
Keywords: master's thesis; speed of recovery; adaptation; recovery; load



3. Adaptation Mechanisms to Stress and Extreme Conditions

Keynote lecture

CARDIOPROTECTIVE POTENTIAL OF EXPOSURE TO MODERATE COLD

Jitka Žurmanová[a], Aneta Marvanová[a], Veronika Tibenská[a], František Galatík[a], Petr Kašík[a], Pavel Vebr[a], Barbara Elsnicová[a], Lucie Hejnová[a] , Daniela Horníková[a], Petr Vodička[b], Petr Matouš[c], Jiří Novotný[a], František Kolář[d], Olga Nováková[a]

[a] Department of Physiology, Faculty of Science, Charles University, Viničná 7, Prague 2, 128 00, Czech Republic

[b] Institute of Animal Physiology and Genetics, Czech Academy of Sciences, Libechov, Czech Republic

[c] First Faculty of Medicine, Center for Advanced Preclinical Imaging (CAPI), Charles University, Czech Republic

[d] Institute of Physiology, Czech Academy of Science, Prague, Czech Republic

Abstract

Acute coronary occlusion is the leading cause of morbidity and mortality in the Western world. This disease is characterized by insufficient blood supply to regions of the myocardium, which leads to tissue necrosis (infarction). Ischemic heart disease develops as a consequence of many pathological situations, including hypertension, atherosclerosis, hyperlipidaemia, and diabetes. However, the heart was found to be able to cope with ischemic stress by activation of endogenous protective pathways, for example, preconditioning, exercise or chronic hypoxia, and newly cold acclimation. Cold acclimation or hardening are well known for hundreds of years and were approved in known Priessnitz´s cold-water therapy, however, the molecular bases of its beneficial effect is not fully understood yet. Cold acclimation stimulates adrenergic and thyroid hormone cocktail in our body, improves thermoregulation, vascular reactivity, possesses hypolipidemic effect and renew insulin sensitivity. Recently, we have documented the infarct size limiting effect of moderate cold in animal models without any negative side effect such as hypertension and ventricular hypertrophy. Since that we are seeking the mechanism of the cold-elicited cardioprotection by protein and structure analyses of myocardial and brown adipose tissue, and also bioactive molecules secreted in blood serum.

Keywords: moderate cold; cardiovascular health; adrenergic signaling; infarct size; immune system

PRACTICAL BENEFITS OF COLD HARDENING IN ATHLETES

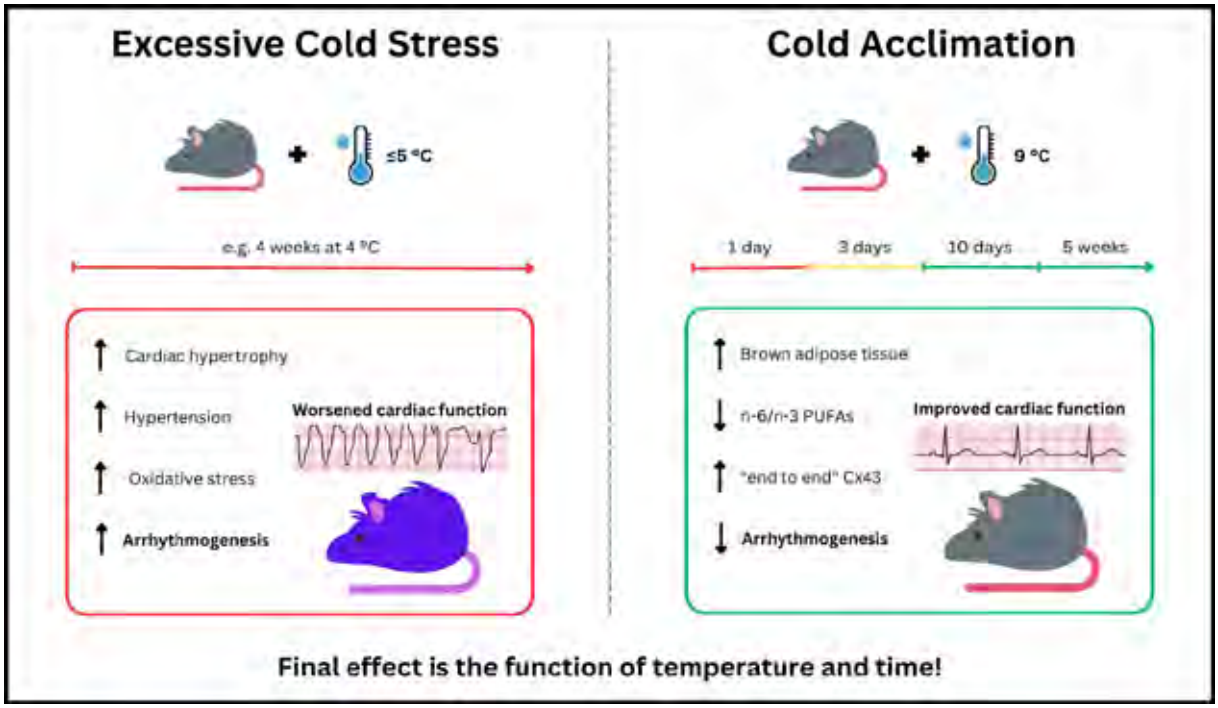
Radim Jebavý
Department Track and Field, Sports and Outdoor Activities, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, rjebavy@ftvs.cuni.cz

Abstract
Cold water affects the human body in different ways. Athletes use cold to affect performance by local or total immersion in cold water at several levels. Either before, during, or even after the sport performance. Our presentation will focus primarily on the health aspects of getting used to the cold, i.e. hardening. We provide practical information on how to proceed with this process for athletes so that hardening is an added benefit in increasing their resistance. The point is not that they become hardened swimmers, but that their organisms can cope with high-intensity training in their specialization in times of various viral diseases without consequences. High intensity often causes a decrease in immunity and higher disease susceptibility. Hardening is also one of the possible forms of how athletes can expand their comfort zone and their mental state.
Keywords: increasing resistance; comfort zone; health

COLD ACCLIMATION AND ARRHYTHMIAS

František Galatík[a], Petr Kašík[a], Pavel Vebr[a], Aneta Marvanová[a], Jana Kohútová[a], Marek Vecka[b], Daniela Horníková[a], Olga Nováková[a] Barbara Elsnicová[a], Jitka Žurmanová [a]
[a] Department of Physiology, Faculty of Science, Charles University, Viničná 7, Prague 2, 128 00, Czech Republic
[b] 4th Department of Internal Medicine, First Faculty of Medicine, Charles University, U Nemocnice 2, Prague 2, 128 08, Czech Republic

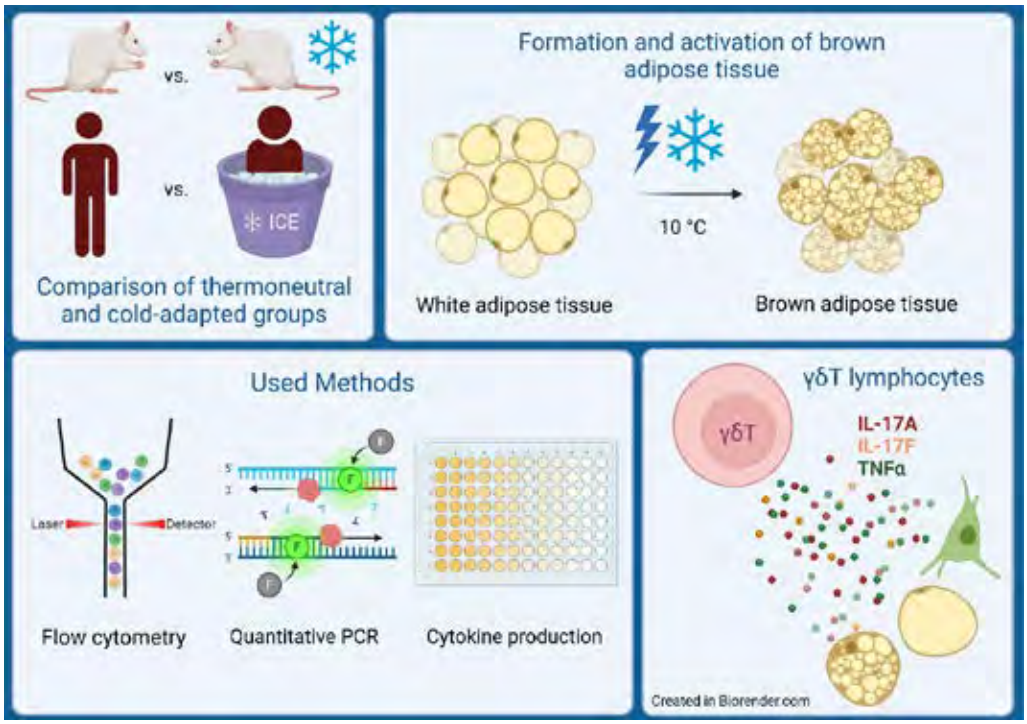
Abstract
A higher incidence of cardiovascular diseases in winter is associated with sudden exposure to cold resulting in adrenergic hyperactivation (cold shock). However, it's common knowledge that deliberate cold exposure is beneficial, even though its mechanisms are mostly unknown. The aim of this work is to elucidate the underlying mechanisms of cold exposure with an emphasis on optimal protocols. It was shown that some protocols with either too low of a temperature and/or long exposure may lead to dangerous chronic conditions such as hypertension, cardiac hypertrophy, and oxidative stress, all of which act as pro-arrhythmic substrates. However, a 200-year-old tradition of cold-water therapy (Vinzenz Priessnitz) led us to develop a protocol of "mild cold acclimation" which elicits anti-arrhythmic phenotype without negative effects, a mechanism we discovered to be associated with the decrease of n-6/n-3 PUFA ratio and remodeling of cardiomyocyte Connexin 43. Considering the recently growing interest in this topic it's necessary to distinguish between positive cold acclimation and negative excessive cold stress.
Keywords: arrhythmias; cardiovascular health; cold acclimation; cold stress



THE EFFECT OF COLD ADAPTATION ON THE IMMUNE SYSTEM

Daniel Vašek[a], Peter Holíček[a], František Galatík[c], Jitka Žurmanová[c], Magdaléna Krulová[a]
[a] Department of Cell Biology, Faculty of Science, Charles University, Viničná 7, 128 43 Prague 2, Czech Republic, daniel.vasek@natur.cuni.cz
[b] SOTIO Biotech a.s., Jankovcova 1518, Prague 7, 170 00, Czech Republic
[c] Department of Physiology, Faculty of Science, Charles University, Viničná 7, 128 43 Prague 2, Czech Republic

Abstract
The reduced temperature represents a challenge for the organism, in which it must ensure the preservation of physiological processes employing thermoregulation. The adaptation process is mainly related to the formation of brown adipose tissue and white adipose tissue being, in which cytokines and immune cells play an essential role. In this study, using flow cytometry, we monitored the presence of individual immune cell at different time points of cold acclimatization. Significant changes in the immune response to inflammatory stimuli indicated complex systemic modulation of immune reactions and were associated with altered metabolism of immune cells. Control of thermogenesis has recently been associated with a homeostatic population of γδT-cells in brown adipose tissue. Accordingly, we observed an increase in the percentage of γδT-cells producing IL-17 and TNFα in the spleen, peripheral blood, and peritoneal cavity of cold-adapted rats. These results have also been confirmed in humans. Compared to controls, volunteers who regularly bathed in ice water showed an increased percentage of γδT-cells and a difference in the levels of various cytokines. Uncovering the immune-related processes associated with cold and subsequent metabolic changes may help develop therapeutic approaches to various diseases, such as obesity or metabolic disorders.
Keywords: cold; cold adaptation; immunology; brown adipose tissue, γδT-cells



Keynote lecture

TELEMEDICINE- HYBRID CARE IN PREGNANCY

Hynek Heřman[a], Ondřej Tefr[b]
[a] Institute for the Care of Mother and Child, Prague (ÚPMD), Czech Republic
[b] Meddi hub, Prague, Czech Republic

Abstract
Telemedicine is defined as an umbrella term for healthcare activities, services, and systems operated remotely via information and communication technologies to support global health, prevention, and healthcare, as well as education, healthcare management, and healthcare research.
In clinical practice, this capability allows us to provide health services remotely and at a scale that can be determined by the needs of patients and the capabilities of health professionals. For prenatal care, the use of telemedicine is an innovation that not only improves compliance of pregnant women, but also provides a more accurate assessment of health status and, ultimately, an economic advantage for both clients and payers. Prenatal care is clearly defined within the recommended practices of professional societies, and thanks to modern technology we are able to provide maximum care not only for prevention but also to ensure comfort for symptomatic patients. For the time being, so-called "low-risk" pregnancies are the priority, with the expectation of use in high-risk patients. Likewise, this modality will gradually be used to monitor high-risk newborns (preterm births, peripartum hypoxia, congenital defects, etc.).
Distance medicine can thus act as a tool to improve access to health care and also complement health care itself in a very useful way.
As the largest maternity hospital in the Czech Republic (over 5000 deliveries/year), ÚPMD in cooperation with MeddiHub provides prenatal care in the form of online pregnancy clinics, and in the future, it is preparing this option for long-term hospitalized patients with the option of remote monitoring in the home environment (of course, according to the preference of the pregnant woman).
Keywords: hybrid care; telemedicine; prenatal care

THE EFFECT OF SHORT MOVEMENT ACTIVITY WITH MAXIMUM EFFORT ON miRNA EXPRESSION

Jana Jaklová Dytrtová[a], Michal Jakl[b], Denisa Smělá[c], Eliška Zelinková[c], Zuzana Bílková[c], Ishak Kovač[a], Jan Maleček[d], Michal Šteffl[a], Lucie Korecká[c]

[a] Laboratory of Sports Biochemistry, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, dytrtova@ftvs.cuni.cz

[b] Department of Agroenvironmental Chemistry and Plant Nutrition, Faculty of Agrobiology, Food and Natural Resources, Czech University of Life Sciences Prague, Kamýcká 129, 165 00 Prague–Suchdol, Czech Republic

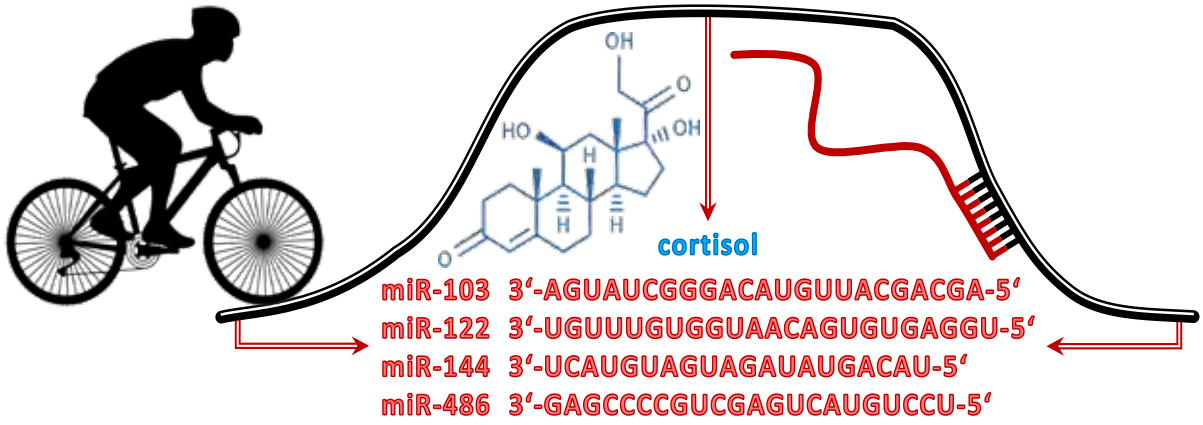
[c] University of Pardubice, Faculty of Chemical Technology, Department of Biological and Biochemical Sciences, Pardubice, Czech Republic

[d] Department of Military Physical Education, Faculty of Physical Education and Sport, Charles University, Prague 6, Czech Republic

Abstract

MicroRNAs (miRNAs) affecting gene expression by post-transcriptional mechanisms are promising biomarkers reflecting the actual physiological state of the organism. To study the response to the movement (load set on an ergometer), men in age 19-23 years were selected. In their blood were monitored: miR-103 (metabolism of saccharides), miR-122 (lipid metabolism), and miR-144 and miR-486 (inflammation), with the cortisol level (stress) in saliva and O_2 saturation in peripheral tissues. In the low sport-active (< 2 hours a week) group, miR-103 decreased immediately after exercise, related to the increase in insulin receptor sensitivity. This was not observed in the highly sport-active (> 11 hours a week) group, probably due to the adaptation to the extensive metabolism during performances. The 25% decrease in miR-122 among all groups indicates that physical performance is related to increased oxidation of fatty acids. The positive effect is related to the decrease in miR-122 during and after the performance: the increased oxidation of fatty acids and cholesterol is mainly seen in sport-inactive or moderately active men (~ 3-5 hours a week).

Keywords: microRNA; marker; exercise; metabolism; cortisol; O_2 saturation



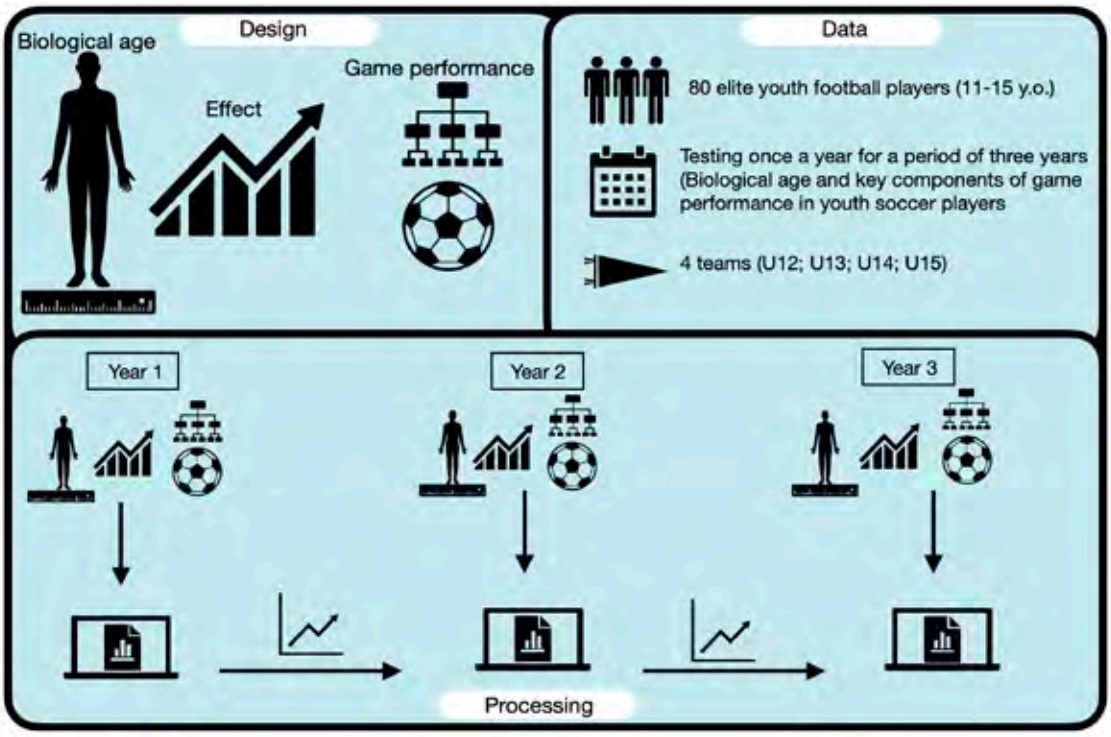
Acknowledgment

The contribution was processed within the project Cooperatio 120 015.

