Vereniging voor Bewegings- en Sportwetenschappen

Flemish association for Movement and Sports Sciences

28th Symposium

15 December 2023

Gent

FOREWORD

Dear fellow exercise and sports scientist,

After a successful edition in Leuven last year we are pleased to welcome you all in Gent for our 28th edition of the symposium of the Association for Movement and Sports Sciences. In the vibrant green environment of the Watersportbaan in Ghent, this edition is hosted in one of the oldest sports halls of Flandres that was transformed to a conference hall, which could not have been realized without the support of the colleagues.

We have retained the concept of our symposium, in which we allow plenty of young researchers to take the podium. We have again selected 12 researchers who will orally present their research in the competition for the Gaston Beunen Award. Besides, we have about 40 poster presentations, from both PhD and Master students. For many Flemish researchers, this symposium is the first event at which they bring their work to a broad audience, outside their own university context. This is one of the main aims of this conference: we want to keep the symposium accessible and focus on positive interaction between sports scientists and feedback from peers. So to the young researchers: don't be fooled by the éminences grises who walk around here... They also once started where you are now.

I would also like to thank the department of Movement and Sports Sciences at Ghent University for creating the flexibility for organizing this symposium in our sports hall and some of the education rooms. Organizing takes some effort because we had to make it fit into our busy schedule full of education and research. But, we are proud to welcome you all here and we succeeded the realization of this 28th edition.

Judging from the program, we have an interesting science day ahead of us. But just as important as the actual sessions are the breaks and closing reception: the ideal moment to meet each other, share research experiences or just catch up. Have fun!

Jan Boone

Chairman of the Association for Movement and Sports Sciences.

INTERACTIVE PROGRAM 28th VBSW SYMPOSIUM 15/12/2023 in Gent

Time	Event	Location
08u15 – 09u00	**Registration** and welcome at Campus Dunant – Building HILO – Watersportlaan 2 – B9000 Gent	*Entrance hall*
08u45 – 09u00	**Poster** installation	*Middenzaal*
09u00 – 09u10	**Welcome** by VBSW-president Jan Boone	*Sports hall (last part)*
09u10 – 09u50	**KEYNOTE Steven Verstockt** (UGent) *Sports Data Science is changing the game*	*Sports hall (last part)*
09u50 – 10u50	**Oral presentations I (Gaston Beunen award)** 09.50-10.05 Mous Anke (KULeuven, Physical Activity, Fitness and Health) *The effect of content knowledge on content development and children's task performance* 10.05-10.20 Vandecauter Jonas (UGent, Exercise physiology) *Muscle fiber typology, a predictor of talent in youth track-and-field athletes?* 10.20-10.35 Descheemaeker Kari (VUB, Sportmanagement) *Examining the relationship between youth sports participation and elite sporting success at a sport-specific level* 10.35-10.50 Vermote Marie (VUB, Physical Activity, Fitness and Health) *The relationship between the amount of grandchild care and levels of physical activity and sedentary behavior in grandparents aged 50 years and over*	*Sports hall (last part)*
10u50 – 11u15	**Coffee Break**	*Practicumlokaal*
11u15 – 12u15	**Oral presentations II (Gaston Beunen award)** 11.15-11.30 Declercq Louise (UGent, Exercise Physiology) *A dive into the physiological responses of apnea training modalities in apnea novices* 11.30-11.45 Vansweevelt Nina (KULeuven, Physical Activity, Fitness and Health) *Reasons for changes in physical activity during the transition from work to retirement: a theory-based interview study in Flanders* 11.45-12.00 Tissot Tassilo Tom (UGent, Sportmanagement, Psychology) *Do athletes tolerate fraud for the benefit of the club? Applying the lens of unethical pro-organizational behaviour* 12.00-12.15 Evelien Iliano (UGent, Physical Activity, Fitness and Health) *The development of the 'Ages get Active' intervention*	*Sports hall (last part)*
12u15 – 12u45	**Lunch**	*Practicumlokaal*

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12u45 – 13u30	**Poster presentations (Gaston Beunen poster award)**	*Middenzaal*

Judging <u>PhD posters</u> & <u>Master Posters</u>

<u>PhD</u>	<u>Master</u>	
Cnudde Kim (UGent)	Cambré Robbe &Van Kerckhove Hannes (KULeuven)	Leenaers Wout & Coenen Lucas (KULeuven)
De Block Fien (UGent)	Cattrysse Matisse (UGent)	Mattheeuws Sebbe & Gilbert Julie (KULeuven)
Deboutte Jolien (KULeuven)	Cocquyt Stef (UGent)	Rooseboom Jente (KULeuven)
D'Hondt Joachim (VUB)	De Kinder Jan (KULeuven)	Schaerlaeken Lisa (KULeuven)
Delobelle Julie (UGent)	De Raeve Arthur (UGent)	Schampheleer Emilie (VUB)
Kerckhove Manon (UGent)	Ezzy Quinten (VUB)	Schockaert Gillian & Timmermans Nicolas (KULeuven)
Lefever Elisa (UGent)	Gargioli Davide (KULeuven)	Truijen Stef & Vandenberghe Ward (KULeuven)
Sablain Mattice (UGent)	Geelhoed Freek (KULeuven)	Van Parys Evy & Vanderbeke Kaat (KULeuven)
Seynaeve Maura (KULeuven)	Gombeer Matthias (KULeuven)	Vanhove Maxine (VUB)
Stuer Lena (UGent)	Lamarti Sami (VUB)	Ziedins Ilyano (KULeuven)
Taheri Hamideh (KULeuven)		
Van Dyck Matthew (UGent)		

13u30 – 14u10	**KEYNOTE Wolfgang Potthast – Jonas Ebbecke** (Deutsche Sporthochschule Köln) *Biomechanics on Two Wheels: Paving the Way for Healthier and Faster Cycling*	*Sports hall (last part)*
14u10 – 15u10	**<u>Oral presentations III (Gaston Beunen award)</u>**	*Sports hall (last part)*

14.10-14.25 Verhavert Yanni (VUB, Physical Activity, Fitness and Health)
Burnout risk and recovery need among Flemish secondary school teachers: what type of physical activity-domain and -intensity matter?

14.25-14.40 Clerinx Tiphaine (UGent, Pedagogy, Psychology)
Developing an intervention for the prevention of gender-based violence for prospective employees in the field of sports

14.40-14.55 Praet Lynn (VUB, Sportmanagement)
Elite athletes as role models? Understanding elite athletes' motives and barriers.

14.55-15.10 Beirens Benjamin (UGent, Physical Activity, Fitness and Health)
Which street characteristics influence cycling behaviour? Using a think-aloud study in virtual reality to empower vulnerable groups in traffic.

15u10 – 15u30	**General Assemblee Meeting** (Jan Boone)	*Sports hall (last part)*
15u30 – 16u00	**Awards session** Public Vote Award & Gaston Beunen Awards (oral presentations/ Poster presentation Master students/ Poster presentations PhD students)	*Sports hall (last part)*
16u00	**RECEPTION**	*GUSB –* *Watersportlaan 3*

VBSW

PART I – Oral presentations
Gaston Beunen Award

All young researchers who have not yet defended their PhD can participate in this oral presentation competition. The jury selected a maximum of twelve oral presentations in advance from the submitted abstracts. The candidates are given ten minutes to present their work, after which the jury can ask questions for five minutes. The winner of this competition receives a prize of 150 euros, while the second and third ranked students are proclaimed.

This year the following PhD students were selected (alphabetical order):

Beirens Benjamin (UGent - 14h55)

ClerincxTiphaine (VUB - 14h25)

Declercq Louise (UGent - 11h15)

Descheemaecker Kari (VUB - 10h20)

Iliano Evelien (UGent - 12h00)

Mous Anke(KU Leuven - 9h50)

Praet Lynn (VUB - 14h40)

Tissot Tassilo Tom(UGent - 11h45)

Vandecauter Jonas (UGent - 10h05)

Vansweevelt Nina (KU Leuven - 11h30)

Verhavert Yanni (VUB - 14h10)

Vermote Marie (VUB - 10h35)

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Which street characteristics influence cycling behaviour? Using a think-aloud study in virtual reality to empower vulnerable groups in traffic.

Beirens Benjamin[1], Deforche Benedicte[2,3], Van Dyck Delfien[1]

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Introduction: Cycling is acknowledged as a sustainable form of transport with several health benefits, yet its limited adoption as a primary mode of transport persists. Research has indicated that people's choice of transportation is influenced by the surrounding environment. Macro-environmental factors play an important role in active transport, but are difficult to change. Micro-environmental factors, on the other hand, have proven to be less complicated to modify in order to promote active transport. In this study we wanted to empower vulnerable groups in traffic, i.e. adolescents, adults with a low SES, and older adults.

Methods: We used a Virtual Reality (VR) set-up as an accessible and inclusive instrument to investigate which street characteristics regarding safety and attractiveness are important to promote cycling for transport among these groups. Two representative streets in Ghent (Belgium) were created in VR, and qualitative data was collected by means of the think-aloud method, while participants cycled virtually through these streets. Various aspects of the VR experience, self-reported cycling behaviour, and socio-demographic information were assessed with a questionnaire.

Results: A content analysis, revealed 14 street characteristics. All 3 vulnerable groups found separate cycling paths, clear markings and traffic signs, even surfaces, calm streets, spacious layouts, and aesthetically pleasing environments important. Adolescents and older adults preferred slower traffic, a good visibility, wider cycle paths, and disliked high curbs, and sudden unexpected actions. Secure bicycle parking was important for adolescents, while older adults valued green environments and had mixed opinions on traffic calming elements.

Conclusion: The results of this study indicate the importance of micro-scale street characteristics when adapting the environment to promote active transport among vulnerable groups. Furthermore, this study shows the potential of VR to give a voice to different sub-groups of the population, and to be an accessible tool for citizen-based science.

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Developing an intervention for the prevention of gender-based violence for prospective employees in the field of sports

Tiphaine Clerincx[1], Prof. dr. Hebe Schaillée[1], Prof. dr. Inge Derom[1] and Prof. dr. Evert Zinzen[1]

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Introduction: Gender-based violence (GBV) is common in college and in the sports sector. Therefore, it is crucial to prepare future employees and develop their competencies that enable the next generation to consciously engage in the prevention of GBV.

Methods:. An Intervention Mapping (IM) approach is used for the development of a GBV prevention journey for undergraduate physical education (PE). The first three phases have led to the first version of the GBV prevention journey. The three phases consisted of (1) a review of the academic literature on GBV and bystander behaviour, (2) a review of non-academic literature that focused on existing GBV interventions and (3) the organisation of focus groups with undergraduate PE students (n=24) in Belgium and Spain.

Results: Various issues arise from this process, current interventions lack theoretical grounding and neglect understanding the human nervous system in stress situations. Additionally, interventions primarily impart knowledge on GBV but fail to educate participants on the behaviour needed to prevent it. Focus group findings reveal that undergraduate PE students lack awareness of reporting procedures for GBV incidents.

Conclusion: This has led to the development of a GBV prevention journey that addressed aforementioned issues and is underpinned by a theoretical framework. The five sessions of the GBV prevention journey cover the continuum of positive proactive and reactive bystander behaviour by working on participants soft skill development (i.e., mentalization skills, non-violent communication, emotional regulation, and problem solving). This approach was deemed relevant for the prevention of GBV in sport as well as for its transferability and usefulness for the target group in terms of intended positions (e.g., coach) they later wish to hold in the sports sector. The current version of GBV prevention journey will subsequently be subjected to a feasibility assessment in one high education institutions to be further optimised.

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A dive into the physiological responses of apnea training modalities in apnea novices

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Introduction: Apnea duration is dependent on three main factors: oxygen storage, oxygen consumption and hypoxia & hypercapnia tolerance. While current literature focuses on maximal apneas to improve apnea duration, apnea trained individuals use timed-repeated submaximal apneas, called "O_2 and CO_2 tables". These tables aim to learn the body to cope with hypoxia and hypercapnia, respectively. The aim of this study was twofold. Firstly, this study investigated the determinants of maximal apnea duration in apnea novices. Secondly, physiological responses to O_2 and CO_2 tables were studied in order to determine their effectiveness in inducing hypoxia and hypercapnia compared to maximal apneas.

Methods: After medical screening, lung function test and hemoglobin mass measurement, twenty-eight apnea novices performed three apnea protocols in random order: maximal apneas, O_2 table and CO_2 table. During apnea, peripheral oxygen saturation (SpO_2), heart rate (HR), muscle (mTOI) and cerebral (cTOI) tissue oxygenation index were measured continuously. End-tidal carbon dioxide ($EtCO_2$) was measured before and after apneas. A multiple linear regression was used to identify the determining factors of maximal apnea duration. A repeated measures ANOVA was used to compare the physiological responses during apnea between protocols.

Results: Results revealed (1) that a larger lung volume, a higher resting cTOI and a lower resting $EtCO_2$ level correlate with longer apnea durations, and (2) that maximal apneas induced greater decreases in SpO_2 and cTOI than O_2 and CO_2 tables, whereas changes in $EtCO_2$, HR and mTOI did not differ between protocols.