THE EFFECT OF BIOLOGICAL AGE ON KEY COMPONENTS OF GAME PERFORMANCE IN YOUTH SOCCER PLAYERS

Miroslav Grobar
Department of Sport Games, Faculty of Physical Education and Sport, Charles University, José Martího 31, Prague 6, 162 52, Czech Republic, grobarm@seznam.cz

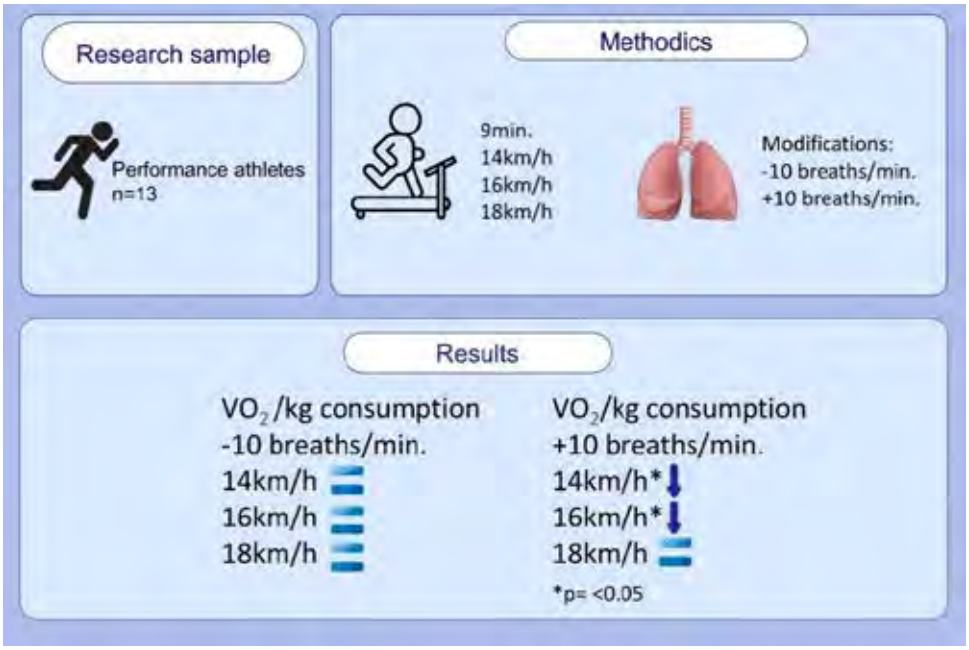
Abstract
The "preference of biologically accelerated individuals" is today an intensively addressed scientific topic not only in football but in sports in general. Different biological age and degree of physical growth in players of the same calendar age are associated with differences in performance criteria, especially in the area of conditioning abilities. This "distorted" view of player potential in the eyes of coaches can have the effect of eliminating promising but biologically delayed players from club talent/elite youth programs. The results of previous research activities point to low or insufficient research into the relationship between biological age and some components of the game performance of young football players. The relationship between technical-tactical skills and biological age appears to be particularly unexplored. The current state of knowledge is very limited due to the fact whether, in what time horizon, and at what pace the individual components of game performance change with respect to the different biological age of individual groups of players (biologically accelerated players, biologically delayed players and ”on time” players in conjunction with a biological and calendar age) in the key period of 11-15 years. Considering the above facts, the project aims to determine the possible effect of biological age on the key components of game performance in young soccer players (11-15 years old). The results of the project can significantly contribute to the optimization and individualization of the development of the long-term game performance of young football players in the adolescent period.
Keywords: biological age; physical growth; game performance; youth



THE EFFECT OF CONTROLLED-FREQUENCY BREATHING ON RUNNING ECONOMY

Dávid Žigo and Rastislav Frass
Department of Physical Activities and Health Sciences, Faculty of Sport Studies, Masaryk University, Kamenice 753/5, 625 00 Bohunice, Czech Republic, 487708@mail.muni.cz

Abstract
The aim of the research was to establish the effect of controlled-frequency breathing on the running economy among endurance runners. Thirteen performance athletes (height 179,6±6,6 cm; weight 68,6±4,9 kg; time for 10 km race – 32:50±1:20 min.) took part in the research and underwent three running economy measurements. The running economy measurement consisted of three steps at 14km/h, 16km/h, and 18km/h velocity. Each step lasted for three minutes.
Based on the data from the first measurement, athletes were instructed to intentionally modify their breathing frequency to 10 breaths/min. higher or 10 breaths/min. lower frequency during the second, respectively, third measurements. Ventilatory parameters were analyzed by the Cortex analyzer.
The decrease in oxygen consumption was statistically significant at 14km/h (p=0.02) and 16km/h (p=0.029) with an intentional increase in the breathing frequency. At 18km/h the statistical significance did not occur (p=0.85). The intentional decrease in the breathing frequency did not show any statistical significance at any of the tested velocities.
According to the measured data, it can be concluded that an intentional increase in the breathing frequency can decrease oxygen consumption at velocities inferior to racing pace for distances up to 10 kilometers. At the racing velocity, none of the breathing modifications reported improvement in the running economy and therefore probably will not improve the racing performance.
Keywords: running economy; breathing frequency; spiroergometry; oxygen consumption



Acknowledgment
The contribution was processed within the project MUNI/C/1709/2022.

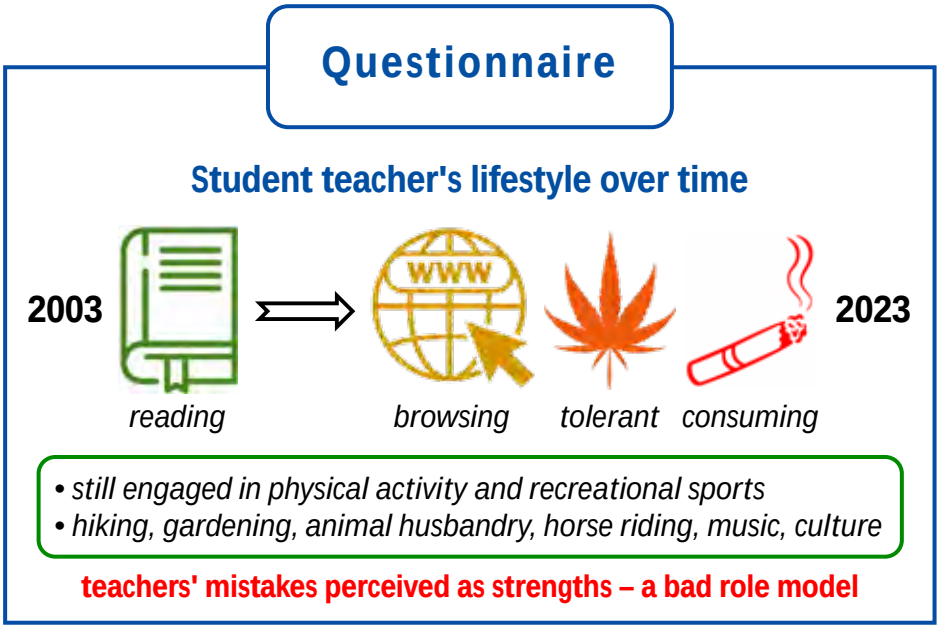
4. Education as a Tool for the Change

SELF-ANALYSIS OF THE LIFESTYLE OF FUTURE TEACHERS OF SECONDARY VOCATIONAL SCHOOLS

Radmila Dytrtová[a], Jana Jaklová Dytrtová[b], Michal Jakl[c]

[a] Institute of Education and Communication, Czech University of Life Sciences Prague, V Lázních 3, 159 00 Prague 5, Czech Republic, dytrtovar@ivp.czu.cz
[b] Sport Sciences–Biomedical Department, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic
[c] Department of Agroenvironmental Chemistry and Plant Nutrition, Faculty of Agrobiology, Food and Natural Resources, Czech University of Life Sciences Prague, Kamýcká 129, 165 00 Prague–Suchdol, Czech Republic

Abstract
The self-analysis of the lifestyle of students of teaching took place in 2003 (235 students) and after twenty years, in 2023 (111 students) to compare changes over the course of two decades. Questionnaires were focused on active movement, leisure activities, and hobbies, eating, smoking, drinking alcohol, and marijuana tolerance. At present, respondents spend more free time on the internet (men 90 min/day, women 105 min/day). The number of smokers increased (men by 16%, women by 13%). Tolerance for marijuana use has increased, and almost a fifth of respondents do not perceive this drug as addictive or dangerous. Respondents (up to 40%) do not have time to eat regularly. Interest in reading decreased; only 50% devoted to reading compared to 2003 when almost everyone listed reading as a hobby. On the other hand, 80-85% of them are still engaged in sports. Teachers must pay close attention to the saying "*Verba movent, exempla trahunt*".
Keywords: exemplary behavior; self-perception; habits

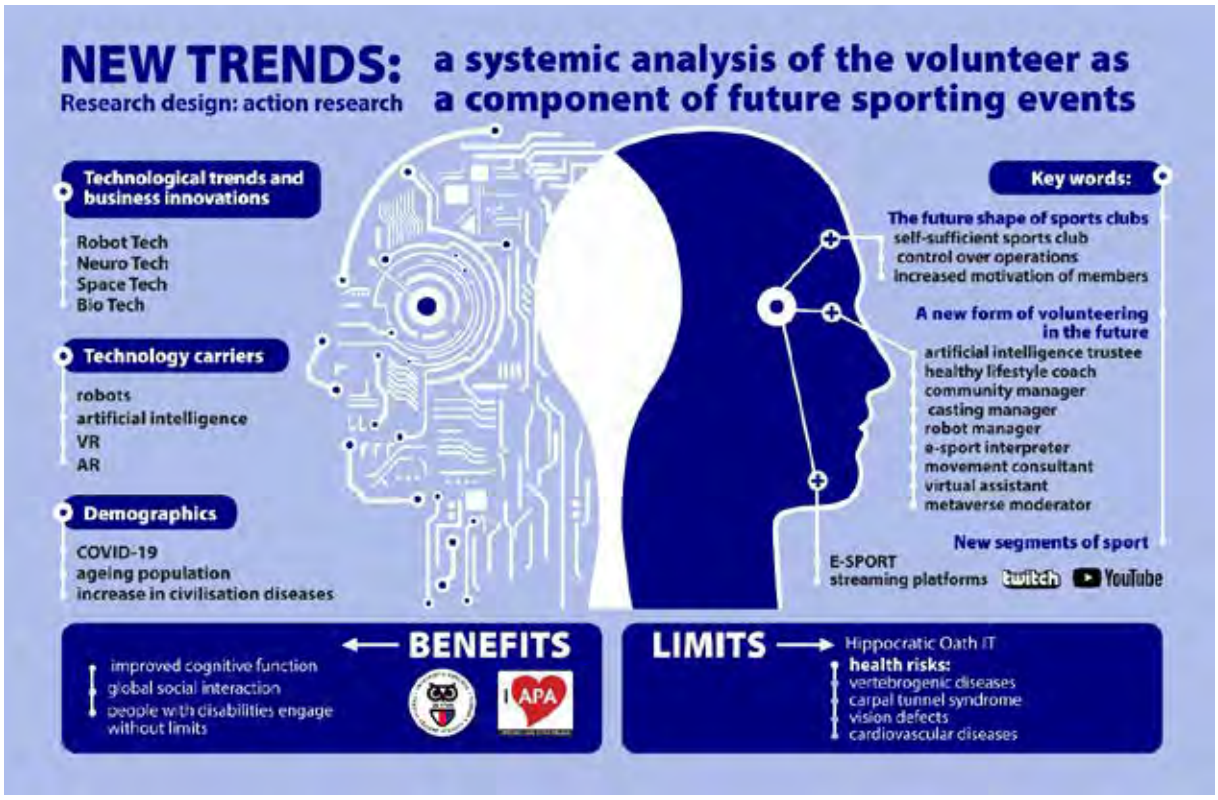


Acknowledgments
The contribution was processed within the project Cooperatio 120 015.

NEW TRENDS: A SYSTEMIC ANALYSIS OF THE VOLUNTEER AS A COMPONENT OF THE IMPLEMENTATION OF FUTURE SPORTING EVENTS

Ilona Pavlová
Department of Health Physical Education and Physical Medicine, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, ipavlova@ftvs.cuni.cz

Abstract
The dissertation on "A Systematic Analysis of the Volunteer as a Component of Future Sport Event Implementation" will include a survey of volunteer needs and preferences, an analysis of current volunteer behavior and future contributions to the organization, identification of areas where volunteers can make the greatest contribution, and future planning and coordination of volunteer activities in sport event implementation. Following the findings, sports organizations can better plan the training of volunteers so that, on the one hand, the training matches the needs of the organization and, on the other hand, the training matches the skills of the volunteers, with a view to better ensuring the coordination of the tasks that volunteers will perform during sporting events in the future. The behavior of the real cohort analyzed in the current time in sport organizations will include the motivation of volunteers, the ways in which organizations recruit and retain volunteers, and how volunteers contribute to improving the quality of the organization's services to members or participants in sport events. Volunteers are people who choose to give their time and energy to help an organization achieve its goals to reduce its costs in implementation. The future shape of sport organizations is likely to be influenced by many factors such as changes in people's interests and preferences in exercise, technological advances, economic conditions, and demographic changes. In the future, volunteering in sport organizations may become more flexible and adaptable, allowing people to engage with the organization according to their preferences and time availability in light of the discussed reduction in working hours. The future shape of volunteering will certainly be influenced by new technologies and opportunities, such as digital platforms for recruiting and coordinating volunteers and the automation of certain processes within the organization. At the same time, it is likely to be important for sport organizations to provide meaningful and rewarding experiences for volunteers to keep them motivated and interested in volunteering. A systemic analysis of the volunteer as a component of future sport event delivery could provide a holistic view of the new face of volunteering and the new face of sport organizations, thereby helping to develop a strategy for attracting and retaining volunteers to deliver sport events and support sport club self-sustainability.
Keywords: new segments of sport; future form of sports clubs; new form of volunteering



Acknowledgments
I very much appreciate the cooperation with the Department of Sport Management and the E-sport section of the Faculty of Physical Education and Sport of Charles University and I sincerely thank them.

THE IMPORTANCE OF VOLUNTEERING FOR INDIVIDUALS AND SOCIETY AT PARA SPORT EVENTS IN TERMS OF WORK AND PERSONAL WELL-BEING

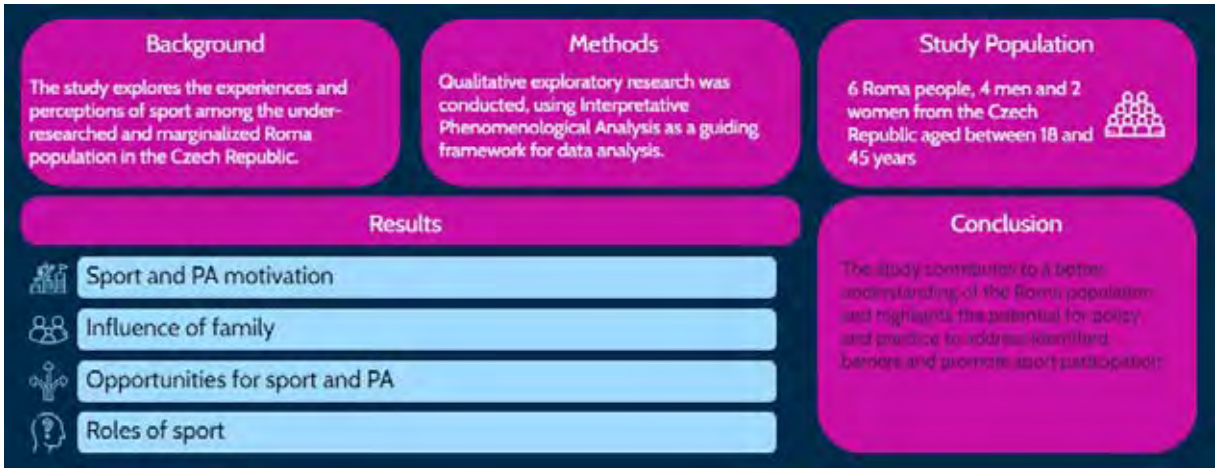
Monika Pavlíková
VŠTVS Palestra, spol. s.r.o. Slovačíkova 1/400, 197 00 Kbely, monipavlik@gmail.com

Abstract
The dissertation proposal discusses volunteering as a phenomenon; across social, biological, and sporting differences, including religion and geographical location brings people together in work that is only prevalent through self-determination and experience rather than financial reward. We narrowed our view of volunteers to participants in sporting events for the Wheelchair Sports Club Prague and Journey to a Dream. The confrontation with a severely disabled athlete mostly in a wheelchair is all the more appreciated when fully engaged in activities with mindfulness of how to work with one's self-perception and self-worth. This thesis aims to extend the credit and acceptance of volunteering as a source of work and personal well-being not only on an individual but also on a societal scale.
Keywords: volunteering; phenomenon; para-sport; mindfulness; well-being

ROMA INTEGRATION, MOVEMENT, AND MENTAL HEALTH

Petr Bezděk
Department of Psychology and Sociology of Sport, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, bezdek@ftvs.cuni.cz

Abstract
The present study addresses the limited knowledge on sport and the Roma population in the Czech Republic, which is scarce in both peer-reviewed literature and government documents. This under-researched and marginalized group is the focus of the research, aimed at exploring their experiences and perceptions of sport, as well as identifying perceived benefits and barriers. Qualitative exploratory research was adopted, using Interpretative Phenomenological Analysis as a guiding framework. The study involved six participants, who were interviewed in a semi-structured manner for approximately 60 minutes. Data analysis was conducted using a combination of phenomenology, idiography, and double hermeneutics. The findings highlight the significance of extrinsic motivation and the availability of accessible opportunities as crucial factors in promoting sport participation. Lack of financial resources was also found to be a major barrier. Furthermore, participants reported inadequate parental support, a lack of ambitions and deeper purpose in engaging in sports and changing priorities during adolescence. Overall, the study contributes to a better understanding of the Roma population, who often face social exclusion and limited access to resources. The significance of this research lies in the potential to inform policy and practice to address the identified barriers and promote sport participation among the Roma population.
Keywords: Roma; sport; physical activity; experiences; perceptions