Conclusion: The results suggest that, in apnea novices, O_2 and CO_2 tables are less effective in inducing hypoxia and hypercapnia compared to maximal apneas. Further research, optimizing the set-up of O_2 and CO_2 tables, is needed to investigate the effectiveness of these training protocols in apnea novices and apnea trained individuals.

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Examining the relationship between youth sports participation and elite sporting success at a sport-specific level

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Introduction: The sports policy in Flanders focuses on two objectives: (1) increasing sports participation and (2) enhancing elite sporting success. A common assumption among policymakers is that elite sports and grassroots sports are interdependent with grassroots sports, particularly youth participation, acting as the breeding ground for elite sports talents. Therefore, it is suggested that a broader participation base will result in increased elite sporting success. This phenomenon is known as the trickle-up effect. However, scientific studies have rarely demonstrated its occurrence. This research aims to examine the relationship between youth sports participation and elite sporting success across sports in Flanders.

Methods: Over 23 years (2000-2022), Sport Vlaanderen collected youth participation data and elite sports success scores across 27 Olympic Summer sports. Mean values spanning the measurement period were used to evaluate sport-specific correlations between youth sports participation and success.

Results: The study revealed variable relationships between youth participation numbers and the level of elite success across sports. However, while high youth participation is associated with high levels of success in most sports, volleyball stands out as an exception with high participation but low success. Conversely, in six sports with low youth participation, Flanders still managed to achieve notable success (>1% of market share). These findings suggest that extensive youth participation is not a prerequisite for international success.

Conclusion: This research contributed valuable insights into the relationship between youth sport participation numbers and the levels of elite sporting success in 27 sports in Flanders. It highlighted substantial variations in the trickle-up effect among sports and underscored that this effect does not occur automatically. Future research is recommended to consider other factors, such as the quality of youth sports delivery, talent identification systems, and talent development systems, which could play pivotal roles in shaping this complex relationship.

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The development of the 'Ages get Active' intervention

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Introduction: Intergenerational physical activity (PA) programs involving grandchildren and their grandparents have the potential to increase PA levels in both age groups, resulting in various associated health benefits. Developing such programs in a systematic, evidence-based way may enhance intervention effectiveness, ensuring a sustained impact.

Methods: The 'Ages get Active' intervention was developed in a systematic and theory-based way, combining the steps of the Behaviour Change Wheel (BCW) with a co-creation approach, taking into account grandchildren's and grandparents' specific needs. For this, three co-creation sessions were organized with grandparents (n=4), two with grandchildren (n=6), and one together (n=8). Specifically, barriers to be co-physically active, intervention goals and mode of delivery were explored in these sessions, which were recorded and analyzed in NVivo. A meeting with organizational stakeholders was organized to gain additional input on the mode of delivery.

Results: The most important barriers identified were physical ailments, long distance between grandparents and grandchildren and no time to be co-physically active; the most important intervention requirements are differentiated exercise levels, providing exercises that can be performed in pairs, but also individually and setting SMART goals to achieve the behaviour. Four intervention components emerged from the development phase; 1) an educational component in which grandparents and parents will receive information about the intervention; 2) organized group-based intergenerational PA sessions, with six weekly PA sessions in which grandparents and grandchildren will be co-physically active; 3) promotion of intergenerational physical activities at home, facilitated by a supporting PA booklet and setting SMART goals and 4) the promotion of community-based activities.

Conclusion: The 'Ages get Active' intervention was developed in an evidence-based way, combining a theoretical framework with a co-creation approach. The intervention evaluation phase will start in March 2024.

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The effect of content knowledge on content development and children's task performance

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Introduction: Selecting and adapting tasks (i.e., content development) so that children meet an instructional outcome is a critical skill for teaching. Previous research showed that teachers' content development is often poor because of low content knowledge (CK), which affects children's task performance. In this study we examined the effect of a CK workshop on (a) instructional tasks; (b) task adaptations; and (c) correct task performance of children in elementary school.

Methods: One male physical education teacher (35 years) taught two six-lesson units front crawl in both the comparison group (n = 31) and the experimental group (n = 31), all children were in the 5th grade. After the comparison classes, a CK-workshop (3 hours) was provided to the teacher, which consisted of knowledge of instructional tasks, knowledge about common errors students make and how to correct these. In both classes, teacher behavior was observed in terms of task selection and task adaptations, and students' behavior in terms of correct performance of the task. Data was collected live by three trained coders and analysed descriptively. Interobserver agreement was 100% based on the full data set.

Results: The number of instructional tasks increased from 48 in the comparison to 61 in the experimental group. In the comparison group, the teacher used at least three different task types in three of twelve lessons. In the experimental group this was the case for eight of twelve lessons. Task adaptations increased from 123 to 211, and more adaptations were given to children who correctly performed the task (14% vs 33%). In the comparison classes, 50%-79% of children performed 54% of tasks correct while in the experimental classes this was 82%.

Conclusion: The CK workshop substantially changed the teacher's content development which positively affected children's task performance.

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Elite athletes as role models? Understanding elite athletes' motives and barriers.

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Introduction: Elite athletes are often leveraged as role models in order to create societal value through sport. A role model can be defined as an individual perceived as an inspirer, motivator, example and/or worthy of being imitated. However, it is important to note that not all elite athletes are motivated to take on a role model function. The aim of this research is to understand the motivators and barriers to (not) be an elite athlete role model.

Methods: A semi-structured interview guide was developed based on the self-determination theory and public service motivation theory. A total of 20 current and former (≤ 2 years) Belgian elite athletes (45% women) from individual and team sports were interviewed. The interview transcripts were analysed using thematic analysis.

Results: Elite athletes experienced both intrinsic (e.g., satisfaction) and extrinsic (e.g., financial compensation) motivation when they engaged as role models. Additionally, athletes expressed the importance of an environment that fulfils their three basic psychological needs of competence, autonomy, and social connectedness. Barriers described by elite athletes for performing their role model function included, among others, time constraints, the location of the activity, and the lack of a personal connection to the activity.

Conclusion: This study contributes to the current literature by exploring the underlying reasons of elite athletes to engage as elite athlete role models, regardless of whether they want to fulfil the role model function or not. Results might provide guidelines to policymakers in involving elite athlete role models in their campaigns and programmes. To illustrate, sport stakeholders are advised to create a motivational climate that addresses the barriers experienced by elite athletes and fulfils the basic psychological needs in order to stimulate intrinsic motivation.

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Do athletes tolerate fraud for the benefit of the club? Applying the lens of unethical pro-organizational behaviour

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Introduction: Fraud in sport is a topic of growing interest, due to its seemingly omnipresent nature and harmful consequences. However, much remains to be uncovered about the underlying organizational mechanisms that help understand and explain fraud in sport. To help fill this knowledge gap, this present experimental study applied the lens of unethical pro-organizational behavior (UPOB) to study athletes' perceptions of different fraud cases.

Methods: We implemented an experimental design using manipulated vignettes to study perceptions of UPOB in the context of sport. Participants received scenarios describing sport-related fraud, depicting either a situation in which the fraud would benefit their respective club or a situation in which the fraud was purely self-serving, followed by several items measuring aversion towards the described actions. In addition, we examined the effects of perceived inter-club competitiveness and individual moral identity on fraud aversion.

Results: Overall, our results suggest that athletes have a significantly more lenient attitude toward UPOB compared to pro-self unethical behavior (PSUB). Moral identity was shown to have a significant positive association with the disapproval of all types of fraud. Also, the more competitive participants perceived their club, the more lenient their attitude toward fraud. These effects were not specific to UPOB, but were also found in regard to PSUB.

Conclusion: Taken together, the results indicate that the intentionality (pro-organizational versus pro-self) of fraud in sport strongly influences how it is perceived, regardless of individual characteristics or organizational circumstances. This relative discrepancy in perceived acceptability lends additional support to earlier concerns about UPOB's higher potential for imitation, which calls for greater management responsibility in addressing this perception gap.

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Muscle fiber typology, a predictor of talent in youth track-and-field athletes?

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Introduction: Current talent identification programs struggle to successfully identify talents at a younger age, mainly because of the sparse relation between elite youth and senior performances. Thus, stable biological and performance-related factors, such as the muscle fiber type composition (MFTC), may hold promise for more robust predictions. Fast and slow muscle fibers possess distinct characteristics and the distribution of these fibers is discipline-dependent in elite track-and-field athletes. Therefore, the aim of this longitudinal prospective study is to investigate whether MFTC, measured at a younger age, is a good predictor for later track-and-field performance.

Methods: The MFTC of 64 youth athletes (age = 15.7±1.3 years) was non-invasively measured in gastrocnemius and soleus using proton magnetic resonance spectroscopy. To evaluate the ideal MFTC for the track-and-field disciplines, an elite reference population of 87 athletes was used. First, a categorical approach was performed where youth athletes were assigned as "match" if their MFTC was within the range of the elite athletes for their discipline (mean±SD), otherwise appointed as "mismatch". In a second continuous approach, the deviation of the MFTC of the youth athletes from the mean MFTC of the elite athletes was measured, called the muscle fiber type deviation factor (MFTDF). The personal best IAAF-score was analysed as performance parameter.

Results: Matches achieve a higher IAAF-score (987.12 vs 914.55, p=0.011) compared to mismatches using gastrocnemius measurements. For the continuous approach, a significant negative correlation was found between MFTDF based on the gastrocnemius and the IAAF-score (r=-0.328, p=0.008).

Conclusion: Youth track-and-field athletes with a matching MFTC to the elite senior athletes from the same discipline seem to perform better in future (prediction over 4.74 years on average). Therefore, MFTC measured in gastrocnemius may be a stable component of talent prediction during adolescence.

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Reasons for changes in physical activity during the transition from work to retirement: a theory-based interview study in Flanders

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Introduction: Previous studies found that total physical activity (PA) decreases during the retirement transition. To implement optimal PA interventions during this life transition, there is a need for information about changes in barriers and facilitators for PA. Therefore, the research questions of this study are 1) what are the perceived changes in daily (physical) activities during the retirement transition, and 2) which reasons do recent retirees mention for changes in activities during the retirement transition.

Methods: One-on-one, semi-structured interviews have been conducted with retirees at seven months after their retirement transition (n = 30). Prompts were based on the COM-B (Capability, Opportunity, Motivation of Behaviour) and TDF (Theoretical Domains Framework) models. Thematic analysis was used and the emerged themes were mapped on the COM-B and TDF models.

Results: Most participants perceived an increase in PA. Key factors were the increased time availability for sports, exercise and/or active transport and the possibility to have a more flexible planning. Besides the actual extra time for PA, the increased time availability might have induced an increase in PA due to better sleep and more energy, more reflection about ageing and health and more time spent with grandchildren. The loss of work-related social contacts was often compensated by increasing other social activities, that were often physically active as well. Some participants perceived a decreased feeling of being useful and tried to counteract this feeling by initiating new meaningful (physical) activities. Factors associated with a decrease in PA were higher levels of procrastination and a lower intention to engage in PA as some participants believed they deserve a less active lifestyle after all their working years.

Conclusion: This study provides meaningful insights on facilitators and barriers that change during the retirement transition. Therefore, future interventions can be more focused on these factors.

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Burnout risk and recovery need among Flemish secondary school teachers: what type of physical activity-domain and -intensity matter?

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Introduction: Due to the high recovery need and increasing incidence of burnout symptoms among secondary schoolteachers, it is important to investigate how teacher burnout can be managed or prevented. Previous research showed that physical activity (PA) may be beneficial in light of recovery and effective in reducing burnout risk, but research regarding the optimal PA-intensity and PA-domain is lacking. Therefore, this study aimed to investigate the association of PA-intensities across all PA-domains with burnout symptoms and recovery need in secondary schoolteachers in Flanders.

Methods: A total of 1,909 secondary schoolteachers were included in this cross-sectional correlational study. In September-October 2019, all teachers completed an online-questionnaire assessing burnout dimensions (i.e., emotional exhaustion, depersonalisation and personal accomplishment), recovery need, and PA-intensities (i.e., walking, moderate-intensity PA (MPA) and vigorous-intensity PA (VPA)) in the following domains: work-related PA, active transport, leisure-time PA, domestic and garden PA, as well as sociodemographic and work-related factors. Multiple linear regression models were applied in R to identify which PA-intensities per PA-domain were associated with burnout and recovery need. Step-1 models (i.e., separate models for the PA-intensities per PA-domain) and step-2 models (i.e., models including all PA-intensities across all-PA domains) were created.

Results: In both the step-1 and step-2 models, more VPA during leisure-time was associated with less emotional exhaustion and recovery need. In contrast, more walking during leisure-time was associated with more depersonalisation and higher levels of MPA in the domestic and garden domain were associated with more emotional exhaustion.

Conclusion: The association between PA, burnout symptoms and recovery need depends on the domain and intensity of PA. Our results suggest that secondary schoolteachers may benefit most from engaging in VPA during leisure-time for the management and/or prevention of burnout symptoms and recovery need. Longitudinal and experimental studies are needed to allow for stronger causal inferences.

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The relationship between the amount of grandchild care and levels of physical activity and sedentary behavior in grandparents aged 50 years and over

Marie Vermote[1,2,3], Eva D'Hondt[1], Ester Cerin[4,5,6], Muhammad Akram[4], Tom Deliens[1], Benedicte Deforche[1,2]

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Introduction: The present study examined the relationship between the amount of grandchild care provided and grandparents' physical activity (PA) and sedentary behavior (SB) levels, while accounting for the moderating effect of grandparents' sex.