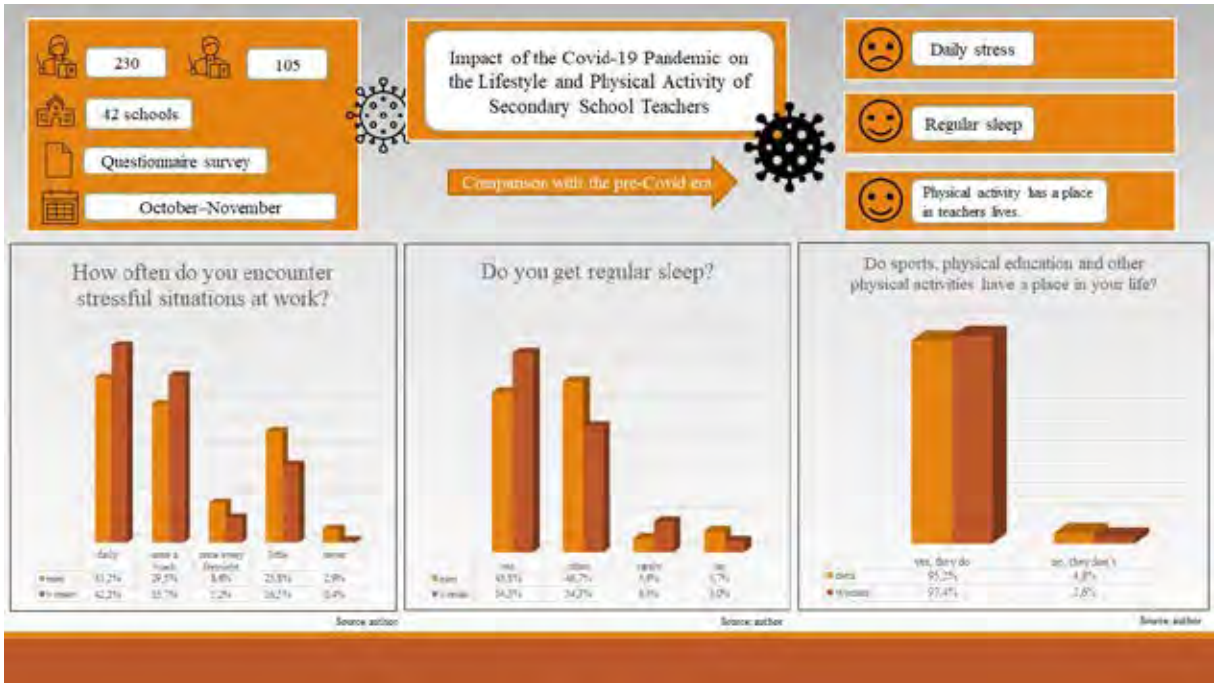


Acknowledgments
The contribution was processed as a part of doctoral studies under the supervision of doc. PhDr. Irena Slepičková, CSc.

IMPACT OF THE COVID-19 PANDEMIC ON THE LIFESTYLE AND PHYSICAL ACTIVITY OF SECONDARY SCHOOL TEACHERS

Jan Reiser
Department of Social Science Foundation in Kinanthropology, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, Jan.Reiser96@seznam.cz

Abstract
The paper deals with the impact of the covid-19 pandemic on the lifestyle and physical activity of secondary school teachers. Forty-two secondary schools participated in the study, with three schools selected from each region, including the capital city of Prague.
Data collection was in the form of a questionnaire survey and took place during the 2022/2023 school year. Results are presented by gender and reflect responses from 335 individuals (230 females and 105 males).
Three questions were analyzed to determine whether respondents sleep regularly and whether physical activity has a place in their lives. The results regarding work stress, to which a large proportion of the teachers surveyed are exposed on a daily basis, can be considered negative.
Keywords: healthy lifestyle; sleep; physical activity; stress; impact of the pandemic



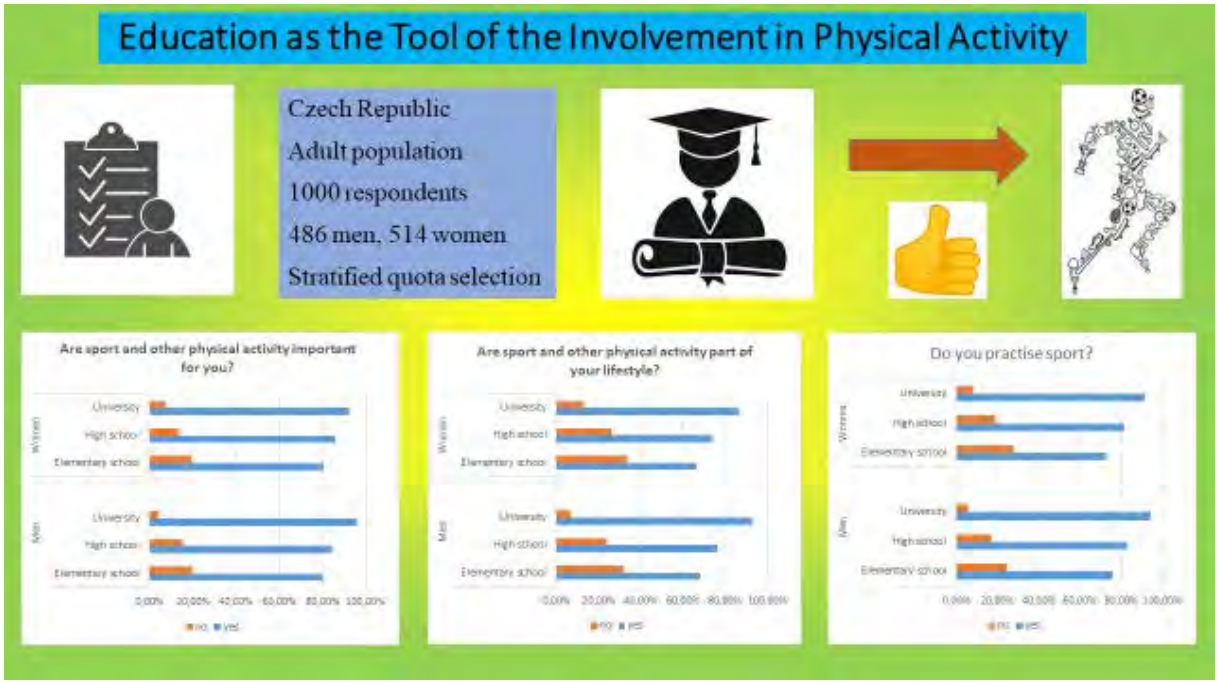
Acknowledgments
I would like to thank the supervisor PhDr. Kamil Kotlík, Ph.D.
The project was processed as part of the rigorous thesis and was approved by the Ethics Committee of the UK FTVS under action number 196/2022.

Keynote lecture

EDUCATION AS THE TOOL OF THE INVOLVEMENT IN PHYSICAL ACTIVITY

Kamil Kotlík
Department of Social Background in Kinanthropology, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, kotlik@ftvs.cuni.cz

Abstract
The paper deals with the issue of education and its relationship with a healthy lifestyle, namely with sport and other physical activities among the Czech adult population.
The research question was if people with higher education will have also a better relationship towards sport and other physical activity. The research was realized by the questionnaire SFSPA (Social Role of the Sport and Physical Activity) in the years 2019-2020. The research sample consisted 1000 of respondents (486 men and 514 women) from all over the Czech Republic. We used a stratified quota selection with regard to a sex, age, and residence.
The results clearly testifie that a grade of an education has a positive connection with a relationship towards sport and other physical activity.
Keywords: sport; education; physical activity; relationship; attitude; lifestyle; adults

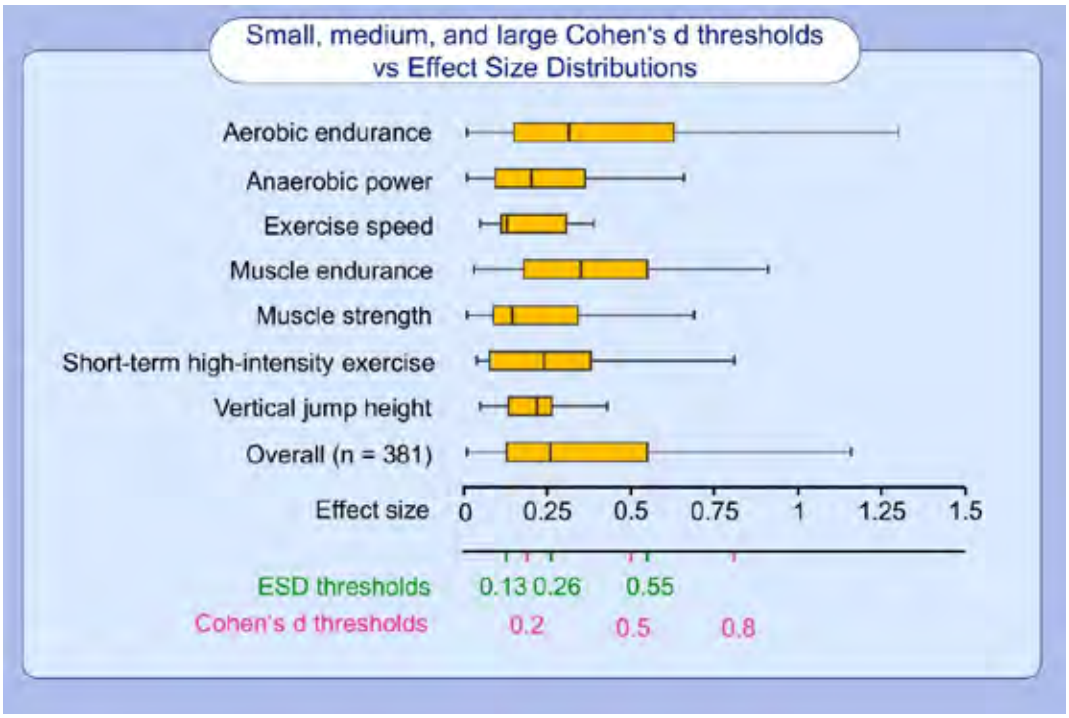


Acknowledgments
The research has been held under the support of Cooperatio, No. 12015.

EVIDENCE-DERIVED EFFECT SIZE DISTRIBUTIONS: A CASE STUDY OF CAFFEINE ERGOGENICS

Vít Třebický, Vojtěch Nesvadba, Daniel Šťastný
Department of Gymnastics and Combat Sports, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic
vit.trebicky@ftvs.cuni.cz

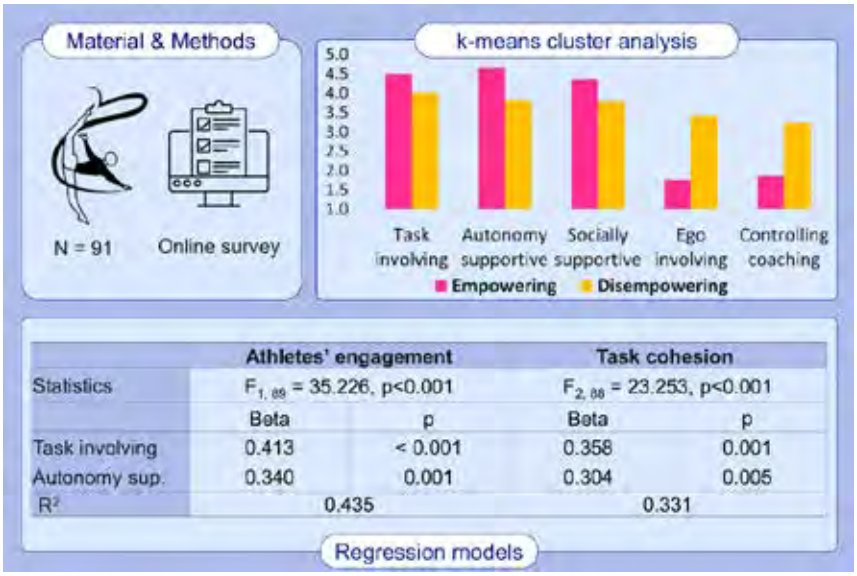
Abstract
In statistical analyses, the magnitudes of the observed effects (e.g., the mean difference between treatments) are expressed as effect sizes. To discern small, medium, and large effect sizes, the rule-of-thumb thresholds (*d* 0.2, 0.5, and 0.8, respectively) suggested by Cohen are frequently used. However, the effect size binning should not be universal but should reflect the effect size distribution (ESD) in particular research topics split into the 25th, 50th, and 75th quartiles. Against these distributions, effect sizes should be compared to determine whether they are smaller, average, or larger than those in comparable studies. Multiple research fields have reported that evidence–based ESDs are considerably smaller than the traditional thresholds.
The effect of caffeine on performance is one of the most studied topics in sports science, where traditional thresholds are also used. We extracted 381 effect sizes from 12 meta-analyses across 7 sports domains (e.g., aerobic performance, muscle strength) to investigate the potential discrepancy between traditional and evidence-based thresholds. The ESD showed effect sizes of 0.13, 0.26, and 0.55 as smaller, average, and larger than average, respectively, with marginal variation between sports domains.
Similar to other research fields, traditional effect size thresholds misrepresent the ESD observed in caffeine ergogenic studies.
Keywords: Cohen's d; Hedge's g; SMD; significance; sample size; reliability



THE EFFECTS OF COACH-CREATED MOTIVATIONAL CLIMATE IN RHYTHMIC GYMNASTICS

Bianca Maria Laroëre[a], Eliška Horová[b], Jiří Mudrák[c], William Crossan[b], Vít Třebický[a]
[a] Department of Gymnastics and Combat Sports, Faculty of Physical Education and Sport, Charles University, Prague, Czech Republic, blaroere@gmail.com
[b] Department of Sport Management, Faculty of Physical Education and Sport, Charles University, Prague, Czech Republic, crossan@ftvs.cuni.cz, eliska.hora@seznam.cz
[c] Institute of Psychology, Czech Academy of Sciences, Prague, Czech Republic,

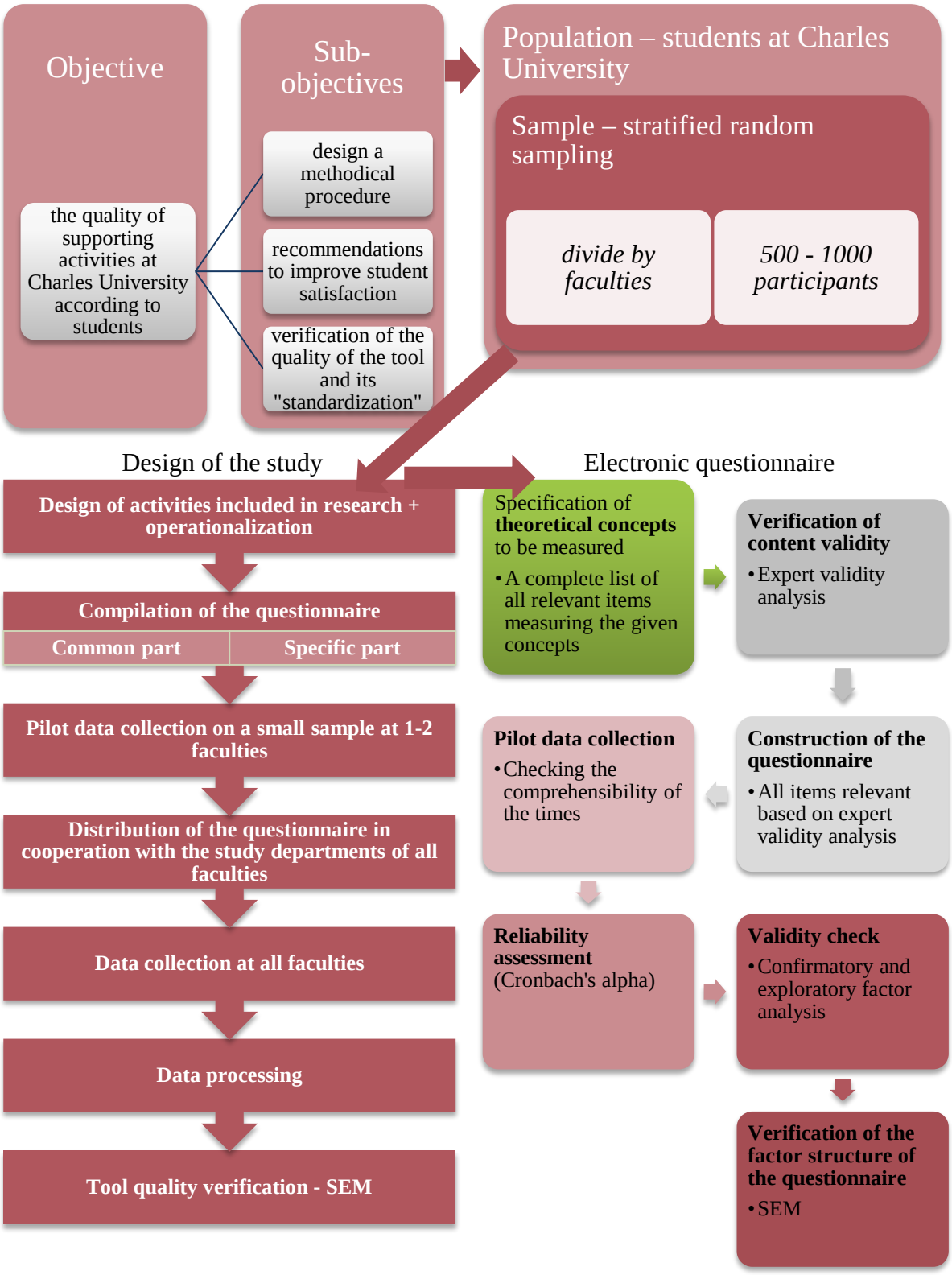
Abstract
Rhythmic gymnastics is an aesthetic sport involving complex and particular training processes with high physical and psychological demands. This study aimed to investigate the athletes' perception of the coach-created motivational climate and its relation to the athletes' motivational and social outcomes.
Ninety-one rhythmic gymnasts (aged 12 to 18; 57.1 % national, 42.9 % international non-elite level) completed an online survey including the Empowering and Disempowering Motivational Climate Questionnaire-Coach and Athlete Engagement Questionnaire. We hypothesized that the empowering climate (represented by greater autonomy, task orientation, social support, and lower ego orientation and controlling coaching) would be positively related to motivational (i.e., athletes' engagement) and social (i.e., team cohesion) outcomes.
In regression models, autonomy-supportive climate (βs 0.413, 0.304) and task involving motivational climate (βs 0.34, 0.358) were the main predictors of athletes' engagement and team cohesion, explaining 43.5 % and 33.1 % of the variance, respectively. In the k-means cluster analysis, we identified two latent groups: "empowered" and "disempowered", the disempowering being more prevalent (57 %).
Our results corroborated our hypotheses and thus suggested that a coach-created empowering motivational climate may be an important predictor of motivational and social outcomes in competitive athletes.
Keywords: coaching; engagement; motivation; performance; athlete



EVALUATION OF THE QUALITY OF SUPPORTING ACTIVITIES AT CHARLES UNIVERSITY

Tereza Viplerová
Department of Sports Management, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, tviplerova@gmail.com

Abstract
Contemporary educational institutions no longer offer only study programs but are engaged in many activities that create a suitable environment for students and other target groups. The success of their institution depends primarily on the perceived quality of the supply, which exceeds the demand for education. Every school must evaluate the quality of studies by law. But as far as supporting activities are concerned, they are neglected in the evaluation. They are often only a very small part of the evaluation of studies. The project, therefore, deals with the evaluation of the quality of supporting activities at Charles University. We are going to find out information about student satisfaction with the offer of supporting activities at the university, and then we are going to draw up recommendations to improve student satisfaction. The partial aim is to propose a methodological procedure intended for the collection of data regarding the evaluation of the quality of the supporting activities offered at Charles University. The information obtained will be important for improving the offer of additional services and for creating a high-quality evaluation tool to use at all faculties of Charles University.
Keywords: evaluation; quality; supporting activities; university

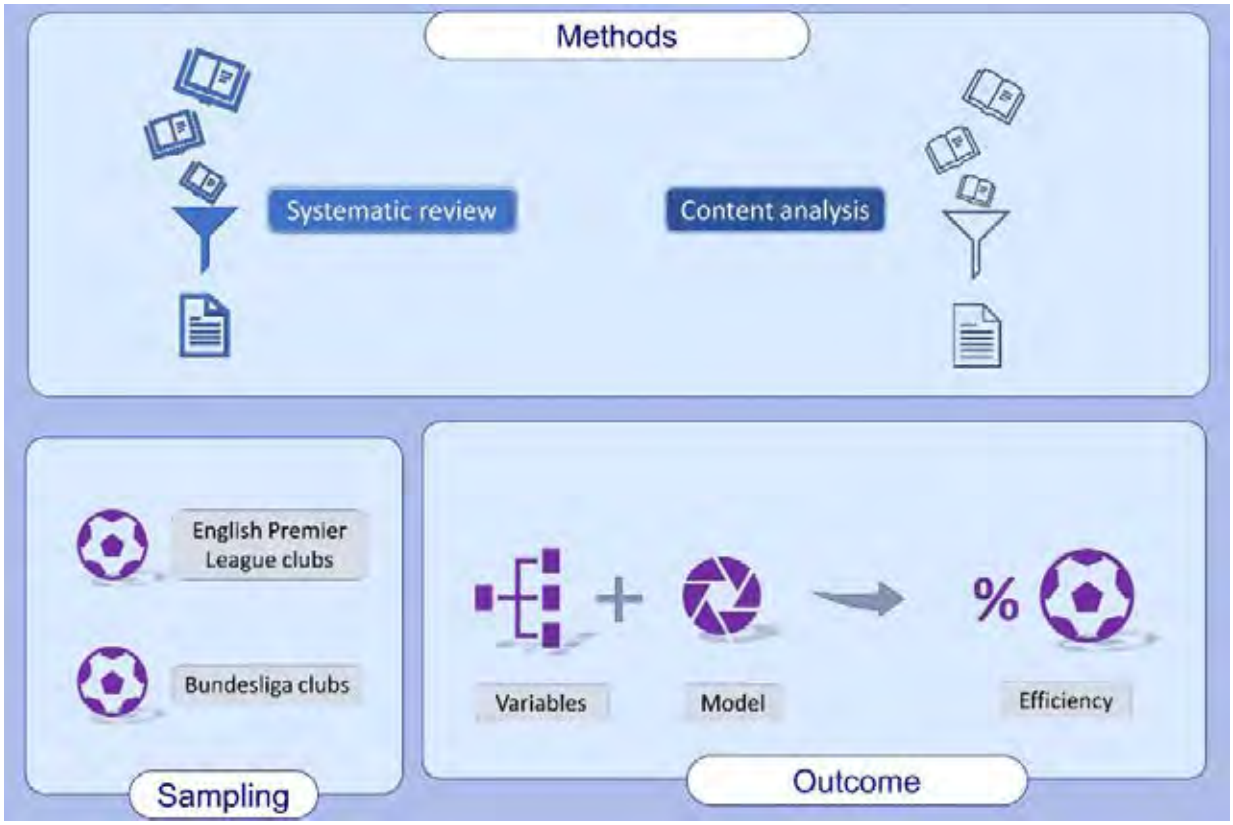


Acknowledgments
The contribution was processed within the project of the dissertation.

DISSERTATION PROJECT: EVALUATION OF PRODUCTIVE EFFICIENCY OF PROFESSIONAL FOOTBALL CLUBS

Veronika Krause[a] and Jan Šíma[b]
[a] Department of Sport Management, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, nika.krause@seznam.cz
[b] Department of Sport Management, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, sima.jan@gmail.com

Abstract
There is currently no scientific consensus on how to evaluate the productive efficiency of professional football clubs. Many approaches have been published by different authors, but each author uses a different methodology. The aim of this dissertation is to develop a new approach to evaluate the production efficiency of professional football clubs that reflects the latest scientific knowledge and the extensive globalisation of European football. To this end, a systematic review of previously published studies that have measured the efficiency of football clubs will be conducted. Subsequently, a content analysis will be conducted in the form of document analysis of annual reports documents and financial statements of clubs and umbrella organisations. In addition, a relational and conceptual content analysis of selected studies that have focused on the economics, marketing and PR of professional football clubs in the last five years will be conducted. Efficiency using new and selected existing approaches will be measured on clubs in the German and English top leagues in two consecutive seasons.
Keywords: Data Envelopment Analysis (DEA); football; productive efficiency

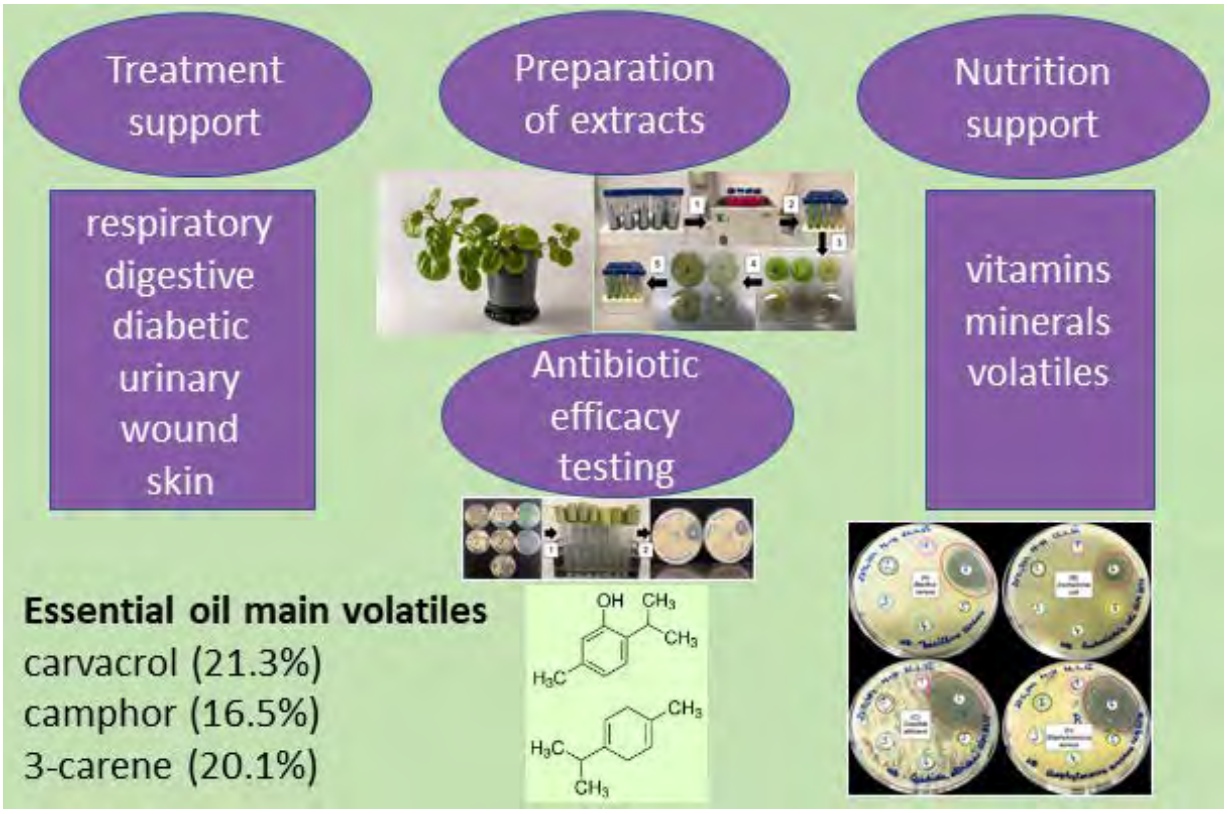


5. Nutrition and Population Health

PLECTRANTHUS SP. AS AN EFFECTIVE SUPPORT IN NUTRITION

Libor Červenka[a], Iveta Brožková[b], Nikola Bezdičková[b], Zuzana Červenková[c]
[a] Department of Analytical Chemistry, Faculty of Chemical Technology, University of Pardubice, Studentská 573, 532 10 Pardubice, Czech Republic, libor.cervenka@upce.cz
[b] Department of Biological and Biochemical Sciences, Faculty of Chemical Technology, University of Pardubice, Studentská 573, 532 10 Pardubice, Czech Republic
[c] Department of Clinical Subspecialities, Faculty of Health Studies, University of Pardubice, Průmyslová 395, 530 03 Pardubice, Czech Republic

Abstract
The leaves of *Plectranthus* sp. are used to treat respiratory disease and digestive problems or reduce the glucose level in the blood. It has also found its application in gastronomy, and it is a source of substances with antimicrobial effects. Essential oil appeared to be the most effective against *Candida albicans, Staphylococcus aureus* and *Bacillus cereus.*
Keywords: volatiles; antimicrobial; application



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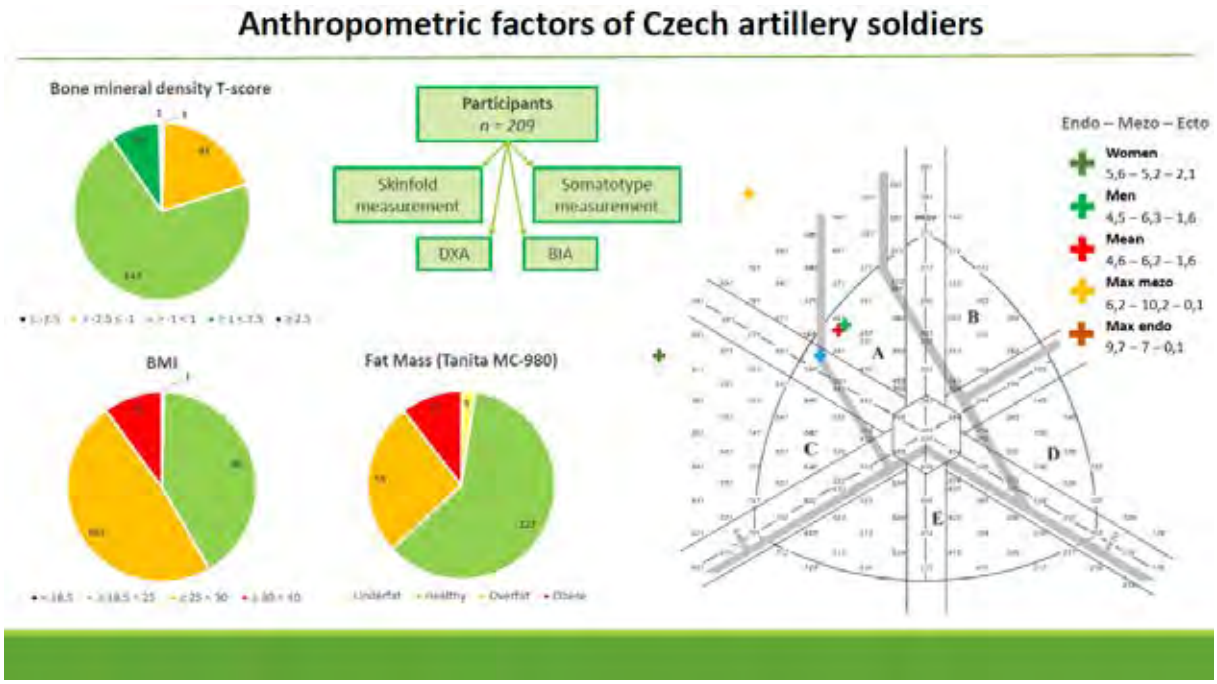
ANTHROPOMETRIC FACTORS OF CZECH ARTILLERY SOLDIERS

Jáchym Šimsa[a], Ivana Kinkorová[b], Karel Sýkora[a]
[a] Department of Military Physical Education, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, simsa.ftvs@gmail.com
[b] Sport Sciences–Biomedical Department, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic

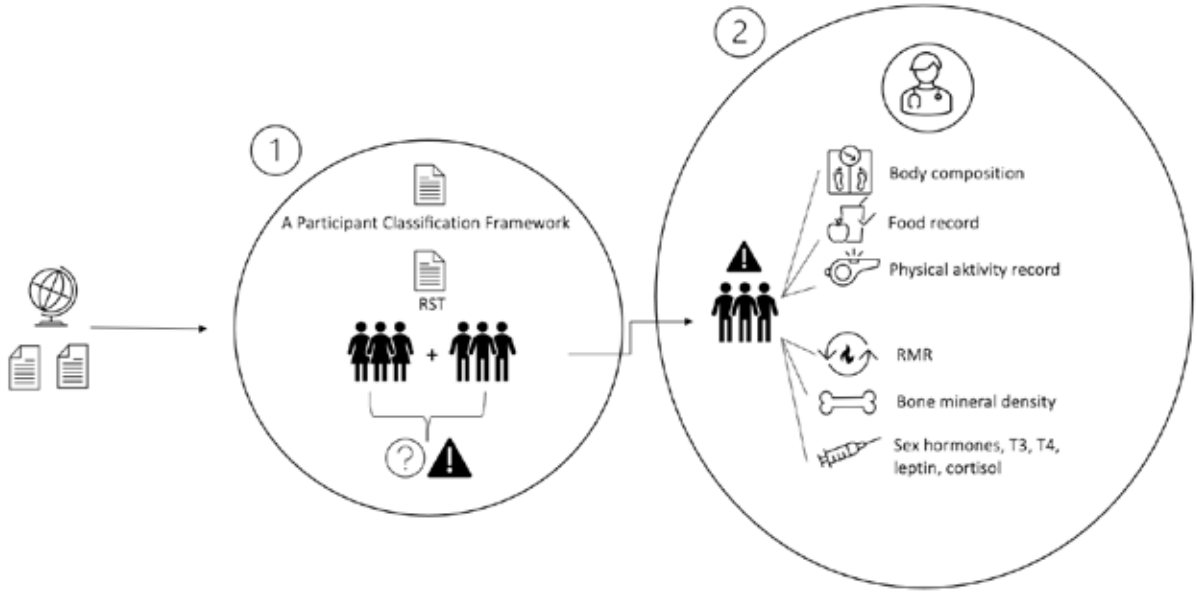
Abstract
The study conducted on professional soldiers involving 189 men and 20 women (age 31.7 ± 6.4 years; height 178.4 ± 7.7 cm; weight 83.8 ± 13.6 kg) consisted of four procedures - Heath-Carter somatotyping, Durnin-Womersley body fat estimation, a detailed bioelectrical impedance analysis (BIA) using Tanita MC-980, and a full-body dual-energy X-ray absorptiometry (DXA) using Horizon System. To determine mutual relations, Kendall rank correlation coefficient was used and the level of significance was set at p = 0.05. The average Czech artillery soldier is an endomorphic mesomorph with values of 4,6 6,2 1,6, has 25,3 % body fat (DXA), BMI 26,3 ± 3,5 kg/m^2 and bone mineral density T-score -0,1 ± 0,9. Compared to DXA used as a reference, the Tanita MC 980 BIA and Durnin-Womersley method measures 5,9 % and 3,3 % lower body fat mass, respectively. Attempt to determine a reliable predictor of low bone density using standard anthropometric methods failed.
Keywords: anthropometrics; somatotype; body fat; osteoporosis; DXA; BIA; Czech Army



PREVALENCE OF RELATIVE ENERGY DEFICIENCY IN SPORT IN ELITE CZECH ATHLETES

Kristýna Dvořáková and Michal Kumstát
Department of Sports Performance and Diagnostics, Faculty of Physical Education and Sport, Masaryk University, Kamenice 735/5, 625 00 Bohunice, Czech Republic,
461701@mail.muni.cz

Abstract
The research project deals with the issue of relative energy deficiency in sport (RED-S) in performance athletes in the Czech Republic. Its main scientific objective is to map the prevalence of RED-S in the Czech sports environment. Its sub-objective is founded on adapting a RED-S-specific screening tool (RST) and validation. In the initial phase, male and female respondents will complete the RST and another questionnaire (A Participant Classification Framework), based on which they will be assigned to the appropriate performance category. In the second phase, the male athletes who were assessed as being at risk of developing RED-S will then undergo the RST questionnaire validation against selected parameters obtained by the practical measurement method. These include the parameters necessary to calculate energy availability (food record, physical activity record, body composition) and other parameters (resting energy expenditure, bone mineral density (via DEXA), sex hormones serum concentration, T3, T4, leptin, and cortisol serum concentration). This procedure, based on comparison with the results of the questionnaire survey, will reveal the suitability of these parameters in the process of RED-S diagnosis in more detail and will also extend the possibility for male athletes to use the RST questionnaire, which has so far only been validated on female athletes.
Keywords: RED-S; relative energy deficiency; elite athletes; professional athletes; elite sports; energy availability; RED-S diagnosis methods



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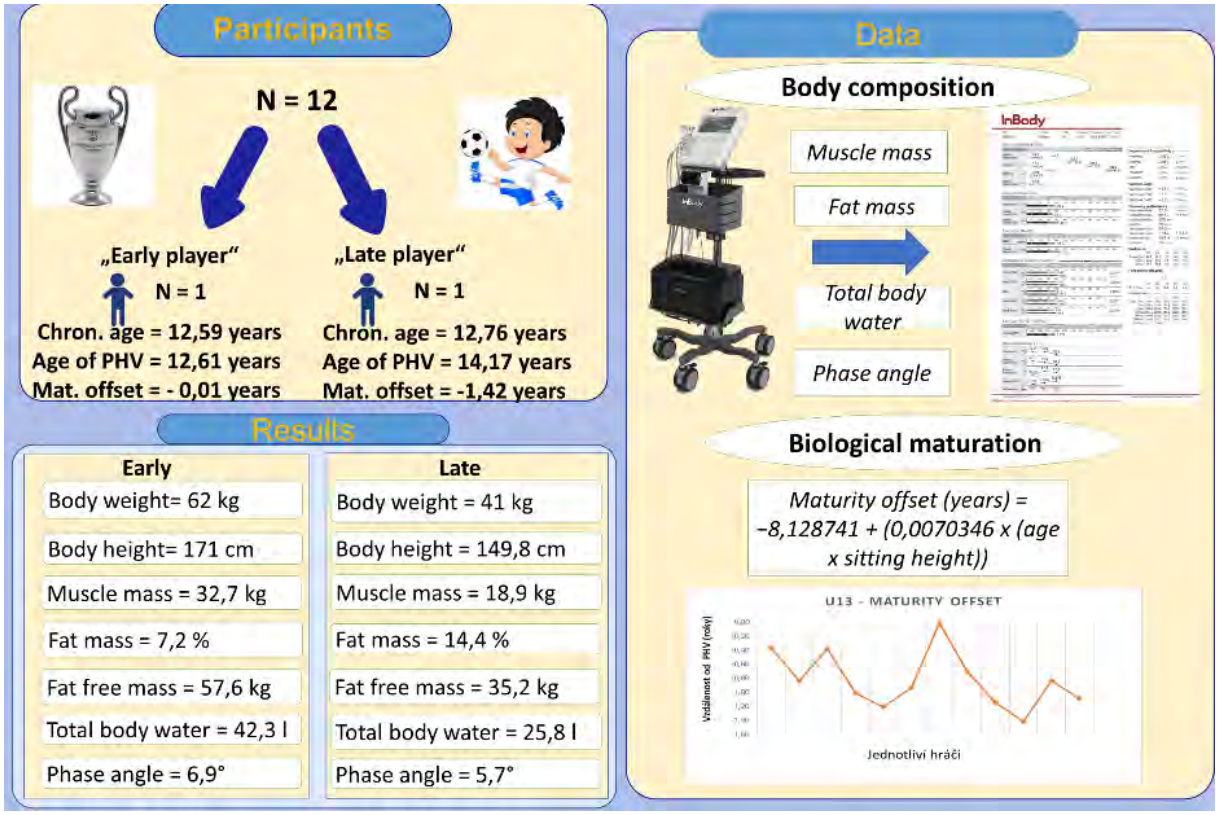
Thanks to Mgr. Michal Kumstát, Ph.D. The conference paper was prepared within the project Health, nutritional and performance-specific determinants in female athletes (69 189).