Methods: The amount of grandchild care was calculated in hours per day based on a one week grandchild care diary kept by the grandparents. ActiGraphs GT3X(+) were used to objectify participants' PA and SB over the same days the diary was kept. Data of three assessment time points (i.e., T0, T1 and T2) with six-month time intervals in between were pooled. Mixed modelling was used to investigate the relationship between the daily amount of grandchild care and grandparents' PA and SB levels on the same day (N=477, 63.1% grandmothers), including grandparents' sex as a moderator in the analysis.

Results: Across assessment time points, a higher amount of grandchild care was related to higher levels of light-intensity PA (LIPA) ($p<0.001$) and lower levels of SB ($p=0.014$) in grandmothers, but not in grandfathers ($p=0.506$; $p=0.911$, respectively). At T1, a borderline significant relationship was found between a higher amount of grandchild care and lower levels of moderate-to-vigorous-intensity PA (MVPA) in grandfathers ($p=0.059$), but not in grandmothers ($p=0.136$). At T0 and T2, the relationship between the amount of grandchild care and levels of MVPA was not moderated by sex of the grandparent ($p=0.623$; $p=0.146$, respectively). Regardless of grandparents' sex, a higher amount of grandchild care was related to lower level of MVPA for T0 ($p=0.017$) and T2 ($p=0.025$).

Conclusion: Higher amounts of grandchild care resulted in higher levels of LIPA and lower levels of SB in grandmothers. However, caution should be provided when promoting care for grandchildren as regardless of sex higher amounts of grandchild care were associated with lower levels of MVPA, potentially hampering grandparents in achieving global PA recommendations.

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DEEL II – Posterpresentaties
Gaston Beunenprijs PhD-studenten

All young researchers who have not yet defended their PhD can participate in this poster presentation competition. The candidates are given two minutes to present their work, after which the jury can ask questions for three minutes. The winner of this competition receives a prize of 150 euros, while the second and third ranked students are proclaimed.

This year the following PhD students were selected (alphabetical order):

Cnudde Kim(UGent)

De Block Fien (UGent)

Deboutte Jolien (KU Leuven)

D'Hondt Joachim (VUB)

Delobelle Julie (UGent)

Kerckhove Manon (UGent)

Lefever Elisa (UGent)

Sablain Mattice (UGent)

Seynaeve Maura (KULeuven)

Stuer Lena (UGent)

Taheri Hamideh (KULeuven)

Van Dyck Matthew (UGent)

A holistic approach to understand multiple health behaviours in older adults through network analyses: A protocol for secondary data analyses on the Asklepios study.

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(1) Ghent University; (2) Ghent University Hospital

Introduction: The WHO clearly states that overweight and obesity are among the greatest public health challenges of the century and that combatting this is a key priority. A large amount of previous research showed that a major cause of overweight and obesity is a disturbed energy balance. Thus, from a health interventionist viewpoint, focusing on energy balance, determined by physical activity (PA), sedentary behaviour (SB), dietary intake and sleep, is promising as these behaviours can be affected by behaviour change interventions. Despite often being viewed as independent, these behaviours are strongly interrelated. This study will tackle this shortcoming by using a holistic approach and focusing on PA, SB, dietary behaviours, sleep and determinants simultaneously. This study aims to explore the contemporaneous covariance of PA, SB, diet and sleep, with a subaim to uncover specific behavioural profiles, linked to socio-demographic and psychosocial variables.

Methods: Secondary data analyses will be conducted on the Asklepios study, a large-scale population study on healthy ageing. This study will utilize data from approximately 2000 participants, collected between 2011 and 2016, encompassing data on sleep, dietary behaviour, physical activity (PA), sedentary behaviour (SB), anthropometric measurements, socio-demographic and psychological variables. The research question will be addressed through contemporaneous network analyses, emphasizing a between-participant network. Additionally, latent profile analyses will be employed to uncover potential behavioural profiles, assuming that individuals can be categorized into subgroups with varying probabilities and different configural profiles.

Results: Currently, data are being analysed.

Conclusion: Insights from this cross-sectional study will inform the development of an intensive, observational, longitudinal study. This approach is crucial for comprehending the temporal dynamics of behaviours and their micro-temporal processes. Multiple closely spaced observations from the same participant will be collected, enabling characterization of individual behaviour changes over time and identification of unique processes of change for each individual.

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Which cognitive tests are used to examine the short-term effect of physical activity on cognition in healthy adults aged 50 and older? - a systematic review

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Introduction: This systematic review summarizes the available scientific research on the short-term effect of physical activity (PA) on cognition in adults aged 50 and older. More specifically, an overview is given of the assessed cognitive domains, the used cognitive tests and outcomes, and whether short-term effects of PA on cognition were demonstrated.

Methods: The MEDLINE, Embase, and Cochrane Central databases were searched in April 2023 for interventional and observational articles assessing the short-term effect of PA on cognition in healthy adults aged 50 and older. The risk of bias was assessed with the EPHPP Quality Assessment Tool for Quantitative Studies.

Results: Forty-two articles were included, using a large variety of protocols. Executive functioning was the most frequently assessed cognitive domain. In total, thirty-five different cognitive tests were administered, among which many variations and modifications were found. Furthermore, the reported outcomes varied greatly, even when using the same cognitive test. Across cognitive tests, less than half of the reported outcomes demonstrated an improvement in cognition shortly after PA. Time-based outcomes demonstrated an improvement more often than accuracy-based outcomes. However, because of the large variety among protocols and the often insufficiently nuanced reporting, results should be interpreted carefully.

Conclusion: The short-term effect of PA on executive functioning in older adults has been examined frequently, but research on other cognitive domains is limited. The variety among study protocols and test outcomes highlights the need for more rigorous research and reporting.

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Force-velocity profiling as a promising approach for estimating one-repetition maximum in an aging population

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Introduction: Resistance exercise is the primary therapeutic strategy to counteract age-related declines in muscle function [1]. To individualize exercise intensity, training loads are often prescribed based on an individual's one-repetition maximum (1-RM) [2]. Despite the excellent reliability of 1-RM measurements [3], the protocol is time-consuming and may enhance the risk of injuries, especially in older adults [4]. Consequently, various approaches for estimating 1-RM have been introduced. Following the observation that assessing movement velocity enables accurate prediction of relative load [5], using the force-velocity (F-v) profile has emerged as a potential method. Therefore, the aim of this analysis was to determine if the 1-RM of older adults can be estimated from their individual force-velocity (F-v) profile.

Methods: F-v profiling was carried out on a pneumatic leg press device [6]. Sixty-four men (age = 66.9 ± 5.4 years) performed explosive concentric leg extensions at five pre-fixed increasing loads, followed by single repetitions until 1-RM was reached. The five submaximal loads and the corresponding velocities were used to generate individualized F-v equations. The sample's mean velocity at 1-RM was calculated and the value (i.e., 0.10 m/s) was inputted into the individualized F-v equations to estimate 1-RM for each individual.

Results: Measured and estimated 1-RM were highly related (r=0.92, p<0.01) and not significantly different (-4.8 ± 62.6 N, p=0.525). A high level of absolute agreement between methods (ICC=0.92, p<0.001) indicated excellent validity of the estimation method. Linear regression analysis resulted in a standard error of estimate of 61.8 N and a Bland-Altman plot indicated substantial inter-individual variability in the differences between methods.

Conclusion: Estimating 1-RM from F-v profiling provides a low risk, time-efficient alternative for prescribing resistance training load. The results are promising at group level but may not be generalizable to all individuals and should therefore be interpreted with caution.

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The magnitude of 505 change of direction (COD) asymmetry decreases with chronological age in male and female youth elite tennis players: Results from 11 years of follow-up

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Introduction: Functional asymmetry can exacerbate by practicing unilateral sports, such as tennis, and has been associated with impaired athletic performance. This longitudinal study investigated the development of 505 COD asymmetry in youth elite tennis players.

Methods: Using an 11-year longitudinal cohort study design, the development of COD asymmetry was yearly assessed in 323 male and 235 female youth elite tennis players (aged 6-13 years). Their 505 COD performance (i.e., time to cover 5m, turn 180° and sprint 5m back) was recorded three times for both directions of rotation. The magnitude of functional asymmetry was calculated using the dominant (i.e., overall best result) and non-dominant value (i.e., best test result of the opposite direction): ([dominant value–non-dominant value]/dominant value)*100. Linear mixed effects regression models were used to examine the development of both performance and asymmetry in the 505 COD test according to players' chronological age and sex. Kappa coefficients examined the consistency regarding the direction of asymmetry across test occasions.

Results: Regardless of sex, 505 COD performance significantly improved (i.e., less time needed to complete the test) with increasing chronological age ($p < 0.001$). An increase in players' chronological age was also related to a significant decrease in 505 COD asymmetry magnitude (-0.17±2.83% per year, $p < 0.001$). Regardless of age, the male players showed a significantly lower 505 COD asymmetry magnitude compared to the female players (-0.30±1.00 %, $p < 0.001$). The kappa coefficients were poor to slight (0.00-0.02) for all youth elite tennis players.

Conclusion: Although the yearly 505 COD performances significantly improved with growing older, the magnitude of 505 COD asymmetry – which was found to be higher in boys – significantly decreased in youth elite tennis players according to their chronological age. The large standard deviations and the poor to slight kappa values, however, emphasize the need for an individual and time dependent approach when monitoring 505 COD asymmetry.

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Acute effects of the physical and social environment on anxiety and perceived stress and their impact on walking levels in people with epilepsy – qualitative walk-along interviews

Ms Julie Delobelle1,2, Prof. Evelien Carrette1, Prof. Kristl Vonck1, dr. Jelle Van Cauwenberg1,2, Prof. Delfien Van Dyck1

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Background: Many people with epilepsy (PWE) do not meet the physical activity (PA) guidelines. However, PA has antiepileptic and anxiolytic effects, which is of utmost importance for PWE, since stress and anxiety are very common triggers of seizures. Walking is an accessible and feasible way to be active. Previous studies already showed that the physical and social environment positively influences walking levels in the general population. Therefore, this study will gain in-depth qualitative information regarding which physical and social environmental characteristics influence anxiety and perceived stress and, consequently, impact PA among PWE.

Methods: Walk-along interviews, i.e. qualitative in-depth interviews during a walk in the participants' residential environment will be conducted, until saturation of information is reached. While walking, participants will be asked to identify and discuss physical and social attributes that (positively or negatively) affect their stress and acute anxiety levels and how this may affect their walking levels. The walk will proceed from the participant's home to a specific destination (e.g. a square or park). Participants can choose the route to walk to the destination. This route will be the participant's preferred route and this can be anticipated to be a route with a minimal presence of stimuli that can provoke anxiety and stress. The way back home will be chosen by the researcher, in order to expose the participants to potential environmental stressors and triggers of stress or anxiety that are normally avoided. Additionally, a go-pro camera will be attached to the participant's chest, to video and audio-record the interview. The audiotapes will be transcribed verbatim and processed afterwards with NVivo-12.1 software. To explore the validity and credibility of the results, member checking will be used.

Results: Data collection for this study will take place between May 2023 and November 2023. Qualitative analyses will be conducted and results will be presented at the conference.

Discussion: This study will provide in-depth information on which environmental attributes are perceived as safe or attractive and stimulate walking; and which attributes evoke feelings of acute anxiety and stress and discourage walking. These findings may contribute to interventions to promote walking in PWE.

Sleeping for success: Investigating the crucial role of sleep among elite cyclists.

Kerckhove Manon[1], Kobe Vermeire[1], Jan Boone[1]

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Introduction: In the world of elite cycling, the demands on athletes continue to intensify and the significance of recovery strategies become increasingly evident. Beyond training intensity and nutrition, the often underestimated factor of adequate sleep emerges as an important aspect of recovery. This research aims to unravel the value of sleep for elite cyclists, mapping their sleep habits, sleep quality and various physiological parameters.

Methods: A survey, based on the Athlete Sleep Screening questionnaire (ASSQ) was employed to assess self-reported sleep difficulties, sleep habits, caffeine intake at home, during competition and while traveling. Forty-eight members of an UCI Pro team participated (n = 22 Pro team males; n = 13 Pro team females; n = 9 development team males). Additionally, the survey covered the determination of each participant's chronotype.

Results: The population's chronotype distribution revealed 18% as morning types, 5% evening types, and 77% neutral types. Sleeping difficulties were reported by 7% of the population, with 5% experiencing moderate and 2% severe difficulties. While traveling, 50% of the population experienced sleep troubles, impacting the performance of 11% of the respondents. The last caffeine was before 4 p.m. (73.7%) and 8.4% reported consuming more than four caffeinated products daily.

Conclusion: The findings of this research hold implications for coaches, sport scientists and athletes. By unravelling sleep-related challenges, targeted sleep strategies can be implemented to enhance overall sleep quality. Future research should examine the potential relationship between training load, sleep quality, and athletic performance.

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May a controlling coaching style form a gate-way to athlete harassment and abuse: a preliminary study.