BIOLOGICAL MATURATION AND SELECTED BODY COMPOSITION PARAMETERS IN YOUNG FOOTBALL PLAYERS

Jakub Lukavský and Lucia Malá,
Faculty of Physical Education and Sport, Charles University, José Martího 31,
162 52 Prague 6, Czech Republic, lukavsky.kuba@seznam.cz

Abstract
Individual parameters of body composition (BC) contribute to and influence the player's performance potential in training or match. Within the individual age categories, we find biologically "early maturing" players and, on the other hand "late maturing" players. This trend can also be observed in the relationship between biological maturation and BC parameters. The work aimed to compare biological maturation and selected parameters of BC during ontogenesis in young football players. 12 players were included from U13 category. 2 players were deliberately selected for the final analysis - early and late players based on the predicted Maturity offset calculated according to Moore's equation. The final analyses indicate a link between biological maturation and BC parameters. Early player (chronological age = 12.59 years, maturity offset = − 0.01 years, predicted age Peak height velocity = 12.61 years). Late player (chronological age = 12.76 years, maturity offset = -1.42 years, predicted age Peak height velocity = 14.17 years). BC parameters were monitored in the players: body height, body weight, muscle mass, Fat-free mass, fat mass, total body water, and whole body phase angle.
Keywords: football; peak height velocity; muscle mass; fat mass

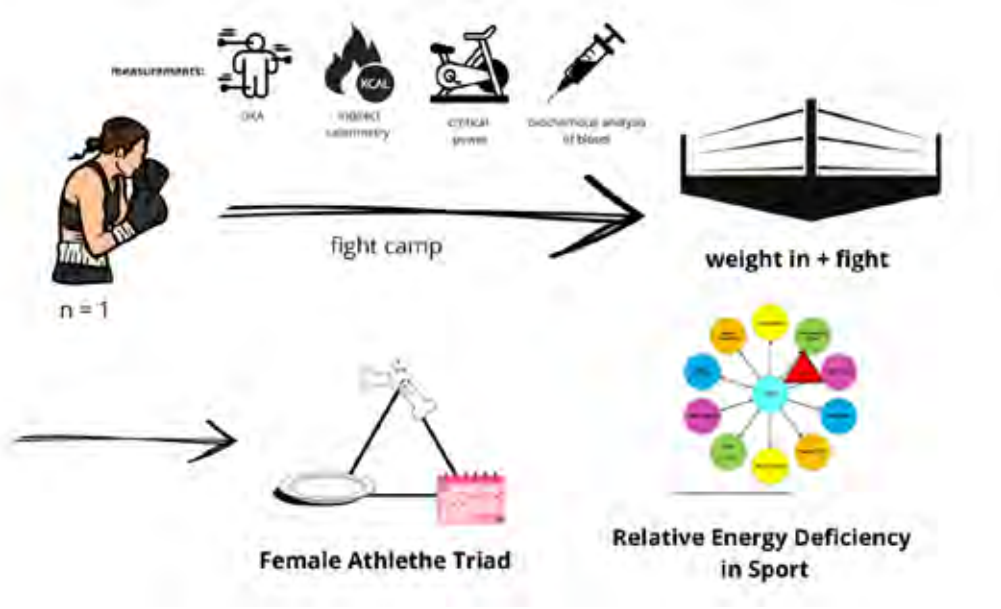


Acknowledgments
The project was supported by Cooperatio: Sports Science, Biomedical & Rehabilitation Medicine.

WEIGHT CYCLING IN COMBAT SPORTS

Viktorie Bulínová and Michal Kumstát
Department of Sports Performance and Diagnostics, Faculty of Physical Education and Sport, Masaryk University, Kamenice 735/5, 625 00 Bohunice, Czech Republic,
469645@mail.muni.cz

Abstract
In combat sports, athletes are divided by body weight into weight classes. In order to meet a given weight class limit, athletes manipulate their body weight. In terms of time, manipulation can be divided into long-term and acute manipulation. When long-term manipulation is used to create an energy deficit, athletes may find themselves in low energy availability, which can lead to the development of an athletic triad or relative energy deficiency syndrome in sports. With acute manipulation, the athlete becomes dehydrated, where there is a risk of acute kidney injury and the development of consequences associated with dehydration of the body. During a pilot study, the effect of pre-fight body weight reduction on the manifestations of relative energy deficiency syndrome in sport was investigated in a professional Muaythai athlete. The female athlete underwent a 5-week fight camp during which she was monitored (DXA, indirect calorimetry, critical power, and blood draws). There were anthropometric changes (reduction in adipose tissue), reduction in resting metabolic rate, changes in biochemical indices (creatinine, urea, cholesterol, thyroid hormones), and decreased performance. Research data, especially on women, in the context of weight manipulation, are lacking for the time being. Research can help with describing the negative consequences of body weight cycling on the body.
Keywords: RED-S; weight cycling; combat sports; diet; muaythai; MMA; box



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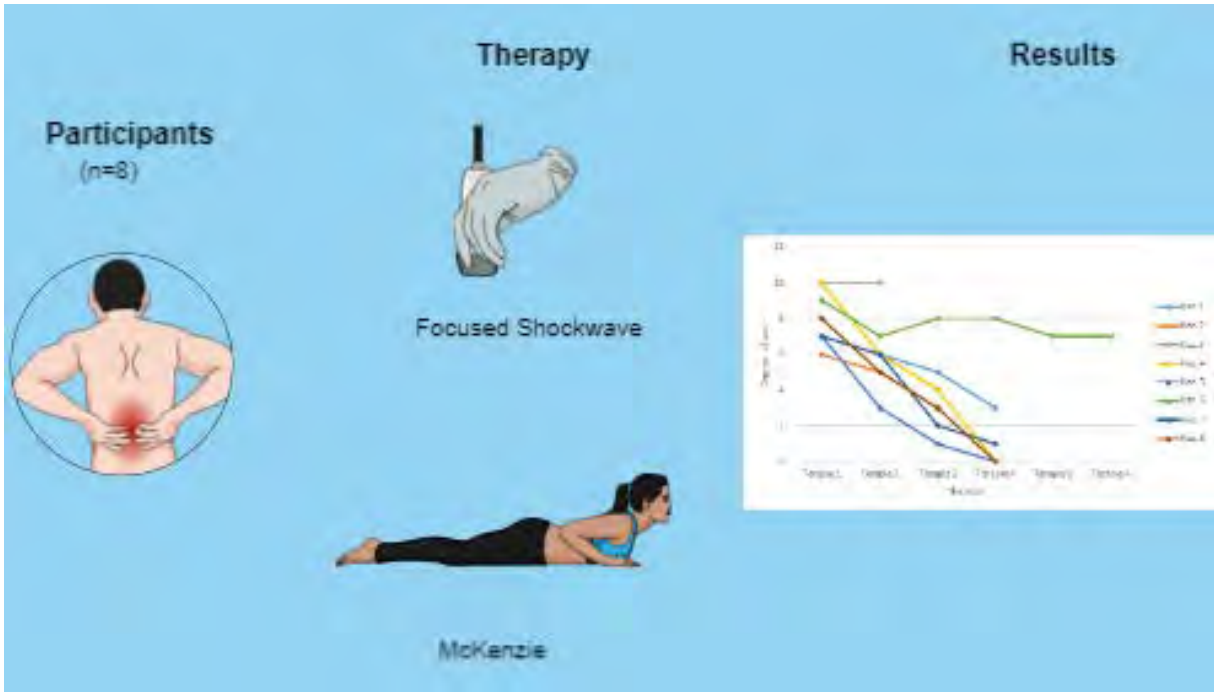
(Thanks to Mgr. Michal Kmustát, Ph.D.)
The conference paper was prepared within the project Health, nutritional and performance-specific determinants in female athletes (69 189) and The effect of pre-match weight reduction on the manifestations of relative energy deficiency syndrome in sport in a professional female muaythai fighter - a case study (60 048).

THE EFFECT OF FOCUSED SHOCK WAVE (FESWT) AND EXERCISES FOR FACET LOWER BACK PAIN BY MCKENZIE

Barbora Blechová[a,b] and Tomáš Nedělka[a]
[a] Faculty of Biomedical Engineering, Czech Technical University in Prague; nám. Sítná 3105, 272 01 Kladno, Czech Republic
[b] Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, barborablechova@seznam.cz

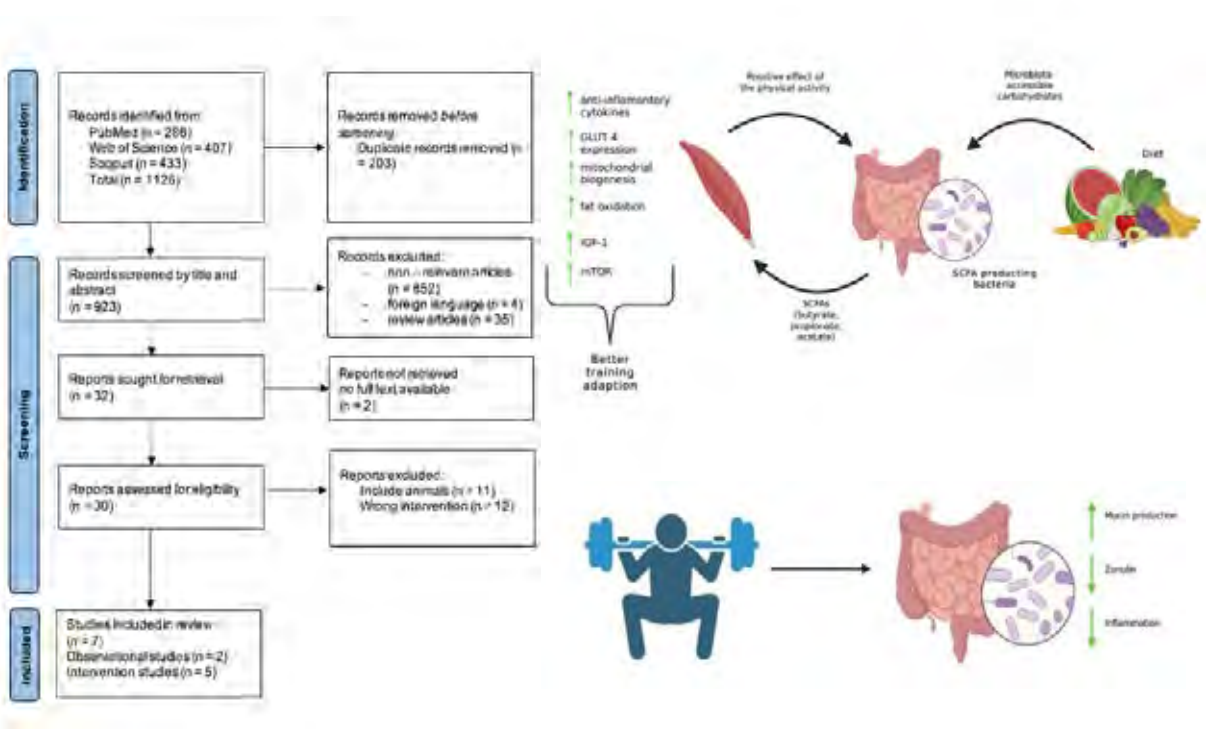
Abstract
The subject of this bachelor thesis is a comparison of the effect of focused shock waves (FESWT) and exercises for facet lower back pain by McKenzie.
The comparison was performed by comparing the initial examination and final examination of two groups of probands. The special part describes eight case studies. Four probands receive a focused shock wave and four probands are on McKenzie exercises. Probands in the McKenzie group had 4–6 therapies and probands in the focused shock wave group were applied 3–4 therapies. Treatment results are comparable. But focused shock wave is more effective. You don't have to rely on the patient´s active cooperation. The theoretical part provides an overview of the current state, anatomy of the area, methodology, and theoretical foundations of focused shock waves.
Keywords: ESWT; focused shock wave; McKenzie method; lumbar spine; facet pain



THE RELATIONSHIP BETWEEN THE GUT MICROBIOME AND RESISTANCE: A RAPID REVIEW

Adam Wagner[a], Ivan Struhár[b], Kateřina Kapounková[b]
[a] Department of Sport Performance and Exercise Testing Promotion, Faculty of Sport Studies, Masaryk University, Kamenice 5, 625 00 Brno, Czech Republic, adam.wagner@mail.muni
[b] Department of Physical Activities and Health Sciences, Faculty of Sport Studies, Masaryk University, Kamenice 5, 625 00 Brno, Czech Republic

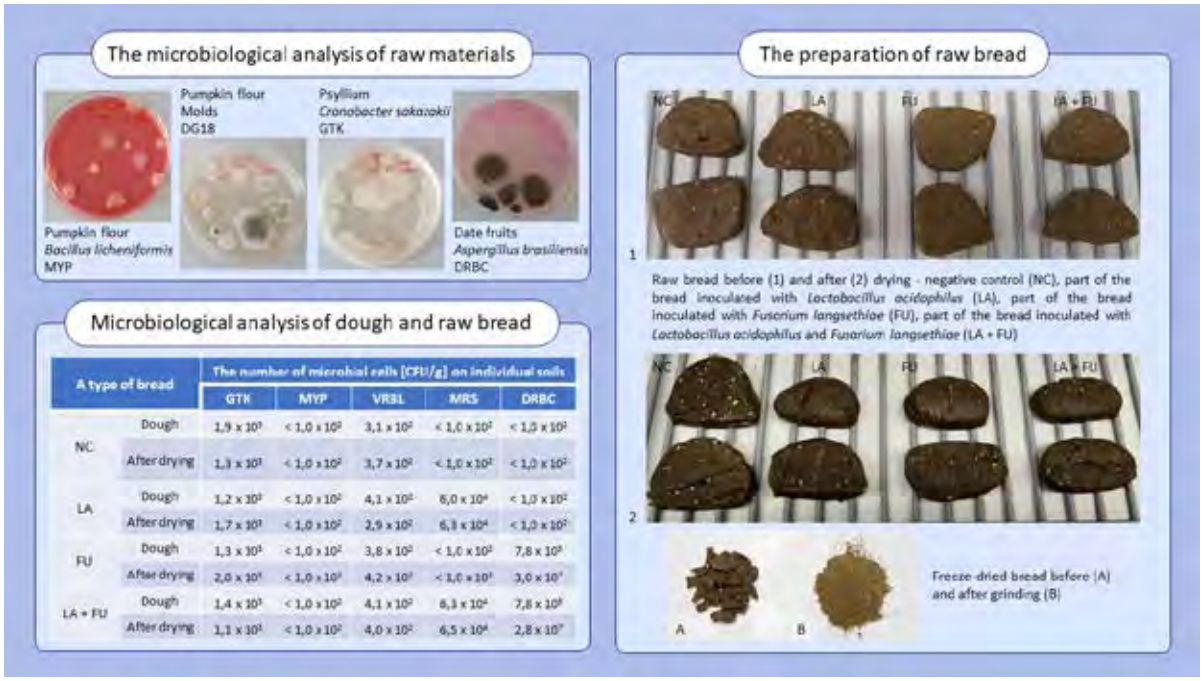
Abstract
The human gut microbiome is attracting increasing attention because of its overall effect on human health. Several reviews have explored the effect of physical activity on the gut microbiome, though these have mostly focused only on endurance or combined types of physical activity. This study aims to describe the effect of resistance or strength training on the gut microbiome of a healthy or unhealthy population. This rapid review follows the guidelines of the Cochrane Rapid Reviews Guidance along with PRISMA. A review of the literature was carried out using articles indexed by PubMed, Scopus, and Web of Science published in the last 12 years. None of the seven studies included found a significant change in the gut microbiome in terms of bacterial taxa composition or overall diversity, though the results show that resistance training might decrease the zonulin level and increase mucin production and thereby reducing inflammation in the gut. Interestingly, two studies point to a gut-muscle axis connection and this is discussed in our paper. However, due to the small number of existing studies and certain methodological disagreements, it was hard to find a consensus on the relationship between the gut microbiome and resistance training.
Keywords: gut microbiome; resistance training; diversity



MICROBIAL TESTING OF RAW BREAD

Ivana Stará[a], Veronika Bugáňová[a], Iveta Brožková[a],
Marcela Pejchalová[a], Libor Červenka[b]
[a] Department of Biological and Biochemical Sciences, Faculty of Chemical Technology, University of Pardubice, Studentská 573, 532 10 Pardubice, Czech Republic, ivana.stara@student.upce.cz
[b] Department of Analytical Chemistry, Faculty of Chemical Technology, University of Pardubice, Studentská 573, 532 10 Pardubice, Czech Republic

Abstract
Raw veganism, vitarianism, or raw food (rawism) is a diet based on consuming mainly or even exclusively uncooked food up to a temperature of 42 °C. However, uncooked food is at risk of bacterial contamination. Microbial representation was determined for raw bread prepared according to a recipe for alternative ways of eating. Mold was visible on the bread surface after three days of storage at room temperature. We also investigated the influence of the microbial representation and the amount of antioxidants in the prepared raw bread depending on the presence of *Lactobacillus acidophilus* and *Fusarium*. The effect of *Lactobacillus acidophilus* on the growth and multiplication of *Fusarium langsethiae* in raw bread was not confirmed, but the effect of mycotoxins on the production was established (T-2, HT-2, diacetoxyscirpenol, neosolaniol). According to our results, this bread should therefore be consumed immediately and not stored.
Keywords: foodborne intoxication; foodborne illness; raw bread



A type of bread		The number of microbial cells [CFU/g] on individual soils				
		GTK	MYP	VRSL	MRS	DRBC
NC	Dough	$1{,}9 \times 10^3$	$< 1{,}0 \times 10^2$	$3{,}1 \times 10^2$	$< 1{,}0 \times 10^2$	$< 1{,}0 \times 10^2$
	After drying	$1{,}3 \times 10^3$	$< 1{,}0 \times 10^2$	$3{,}7 \times 10^2$	$< 1{,}0 \times 10^2$	$< 1{,}0 \times 10^2$
LA	Dough	$1{,}2 \times 10^3$	$< 1{,}0 \times 10^2$	$4{,}1 \times 10^2$	$6{,}0 \times 10^4$	$< 1{,}0 \times 10^2$
	After drying	$1{,}7 \times 10^3$	$< 1{,}0 \times 10^2$	$2{,}9 \times 10^2$	$6{,}3 \times 10^4$	$< 1{,}0 \times 10^2$
FU	Dough	$1{,}3 \times 10^3$	$< 1{,}0 \times 10^2$	$3{,}8 \times 10^2$	$< 1{,}0 \times 10^2$	$7{,}8 \times 10^5$
	After drying	$2{,}0 \times 10^3$	$< 1{,}0 \times 10^2$	$4{,}2 \times 10^2$	$< 1{,}0 \times 10^2$	$3{,}0 \times 10^7$
LA + FU	Dough	$1{,}4 \times 10^3$	$< 1{,}0 \times 10^2$	$4{,}1 \times 10^2$	$8{,}3 \times 10^4$	$7{,}8 \times 10^5$
	After drying	$1{,}1 \times 10^3$	$< 1{,}0 \times 10^2$	$4{,}0 \times 10^2$	$6{,}5 \times 10^4$	$2{,}8 \times 10^7$

Acknowledgments
The contribution was processed within the project of the University of Pardubice (SGS_2023_005).