Elisa Lefever, Felien Laureys, Cleo Schyvinck, Tine Vertommen, Leen Haerens

Area of study: *sport, exercise, and physical activity*

Abstract:

Previous (prevalence) studies showed that athlete harassment and abuse by the coach is omnipresent, and leads to many detrimental effects like athletes' anxiety and self-esteem. One way to look deeper into the development of AHA by the coach, is to look at the styles that coaches can use when they interact with their athletes. One coaching style in particular is controlling coaching, which is, according to the Self-Determination Theory, evident in the conditional use of rewards, and the presence of intimidation, excessive personal control, and negative conditional regard. This way of coaching shows great conceptual overlap with psychological athlete harassment and abuse by the coach (e.g., coaches trying to control athletes' spare time), which may make it easier to conduct psychological AHA, or even other forms of AHA. Both fields of research (i.e., literature on AHA and controlling coaching) exist separately from each other. That's why this study looked at the relation between controlling coaching and the three forms of athlete harassment and abuse (i.e., psychological, physical, and sexual), and the relation of both constructs to athletes' anxiety and self-esteem.

In total, 565 Belgian (former) gymnasts (91.2% female; 33.7% active; age = 21.70 ± 4.26) reported perceived coach's controlling style, coach's athlete harassment and abuse, their feelings of anxiety, and self-esteem. Adopting a controlling coaching style related to experiencing more psychological AHA by the coach. Similar results were found for physical and sexual AHA. In terms of athletes' outcomes, controlling coaching and all forms of AHA related detrimentally to athletes anxiety and self-esteem. As a controlling style strongly related to all forms of AHA by the coach, this style may form a gate-way to AHA. Equipping coaches through evidence-based safeguarding education with suitable alternative coaching styles may help protect athletes from psychological harassment and abuse.

VLamax: innovation in testing or work in progress?

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Introduction: Although exercise testing for endurance performance is often focussed primarily on aerobic factors, the anaerobic metabolism should not be neglected. Platforms such as INSCYD try to combine the maximal glycolytic flux rate (VLa_{max}) and maximal oxygen consumption rate (VO_{2max}) in order to accurately determine the maximal lactate steady state. There is however still a lack of validation in current literature. The purpose of this study was to re-evaluate the reliability of VLa_{max} and the calculated power at maximal lactate steady state (cPMLSS) and to compare cPMLSS with the second lactate threshold determined by experts ($LT_{2expert}$).

Methods: 13 male participants (Weight: 76.3 ± 5.8 kg; Length: 1.82 ± 0.04 m) completed a step incremental test in order to determine VO_{2max} (60.5 ± 5.8 $ml.min^{-1}.kg^{-1}$) and $LT_{2expert}$ (277 ± 41W). Additionally four 15" isokinetic cycling tests were done on separate days for VLa_{max} calculations (0.48 ± 0.10 $mmol.l^{-1}.s^{-1}$). A mathematical formula proposed by Mader & Heck was used to determine cPMLSS (282 ± 42W) based on VLa_{max} and VO_{2max}. Interclass correlations (ICC) were used to determine the reliability. Paired sample T-tests were used to compare the average cPMLSS and $LT_{2Expert}$. A Pearson correlation (r) was used to determine if there was a relationship between the average cPMLSS and $LT_{2Expert}$ and between the average cPMLSS, the average VLa_{max} and VO_{2max}.

Results: VLa_{max} and cPMLSS showed good (ICC = 0.804) and excellent (ICC = 0.992) reliability respectively. Furthermore, no significant difference and a significant correlation was found between cPMLSS and $LT_{2Expert}$ (r = 0.917, p < 0.001). Only VO_{2max} correlated significantly with cPMLSS (r = 0.865, p < 0.001).

Conclusion: VLa_{max} and cPMLSS can be considered reliable measurements, however the validity and therefore practical implication still needs further research. Additionally, the influence of VLa_{max} on cPMLSS is rather small when compared to VO_{2max}. Despite the small non-significant difference between $LT_{2Expert}$ and cPMLSS, large errors are apparent on the individual level. The mathematical model should be further refined by individualizing the variables used in the calculation.

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Exploring non-linear analysis methods to detect onset and progression of muscle fatigue

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Introduction: Muscle fatigue heavily impacts daily functioning. Various methods have been used to detect its occurrence, including analysis of time and frequency components of the electromyography signal. Recent studies, however, were able to detect fatigue based on non-linear analysis methods of the torque signal. However, it is unclear if these methods are sensitive enough to accurately identify the onset and progression of muscle fatigue. In this pilot study, we compared different analysis methods to determine the most sensitive method to detect muscle fatigue in real-time during sustained contractions.

Methods: Four healthy human subjects (21.25 years old ± 2.06) participated in a pilot study. Each participant completed two training sessions on two different days consisting of one-minute isometric dorsiflexion contractions on an isokinetic dynamometer. In the fatiguing condition, participants performed these contractions at 40% MVC, while in the control condition at 10% MVC. During this task, m. tibialis anterior activity was measured using EMG. The differential progression of fatigue between the two conditions is monitored via (i) more frequently used parameters such as mean activation, EMG median frequency and the coefficient of variation and (ii) non-linear analysis methods such as detrended fluctuation analysis (DFA) and sample entropy of the torque fluctuations.

Results: Data is currently being analyzed.

Conclusion: Klik of tik om tekst in te voeren.

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The impact of skinfold thickness and exercise intensity on the reliability of NIRS in the VL

Stuer Lena[1], Teso Massimo[2], Colosio Alessandro[1], Loi Maura[2], Mucci Patrick[3], Pogliaghi Silvia[2], Boone Jan[1] and Caen Kevin[1]

(1) **Introduction:** The first aim of this study was to assess the test-retest reliability of the primary near infrared spectroscopy (NIRS) parameters (i.e., StO_2, $T[Hb]$, $[HbO_2]$ and $[HHb]$) at the M. Vastus Lateralis (VL) during cycling at a constant intensity. The second aim was to investigate potential influences of exercise intensity and adipose tissue thickness (ATT) on this reliability.

Methods: 41 healthy and physically active participants (21 men and 20 women) completed constant work rate tests at six different exercise intensities and each intensity was performed twice. NIRS variables were measured at the VL.

Results: The reliability of baseline values were acceptable to very good (CV% range: 5.83 – 21.96%). The reliability of end-values (CV% range: 0.02 – 25.02%, ICC range: 0.0 – 0.935) and amplitudes (ICC range: 0.0 – 0.887) were more variable. In general, the mean biases of end-values and amplitudes showed wide limits of agreement. A homogeneous influence of both exercise intensity and ATT on reliability measurements could not be established. However, the NIRS signals decreased with increasing ATT but stabilized upon reaching a cut-off of 8 mm ATT. Furthermore, ATT did have a significant influence on [HHb] amplitude. In participants with ATT < 8 mm, higher amplitudes were observed with increasing intensity whereas in participants with ATT > 8 mm, there were no differences between the intensities.