6. Esports: Opportunities and Threats

Keynote lecture

COACHING QUALIFICATIONS THE CONTINUOUS ONGOING DEBATE, A STUDY OF THE DEMAND'S AND REQUIREMENTS OF ESPORTS COACHING?

Cameron Vanloo
Department of Esports, Faculty of Digital Technology and Arts College Rd, Stoke-on-Trent ST4 2DE Staffordshire University, cameron.vanloo@staffs.ac.uk

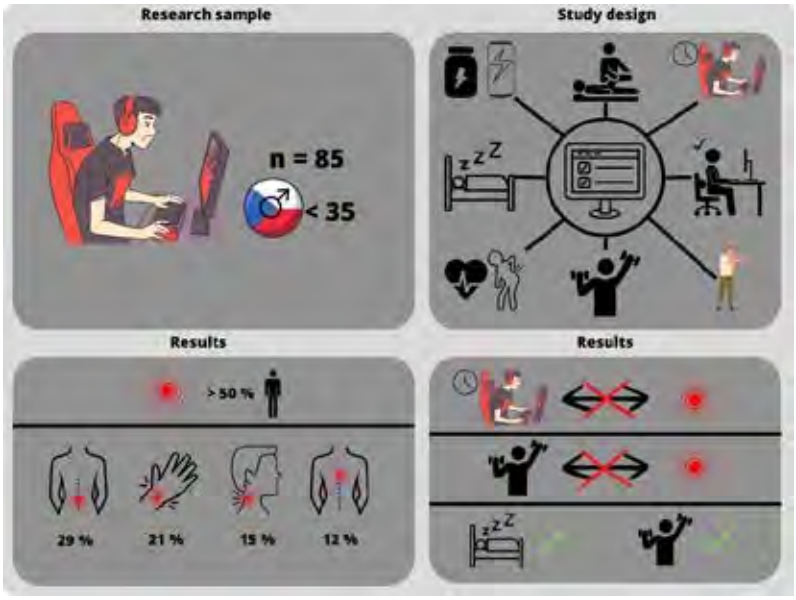
Abstract
Competitive gaming has seen dirastic growth rates and increased popularity over the past decade as a result the level of professionalism has drastically increased within team environments. As such, we have seen a growth rate in the amount of teams adopting and hiring coaches to support professional players. However, we have seen much discussion over the value of education in the role of developing coaches with strong debates on both sides of how education should be adopted within practise within this paper we will highlighting some of the key challenges and possible solutions moving forward within the development of esports coaches.

THE INFLUENCE OF ESPORT ON MAN PROFESSIONAL COMPUTER PLAYERS' MUSCULOSKELETAL SYSTEM IN THE CZECH REPUBLIC

Jan Kovářík
Department of Physiotherapy, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, jan.kovarik98@seznam.cz

Abstract
The main aim of the research is to determine the influence of esports on the musculoskeletal system of Czech professional computer players. The secondary aim of the research is to map the exercise regime and lifestyle of Czech professional computer players. The study was conducted using an electronic non-standardized questionnaire survey. The research population consisted of 85 Czech professional computer gamers under the age of 35 years. The resulting data analysis was performed using analytical tools and descriptive statistics of MS Excel, one and two-sample T-test, and Pearson correlation coefficient. There was no significant correlation between time spent playing esports and the incidence of player musculoskeletal pain/discomfort ($r = -0.004$). Nor could an inverse correlation be confirmed between the average weekly time spent in esports and the incidence of musculoskeletal pain/discomfort ($P = 0.219$). More than 50% of the players suffer from musculoskeletal problems, with the lumbar spine troubling the most players - 29%, the wrist - 21%, the cervical spine - 15%, and the thoracic spine - 12%. Czech esports players adhere to the recommended number of hours of sleep and significantly exceed the WHO recommendations for weekly time spent in moderate to vigorous physical activity.

Keywords: esport; prevention; computer; ergonomy; aids; compensation; survey; physiotherapy



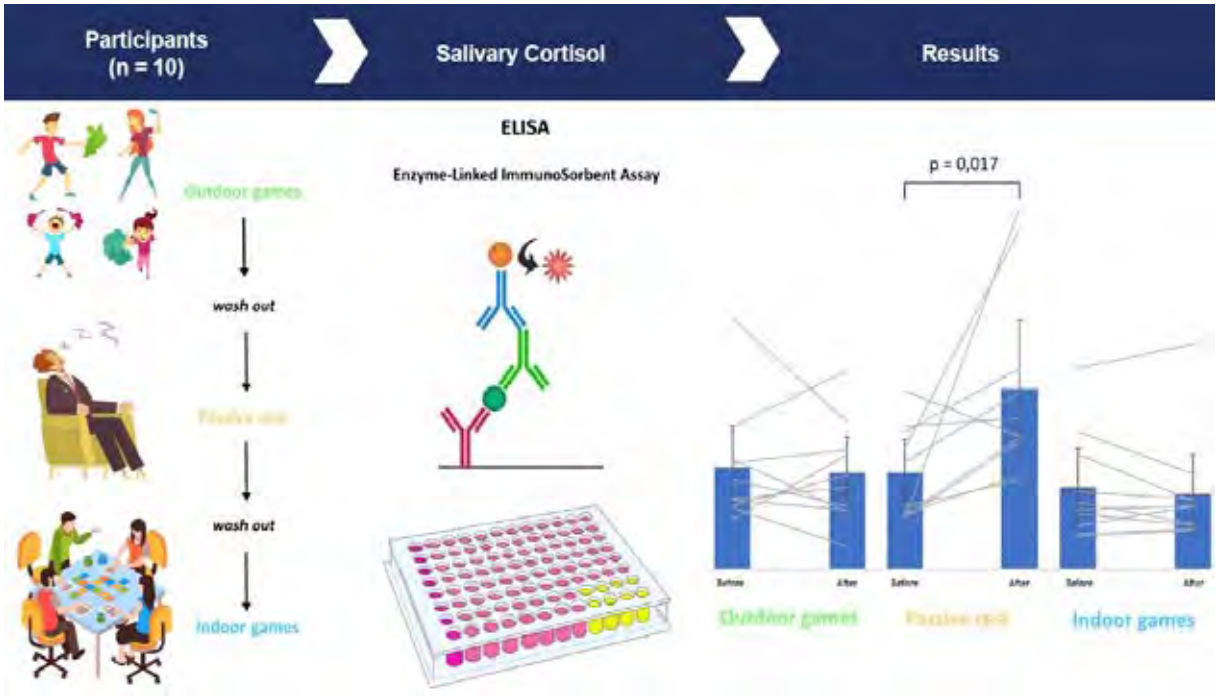
7. Poster Section

P1

THE EFFECT OF TEAMBUILDING OUTDOOR GAMES ON CORTISOL LEVELS

Monika Ludlová, Ishak Kovač, Jana Jaklová Dytrtová, Michal Šteffl
Sport Sciences–Biomedical Department, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, monicka.ludlova@seznam.cz

Abstract
Teambuilding outdoor games are frequently used to enhance teamwork and alleviate stress among employees. However, their effect on cortisol salivary levels has not been sufficiently proven yet. The main aim of this study was to find out the effect of outdoor games on cortisol salivary levels compared to indoor games and passive control. 10 healthy participants (41.3 ± 10.6 years) participated in our randomized cross-over designed intervention study. Except for the significant elevation in the passive control ($p = 0.017$), there were not any significant effect on the cortisol levels. Even though we could not prove the significant effect, the positive trend was evident especially when participants came with elevated cortisol levels. Further research with a larger study group is needed to demonstrate the significant effect.
Keywords: stress; saliva; biomarker; intervention; physical activity



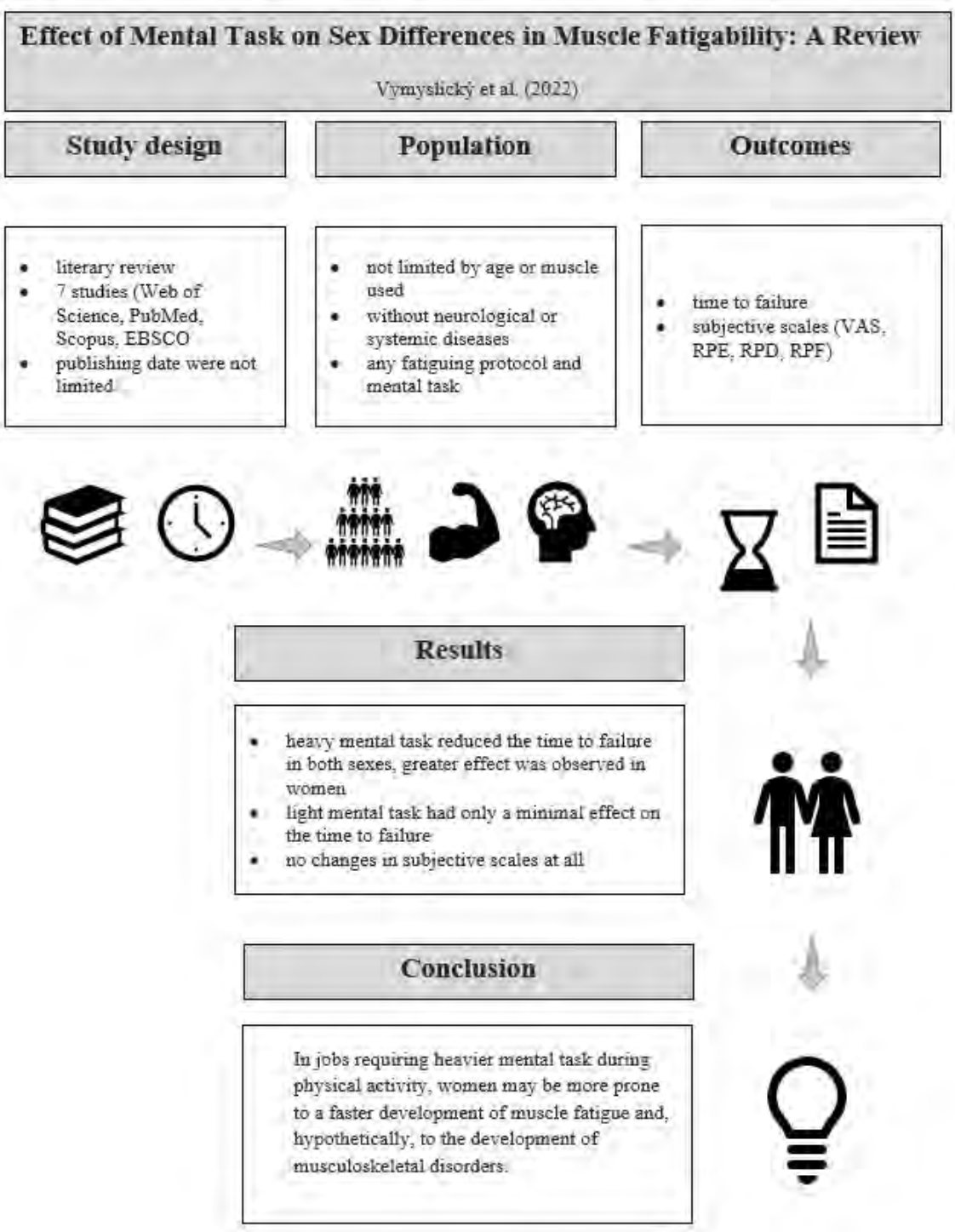
Acknowledgment
The contribution was processed within the project Cooperatio of FTVS UK.

P2

EFFECT OF MENTAL TASK ON SEX DIFFERENCES IN MUSCLE FATIGABILITY: A REVIEW

Patrik Vymyslický, Dagmar Pavlů, David Pánek
Department of Physiotherapy, Faculty of Physical Education and Sport, Charles University,162 52 Prague 6, Czech Republic, patrik.vymyslicky@gmail.com

Abstract
Previous research demonstrated that there are observable sex differences in developing muscle fatigue when mental task during fatiguing activity is present; however, there is no available review on this matter. Therefore, this review aimed to summarize the findings of previous studies investigating the effect of mental tasks on muscle fatigue in men and women. To conduct the review, we utilized searches using the electronic databases Web of Science, PubMed, Scopus, and EBSCO Cinahl Ultimate. The studies included had no limited publication date and examined the effects of mental tasks on muscle fatigue in a healthy adult population of any age. The evaluation was performed using the following criteria: time to failure, or subjective scale in various modifications (visual analogue scale – VAS, rate of perceived effort – RPE, rate of perceived fatigue – RPF, rate of perceived discomfort – RPD). A total of seven studies met the set criteria and were subsequently analyzed. Heavy mental tasks (more demanding math tasks) can reduce the time to failure for both men and women, with the reduction being more pronounced for women than for men. For light mental tasks (simple math tasks), no reduction in time to failure was observed to a great extent. The mental task in any of the included studies did not affect the subjective perception of fatigue, effort, discomfort, or pain. Although the studies investigating the effect of mental tasks on sex differences in muscle fatigability are limited, based on our findings we can assume that in jobs requiring heavier mental tasks, women may be more prone to the faster development of muscle fatigue, and, hypothetically to the development of musculoskeletal disorders. Thus, employers might consider paying attention to the possibility of adequate rest.
Keywords: fatigue; muscle fatigue; sex differences; mental task

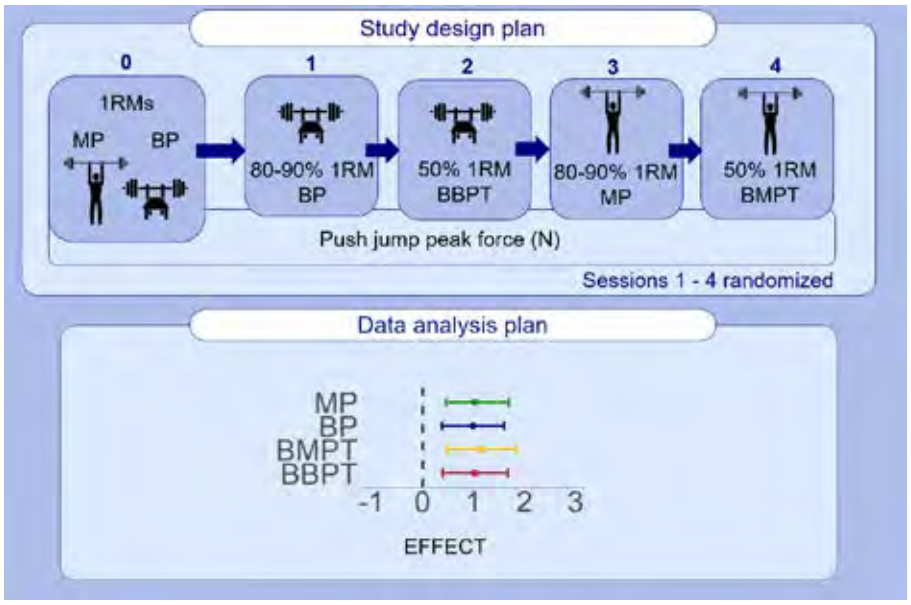

Effect of Mental Task on Sex Differences in Muscle Fatigability: A Review
Vymyslický et al. (2022)
Study design
literary review
7 studies (Web of Science, PubMed, Scopus, EBSCO
publishing date were not limited
Population
not limited by age or muscle used
without neurological or systemic diseases
any fatiguing protocol and mental task
Outcomes
time to failure
subjective scales (VAS, RPE, RPD, RPF)
Results
heavy mental task reduced the time to failure in both sexes, greater effect was observed in women
light mental task had only a minimal effect on the time to failure
no changes in subjective scales at all
Conclusion
In jobs requiring heavier mental task during physical activity, women may be more prone to a faster development of muscle fatigue and, hypothetically, to the development of musculoskeletal disorders.

P3

COMPARISON OF BENCH PRESS, BALLISTIC BENCH PRESS THROW, MILITARY PRESS, AND BALLISTIC MILITARY PRESS THROW ON THE POST-ACTIVATION PERFORMANCE ENHANCEMENT OF THE UPPER LIMBS POWER OUTPUT – A PROJECT PROPOSAL

Roman Malíř[a], Jan Maleček[b] and Vít Třebický[a]
[a] Department of Gymnastics and Combat Sports, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, malir@ftvs.cuni.cz
[b] Department of Military Physical Education, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic

Abstract
Post-activation Performance Enhancement (PAPE) is a popular technique to increase performance across sports where explosive and maximal strength plays a significant role. The most common exercises for the upper body PAPE are performed in 90° of shoulder flexion, such as variations of bench press. In multiple disciplines, greater shoulder joint flexion is needed during explosive and maximal strength tasks, such as gymnastics. Although exercises with the appropriate shoulder flexion performed in a power-explosive manner exist, their PAPE efficacy is unknown.
The proposed research aims to compare the effect of previously used PAPE exercises and candidate PAPE exercises on upper body power output. In this experimental crossover study, a sample of athletes will attend five sessions, one base and four experimental. During each experimental session, they will perform push-up jumps on a force plate after PAPE exercise (regular bench press, ballistic bench press throw, regular seated military press, ballistic seated military press throw; randomized order). Differences between performances will be analyzed using a Mixed effects model and tests of equivalence.
Keywords: strength training; upper body; shoulder; push-up; gymnastics

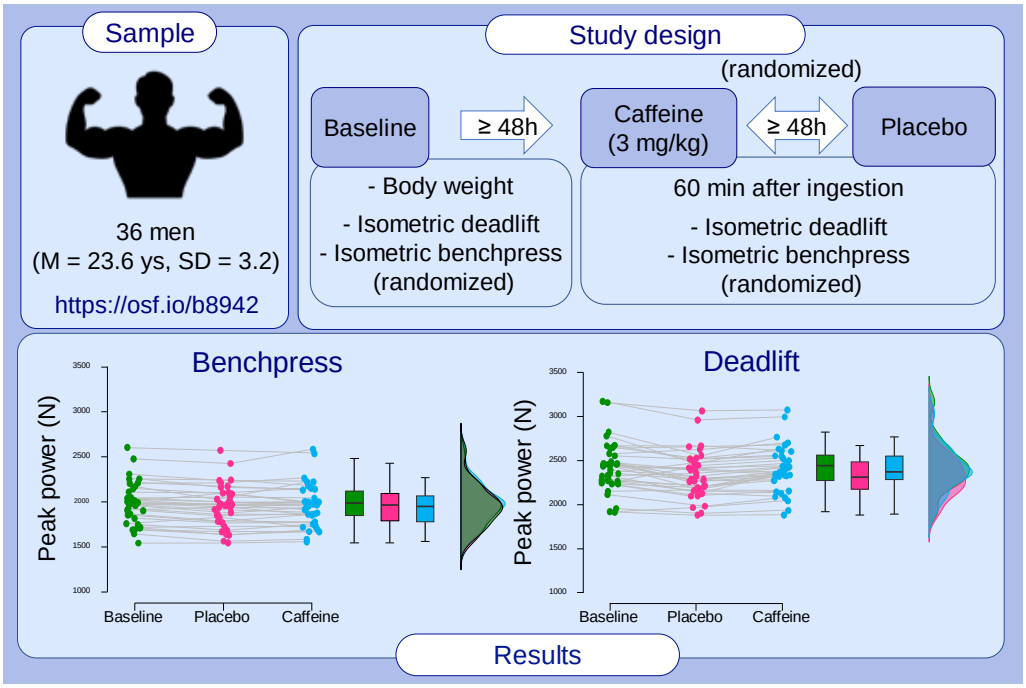


P4

THE EFFECT OF CAFFEINE ON MAXIMAL STRENGTH IN COMPLEX EXERCISES

Daniel Šťastný and Vít Třebický
Department of Combat Sports and Gymnastics, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic
31355183@cuni.cz

Abstract
Caffeine is frequently used to enhance athletic performance. However, the evidence regarding its effect on maximal strength in complex exercises is limited. This preregistered study aims to test the acute effects of caffeine on maximal strength in deadlift and benchpress.
Using a double-blinded within-subject design, 36 resistance training experienced men (M = 23.6 yrs, SD = 3.2) attended three sessions; baseline and two experimental. They received caffeine (3 mg/kg) or a placebo in a randomised order and performed an isometric deadlift and benchpress 60 min after consumption.
Repeated measures ANOVAs showed a statistically significant effect of the session in both benchpress ($\eta^2 = 0.19$) and deadlift ($\eta^2 = 0.299$). The benchpress peak force in the baseline was statistically discernably larger than caffeine (d = 0.151) and placebo (d = 0.127), but caffeine and placebo did not differ statistically discernably (d = 0.032). The effect of caffeine on deadlift peak force differed statistically discernably from placebo (d = 0.229) but not baseline (d = 0.097).
Contrary to previous (smaller sample-sized) studies, we observed no effect of caffeine on benchpress peak force. Although we observed an ergogenic effect in the deadlift, the effect size was below our sample size's pre-defined sensitivity threshold.
Keywords: supplement; benchpress; isometric; force plate; deadlift; peak force

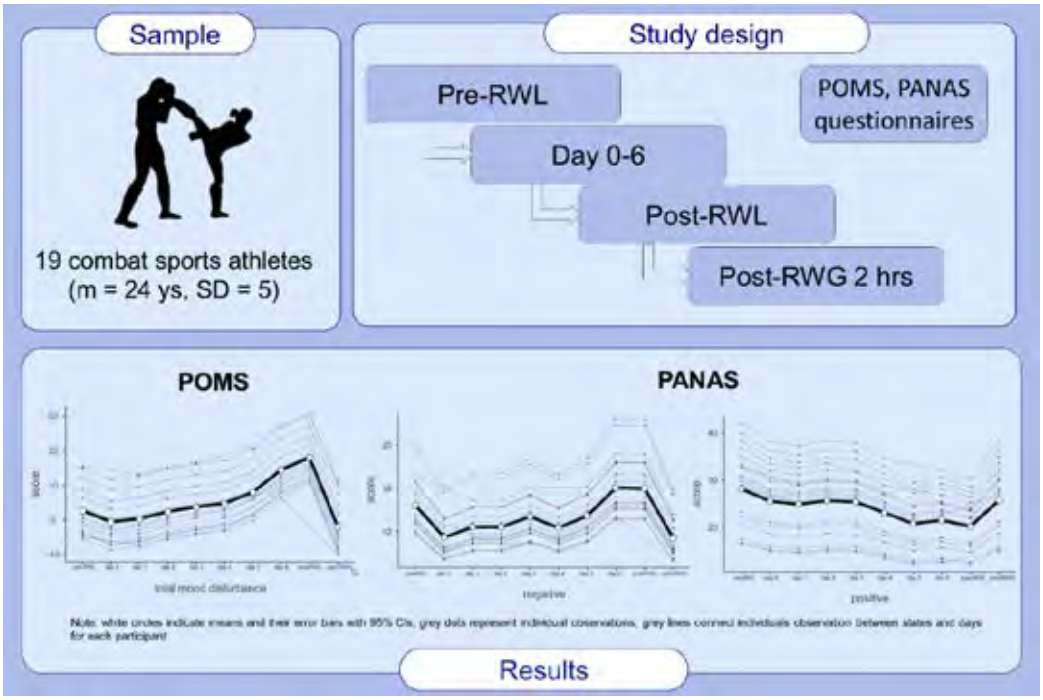


P5

THE EFFECT OF RAPID WEIGHT LOSS ON MOOD IN COMBAT SPORTS

Jaroslav Hrdlička*, Radim Pavelka, Vít Třebický
Department of Technical and Combat Sports, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic,
hrdlicka.jaroslav95@seznam.cz

Abstract
Different methods of rapid weight management before competition are widespread across combat sports. Athletes try to reduce their weight before the weighing-in by radical changes to water and caloric intake and output. Although it has been shown that these methods negatively impact physical performance and mood, the evidence is fragmentary. In our study, 19 fighters reduced 5% of their body weight in 7 days and recover within 2 hours. Each day, they recorded mood in standardized questionnaires measuring positive and negative states (PANAS) and mood (POMS) before Rapid Weight loss (RWL), during RWL, after RWL, and after Rapid Weight Gain (RWG). Using mixed-effect models, we observed a statistically significant decline in mood from pre-RWL to post-RWL (110.8% increase in mood disturbance, 41.4% increase in negative emotion, and 26.6% decrease in positive emotion). After RWG, we observed a statistically significant improvement in mood and affective states compared to post-RWL (100% decrease in total mood disturbance, 29.3% decrease in negative emotions, and 26.6% increase in positive emotions). Our results support previous findings that RWL negatively affects mood. However, after RWG, mood and affective states have returned to similar levels as before the RWL.
Keywords: combat sports; mood state; weight loss; weight gain

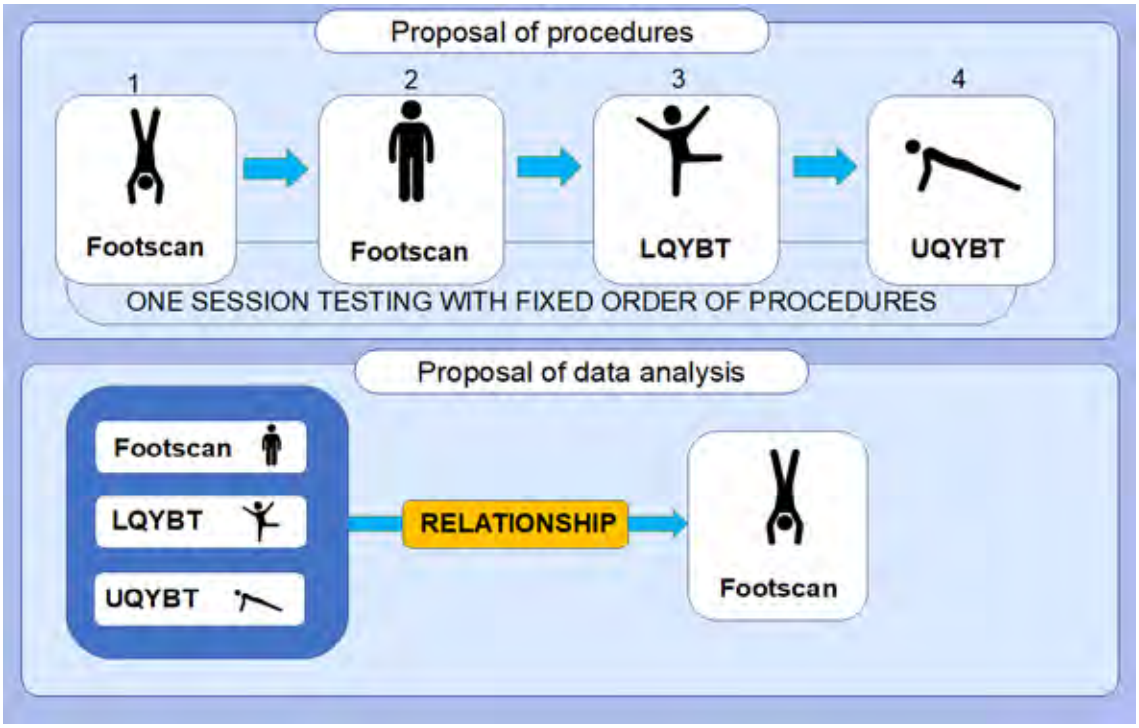


P6

THE RELATIONSHIP OF POSTURAL STABILITY AND SHOULDER JOINT FUNCTION WITH HANDSTAND STABILITY – A PROJECT PROPOSAL

Daniel Szabó and Roman Malíř
Department of Gymnastics and Combat Sport, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic.
*szabo.daniel600@gmail.com

Abstract
Handstand is a fundamental element across gymnastic disciplines. It is a relatively unstable body position used in static or dynamic form and as a part of more complex elements. Several balancing strategies are used to maintain balance during handstands, where shoulder joint function and postural stability are claimed to play an important role. This research plans to investigate the influence of postural stability during an upright stance and shoulder joint function on stability during handstands. A sample of male artistic gymnasts will perform a handstand and several variants of upright stances on a balance platform (Footscan) to measure their handstand and postural stability (via shifting of the center of pressure (SCoP)). Subsequently, the Y Balance Test will be used to measure the Lower (LQYBT) and Upper (UQYBT) quarter dynamic postural stability. We will use regression models to test the influence of static postural stability (SCoP of upright stance variants), dynamic postural stability (LQYBT), and shoulder joint function (UQYBT) on the stability during handstand execution (SCoP of handstand).
Keywords: balance; footscan; Y balance test; gymnastics; mobility; flexibility

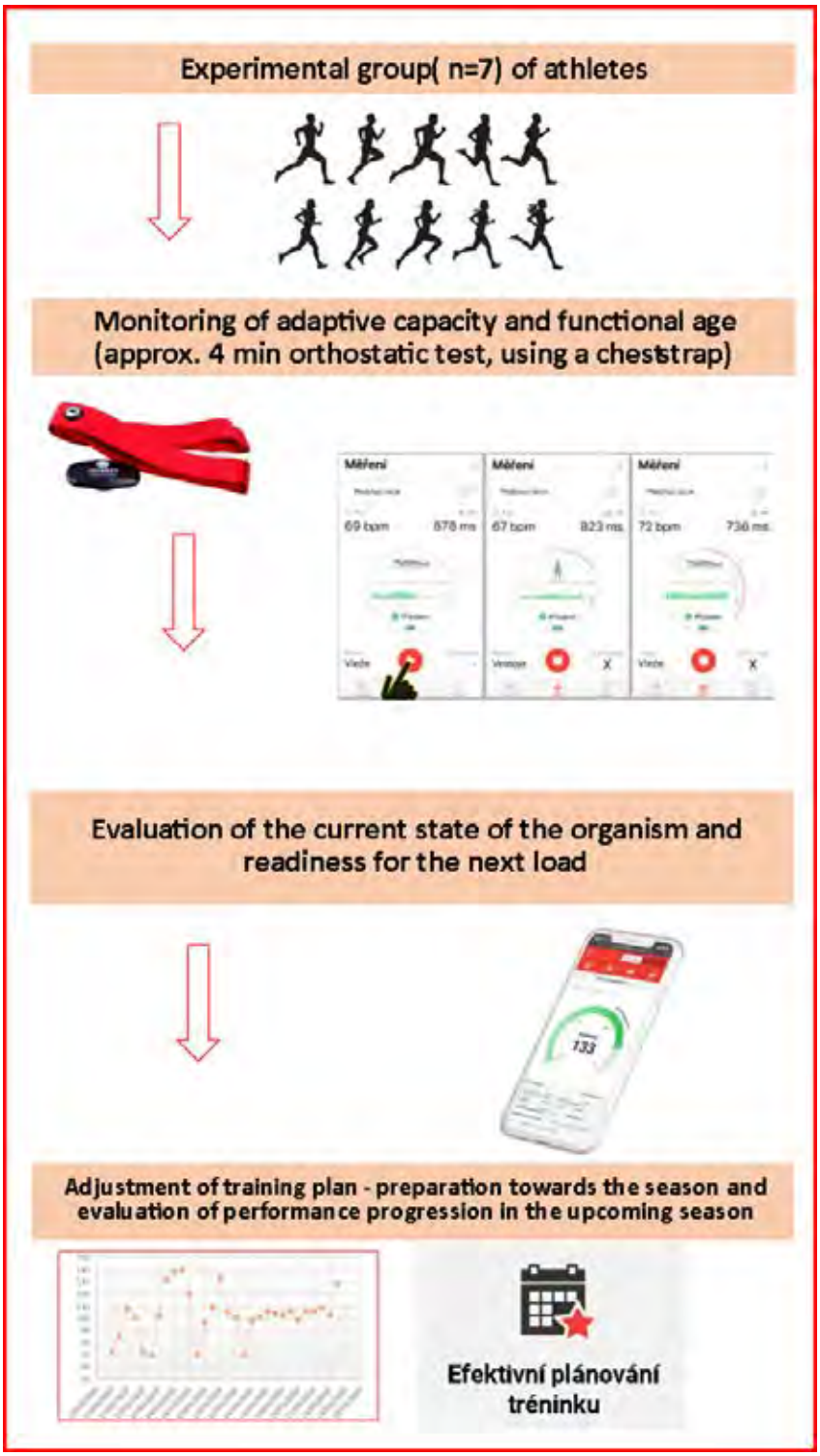


P7

HRV AND ITS INFLUENCE ON ATHLETES‘ PERFORMANCE

Michaela Treglerová and Jan Feher
Department of Track and Field and Outdoor Activity, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic,
michaela.treglerova@outlook.cz

Abstract
This study looks at heart rate variability and how measuring, evaluating, and working with data measured through the mysasy mobile app can affect athlete performance. If training is modified according to the body's response to loading individually, more efficient performance gains and proper timing of more demanding training units can be achieved. If training is well planned and the principles of progressive loading during the macrocycle are followed at the same time, it is possible to obtain an added value using heart rate variability that reflects the state of the organism in relation to the autonomic nervous system (parasympathetic and sympathetic branches). This paper compares the in-season performance of an experimental group (n=7) and a control group (n=7) training to the same training plan. Performance gains are determined each season following the measurements in the transition, preparation, and pre-race periods and during the competition period. According to the World Athletics Scoring tables, the two groups were compared and the effect size of heart rate variability measurement was evaluated. An increase in performance was found in both groups, and the difference (mean effect size) of the performance progression was greater in the experimental group (on average 10% year-on-year) than in the control group (on average 2% year-on-year).
Keywords: heart rate variability; athletes; overload prevention; training effectivity; performance



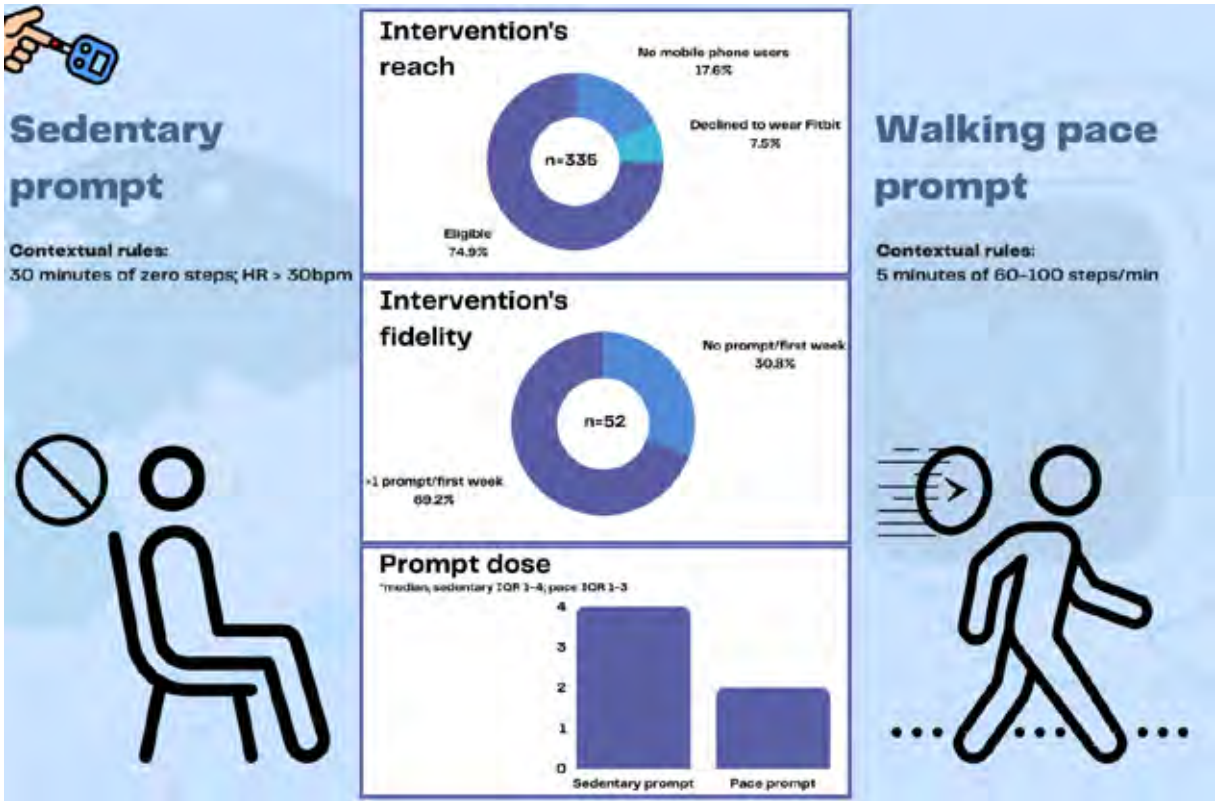
Acknowledgment
To coach Petr Šarapatka for providing data and to the supervisor for valuable advice. The contribution was processed within the thesis.

P8

IMPLEMENTATION OF A JUST-IN-TIME ADAPTIVE INTERVENTION (JITAI) IN PATIENTS WITH TYPE 2 DIABETES AND PREDIABETES RECRUITED IN PRIMARY CARE: A PROCESS EVALUATION

Jan Novák[a], Jitka Kuhnová[b], Andrea Jaklová[c], Markéta Pfeiferová[d], Norbert Král[d], Richard Cimler[b], Tom Yates[e,f], Charlotte Wahlich[g], Tess Harris[g], Bohumil Seifert[d], Tomáš Větrovský[a]
[a] Faculty of Physical Education and Sport, Charles University, Prague, Czech Republic
[b] Faculty of Science, University of Hradec Kralove, Hradec Kralove, Czech Republic
[c] 2nd Faculty of Medicine, Charles University, Prague, Czech Republic
[d] Institute of General Practice, 1st Faculty of Medicine, Charles University, Prague, Czech
[e] Diabetes Research Centre, University of Leicester, Leicester, UK
[f] National Institute for Health Research (NIHR) Leicester Biomedical Research Centre
[g] Population Health Research Institute, St George's University of London, UK

Abstract
JITAIs can potentially improve sedentary adults' physical activity levels. Whether JITAIs can be successfully applied to patients with chronic conditions in healthcare settings is unknown. The JITAI was developed with the involvement of pre/diabetes patients in primary care according to the mHealth development and evaluation framework. The resulting JITAI consisted of prompts to interrupt sitting and to increase walking pace. The prompts were triggered by the HealthReact system and delivered as text messages. The evaluation of the JITAI's implementation included the intervention's reach, fidelity, and dose. Of 335 patients randomly selected from among 18 general practices, 59 (18%) were ineligible due to not being mobile phone users, and 25 (7%) declined to wear the Fitbit tracker. In the reference 7-day period, of 52 patients assigned to the JITAI, 16 (31%) did not sync their Fitbit data, mainly due to internet access difficulties and technical issues. Of the remaining 36 patients, 29 (81%) triggered at least one sedentary prompt, and 16 (44%) triggered at least one walking prompt. Irregular sync due to a lack of a mobile data plan was the principal reason for not triggering any prompt. Among those who received at least one prompt, the median was 4 (IQR 1–4) sedentary and 2 (IQR 1–3) walking prompts per week.
Keywords: physical activity; sedentary behavior; diabetes; JITAI; mHealth; prompt; text messaging; behavioral cognitive technique



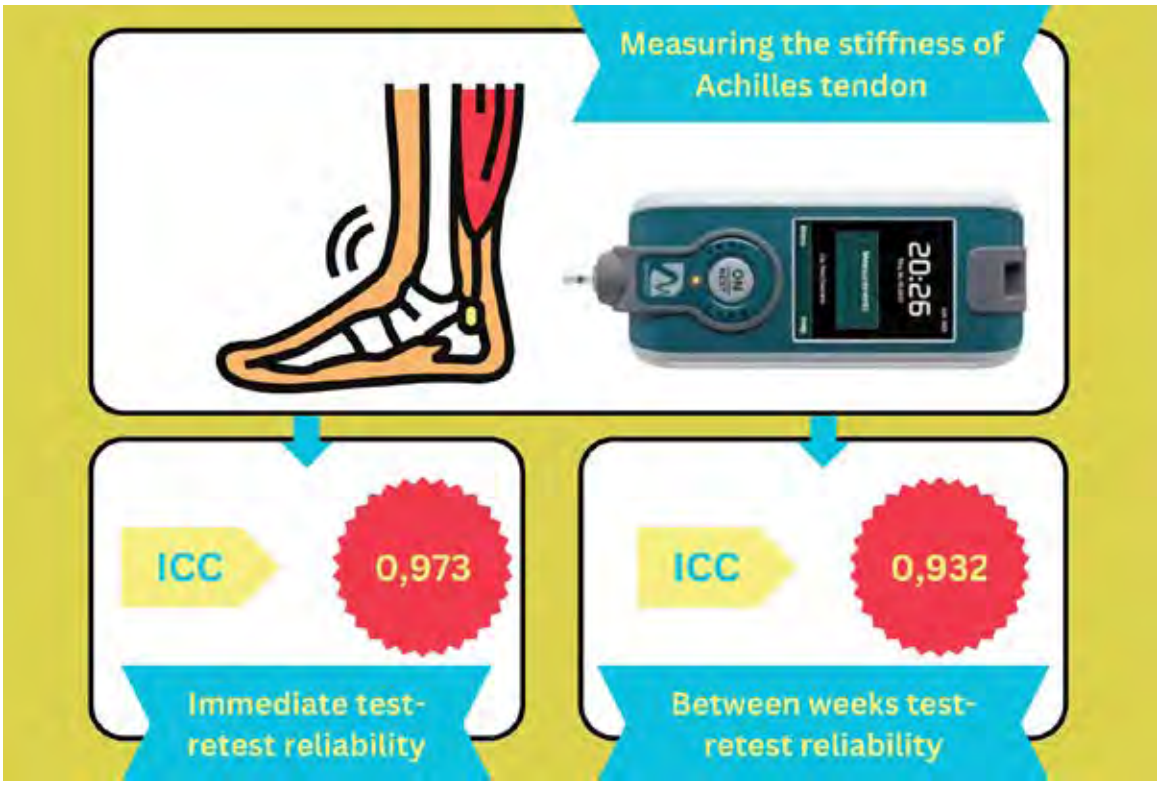
Acknowledgments
This work was supported by the Czech Health Research Council of the Ministry of Health of the Czech Republic (Grant Number NU21-09-00007).

P9

ASSESSING THE TEST-RETEST RELIABILITY OF MYOTONPRO FOR MEASURING ACHILLES TENDON STIFFNESS

Kryštof Voleský, Jan Novák, Michael Janek, James Joseph Tufano, Tomáš Větrovský
Sport Sciences-Biomedical Department, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic

Abstract
This study aimed to assess the test-retest reliability of MyotonPRO in measuring the stiffness of the Achilles tendon. The stiffness of the Achilles tendon was measured by three operators, at the distal and proximal locations, in eight healthy volunteers. Reliability was evaluated for various time frames (immediate, short-term, between-day, between week) and settings (retaking of the standardized position between measurements, loading of the tendon between measurements). The data were analyzed using the irr package (version 0.84.1) in R statistical software. The analysis was conducted using the „two-way“ model, with the type set to „agreement“ and values set to either „average“ or “single“. The test-retest reliability across the different time frames and settings ranged from good to excellent ($ICC_{(4,1)}$ = 0,889-0,973). The study demonstrated that MyotonPRO is a reliable tool for assessing Achilles tendon stiffness across different time frames and settings.
Keywords: Achilles tendon; stiffness; MyotonPRO; reliability; test-retest, Achilles tendinopathy; biomechanical properties; tendon



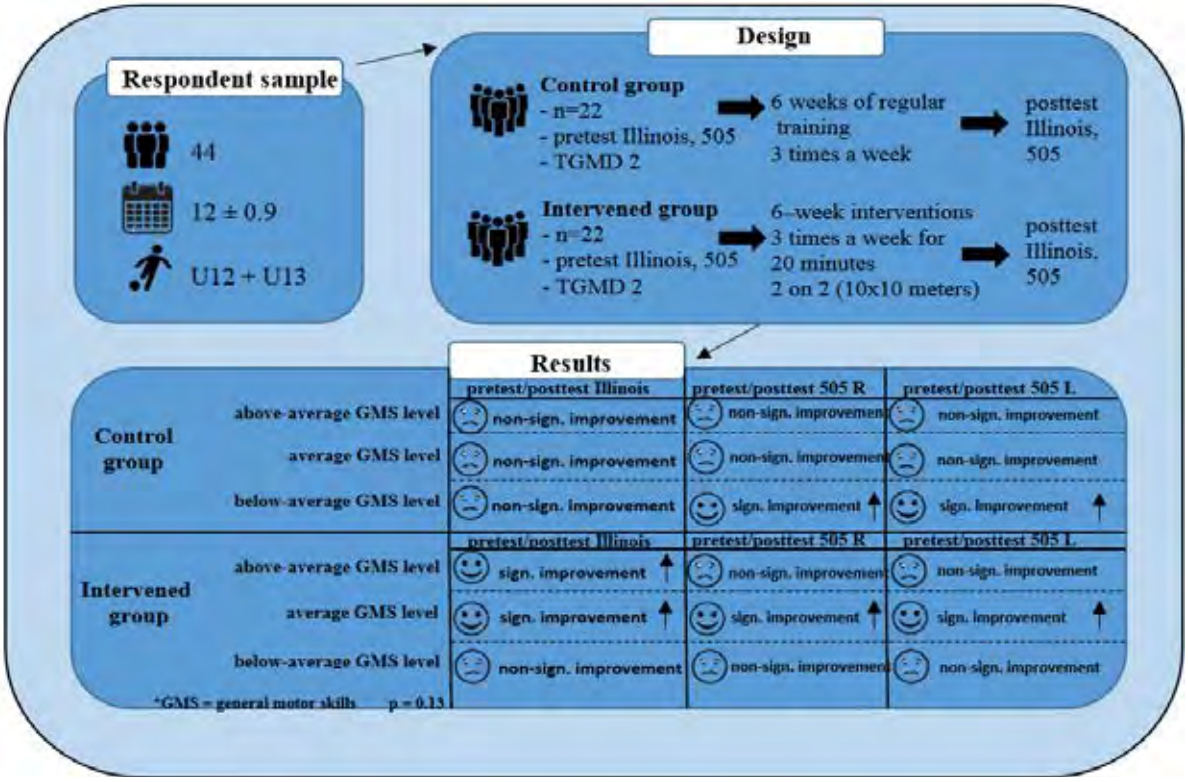
Acknowledgments
The contribution was processed within the project GAUK: 94622.

P10

THE EFFECT OF SMALL-SIDED GAMES ON AGILITY PERFORMANCE IN PRE-ADOLESCENT SOCCER PLAYERS

Pavel Nápravník and Petr Šťastný
Department of Sports Games, Faculty of Physical Education and Sport, Charles University, 162 52 Prague 6, Czech Republic

Abstract
The research aims to assess the effect of an 8-week intervention in the form of small-sided games on the level of agility in soccer players in the youth category. Players (n=44, age 12±0.9) completed a battery of TGMD 2 general motor tests, as well as the Illinois and 505 R and L agility tests (pretest and posttest). According to the results in the GMS (general motor skills) TGMD 2 test, the probands were divided into 3 performance subgroups. The intervention had a greater effect on the increase in agility level than conventional training only in the 505 R and L tests for the subgroup with average GMS level. For the Illinois test, the intervention group had a greater increase than the control group in the subgroups with average and above-average GMS levels. Players with below-average GMS levels achieved the greatest improvement in agility levels across all tests. However, this was only the control group.
Keywords: agility; change of direction speed; general motor skills; small-sided games; 505; Illinois; TGMD 2



Acknowledgments
I would like to thank Doc. Petr Šťastný, Ph.D. for his professional guidance in the development of this thesis. The research was approved by the Ethics Committee of the Charles University Faculty of Physical Education and Sport under reference number 140/2019.

P11

SIMULTANEOUS EXAMINATION OF PHYSICAL AND EATING BEHAVIORS AND THEIR CONTEXT USING ECOLOGICAL MOMENTARY ASSESSMENT: THE WEALTH PILOT STUDY

Michael Janek[a], Jitka Kuhnová[b], Antje Hebestreit[c], Christoph Buck[c], Richard Cimler[b], Greet Cardon[d], Jean-Michel Oppert[e], Leopold Fezeu[e], Janas Harrington[f], Alan Donnelly[g], Tomáš Větrovský[a], Steriani Elavsky[b,h], on behalf of the WEALTH consortium

[a] Sport Sciences–Biomedical Department, Faculty of Physical Education and Sport, Charles University, José Martího 31, 162 52 Prague 6, Czech Republic, michael.janek93@gmail.com

[b] Faculty of Science, University of Hradec Kralove, Hradec Kralove, Czech Republic

[c] Leibniz Institute for Prevention Research and Epidemiology - BIPS, Bremen, Germany

[d] Department of Movement and Sports Sciences, Ghent University, Ghent, Belgium

[e] Nutritional Epidemiology Research Unit (EREN), Universite Paris Sorbonne Paris Nord, Inserm, Inrae, Bobigny, France

[f] School of Public Health, University College Cork, Cork, Ireland

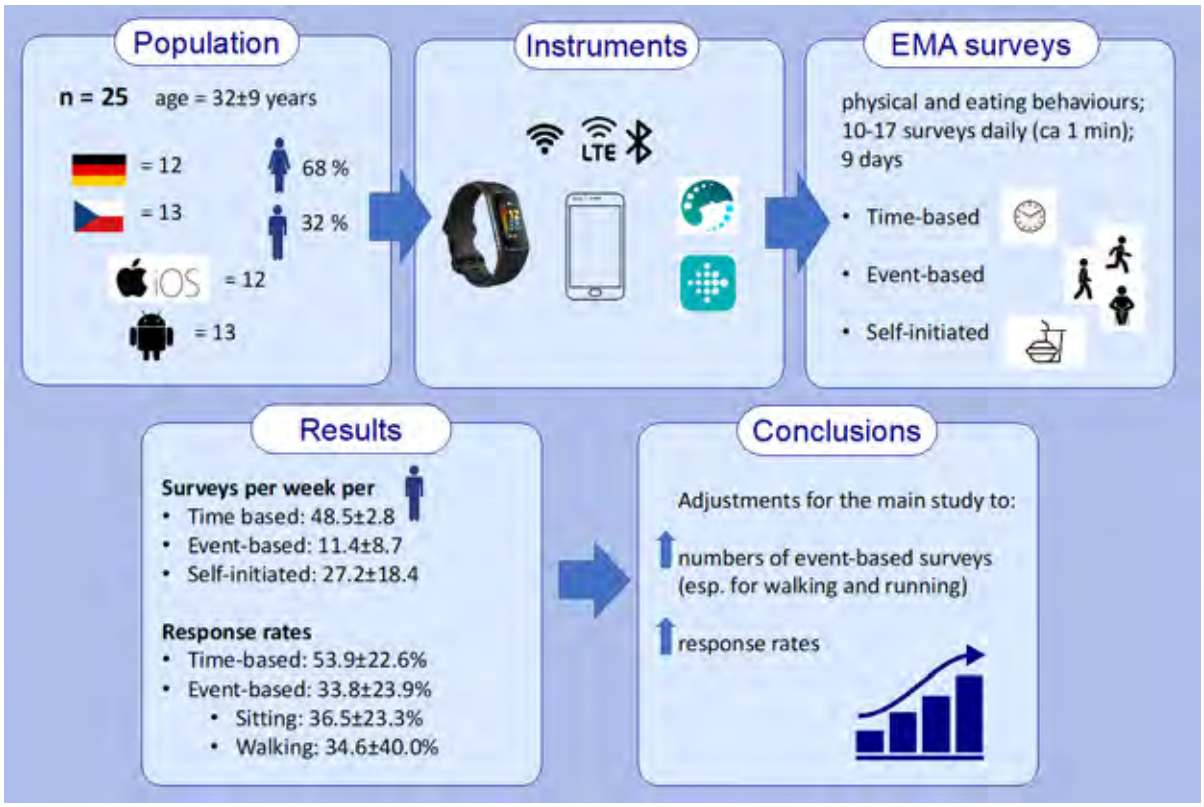
[g] Health Research Institute, University of Limerick, Limerick, Ireland

[h] Department of Human Movement Studies, University of Ostrava, Ostrava, Czech Republic

Abstract

The WEALTH (WEarable sensor Assessment of physicaL and eaTing behaviors) project harnesses event-based EMA to simultaneously capture physical and eating behaviors and their context. This pilot study aimed to evaluate the feasibility of a complex EMA protocol for use in the project. The protocol was pre-tested on 25 participants (32±9 years, 68% female) from Germany (n=12) and Czechia (n=13). Participants wore Fitbit Charge 5 and completed EMA surveys for 9 days using the custom-built HealthReact app on their smartphones (Android n=13, iOS n=12). The daily EMA protocol consisted of 7 time-based and up to 10 event-based surveys triggered by Fitbit-detected sitting or walking/running, and self-initiated surveys for food and drinks. Surveys included questions on physical and eating behaviors (e.g., social company, location, mood) and expired after 8 minutes. On average, participants received 48.5±2.8 time-based and 11.4±8.7 event-based (10.2±8.0 sitting and 1.2±1.6 walking) surveys per week per person. The response rates were 53.9±22.6%, 33.8±23.9%, 36.5±23.3%, and 34.6±40.0%, and the average latency (time elapsed between survey initiation and the start of responding) was 115±126, 105±132, 77±129, and 195±141 seconds for time-based, event-based, sitting, and walking surveys, respectively. The response rates were higher among iOS than Android users (61.9±13.8% vs 40.2±21.0%, p=0.006). On average, participants self-initiated 27.2±18.4 surveys; 42%, 18%, and 40% reported meals, snacks, and drinks, respectively. The average time needed to complete a survey was 70±46, 67±47, 65±48, 89±14, and 48.0±36.0 seconds for time-based, event-based, sitting, walking, and self-initiated surveys, respectively.

Keywords: physical activity; sedentary behavior; eating behavior; ecological momentary assessment; EMA; wearables



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