Conclusion: The study reveals variable results with regards to reliability and there was no consistent influence of exercise intensity and ATT on reliability measurements. Nevertheless, NIRS signals decrease when ATT exceeds 8 mm. Careful consideration is necessary when interpreting NIRS signals in such cases.

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Generalization of participation in physical activity from physical education to recess in two elementary school classes

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Introduction: The purpose of this study was to investigate the generalization of participation in parkour from physical education to parkour recess in two different elementary school classes taught by the same teacher

Methods: One class of 2nd Grade (n = 19) and one class of 3rd Grade (n 26) elementary schoolchildren were taught a seven-lesson parkour unit during physical education. The teacher and the children were new to parkour, and the teacher taught each lesson first to second Graders and next to third Graders. The voluntary participation of children from both classes in six parkour recess sessions was investigated, and moderate-to-vigorous physical activity (MVPA) in parkour was collected by trained observers through systematic observation. In physical education, lesson context and teacher's physical activity promotion in both classes were investigated using systematic observation

Results: The results indicated that more time was spent in management in Grade 2 compared to Grade 3. In Grade 3, more time was spent on skill practice and children achieved more MVPA compared to second Graders during physical education (38% versus 35%, $p<.001$). More children from 3rd Grade participated during parkour recess (74%) compared to children in the 2nd Grade (43%, $p=0.001$), while they all had similar MVPA levels during parkour recess (70%).

Conclusion: Connecting physical education content with organized recess sessions offered a valuable contribution to children's MVPA levels. Future research should further explore how children's participation and MVPA levels vary as a function of teachers' effectiveness in delivering the content and as a function of children's age.

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Application of the critical power concept in track cycling – team pursuit

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Introduction: The Critical Power concept consists of Critical Power (CP), an estimate of the maximal metabolic steady-state intensity, and W', a finite anaerobic work capacity above CP. Team pursuit is a discipline in track cycling where a team of four riders race over a distance of 4 km to achieve the fastest time possible by maintaining a close-knit formation. The purpose of this descriptive study is to explore the power output profile of a team pursuit and to model the intermittent work capacity during such event by applying the Critical Power model.

Methods: Team pursuit data were assessed during the first round of the World Championships in Paris of four elite cyclists competing for Belgium. Average power output was calculated for each rider in every formation and W' values were quantified using the PACE model.

Results: On average, a power output of 602 ± 97 W was found in first position, 459 ± 135 W in second position, 398 ± 92 W in third position and 420 ± 141 W in fourth position. W' dynamics indicated a pronounced depletion of W' in first position, whilst W' did not reconstitute notably in second, third and fourth position. The PACE model approached 0 J for one rider, whilst it exceeded below 0 J for another rider and did not drop below 5 kJ for the two other riders during the race.

Conclusion: The lowest power output in third position on average is feasibly due to a reduction in drag. W' modelling unveiled W' depletion in first position and W' defending in second to fourth position during a team pursuit race. Future research should investigate the influence of individual characteristics when modelling W' dynamics allowing modification of pacing strategies and enhancement of performance.

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DEEL III – Posterpresentaties
Gaston Beunenprijs masterstudenten

All master student scan participate in this poster presentation competition. The candidates are given two minutes to present their work, after which the jury can ask questions for three minutes. The winner of this competition receives a prize of 150 euros, while the second and third ranked students are proclaimed.

This year the following Master students were selected (alphabetical order):

Cambré Robbe & Van Kerckhove Hannes (KU Leuven)

Cattrysse Matisse (UGent)

Cocquyt Stef (UGent)

De Kinder Jan (KULeuven)

De Raeve Arthur (UGent)

Ezzy Quinten (VUB)

Gargioli Davide (KULeuven)

Geelhoed Freek (KULeuven)

Gombeer Matthias (KULeuven)

Lamarti Sami (VUB)

Leenaers Wout & Coenen Lucas (KULeuven)

Mattheeuws Sebbe & Gilbert Julie (KULeuven)

Rooseboom Jente (KULeuven)

Schaerlaeken Lisa (KULeuven)

Schampheleer Emilie (VUB)

Schockaert Gillian & Timmermans Nicolas (KULeuven)

Truijen Stef & Vandenberghe Ward (KULeuven)

Vanhove Maxine (VUB)

Van Parys Evy & Vanderbeke Kaat (KULeuven)

Ziedins Ilyano (KULeuven)

The effect of palmitoylethanolamide on muscle recovery after an acute eccentric training session

Cambré Robbe[1], **Van Kerckhove** Hannes[1], Schouten Moniek[1], Dalle Sebastiaan[1], Costamagna Domiziana[1], Koppo Katrien[1]

(1) Department of Movement Sciences, Exercise Physiology Research Group, KU Leuven, Leuven, Belgium

Introduction: Exercise-induced muscle damage (EIMD) goes along with the initiation of an inflammatory response and muscle soreness which subsequently reduce muscular strength and functionality. Athletes might therefore experience a temporary decrease in training quality and performance. Since palmitoylethanolamide (PEA), an endocannabinoid lipid mediator, has anti-inflammatory and analgesic effects, it might promote muscle recovery following a muscle damaging exercise (MDE).

Methods: Eleven healthy, young, male recreational athletes (height, 1.82 ± 0.02 m; weight, 78.62 ± 2.49 kg; BMI, 23.8 ± 0.4 kg/m^2; age, 22.5 ± 1.4 yr) were included in this randomized double-blind crossover study. During each intervention period, participants were randomly assigned to either consume PEA (350 mg Levagen+) or placebo (350 mg maltodextrin). At baseline, jump height during the counter movement and squat jump, along with maximal voluntary concentric, eccentric and isometric contractions (MVCs) of the right leg were measured. Three days later, MDE was performed, consisting of 24x10 maximal eccentric contractions of the right knee extensors. Measurements of muscle strength and jump height were repeated 24, 48, 72 and 120h post-MDE. Blood samples were collected at the same time points, with an additional collection 96h post-MDE. Perceived muscle soreness was assessed daily using a visual analogue scale.

Results: MDE induced muscle damage as evidenced by elevated creatine kinase levels, increased perceived muscle soreness, and decreased jump height and MVCs (P_{time}< 0.0001) in both conditions. Compared to placebo, PEA did not reduce the decline in jump height and MVCs induced by MDE. Furthermore, PEA did not attenuate the increase in creatine kinase levels and muscle soreness caused by MDE, in comparison to the placebo. Klik of tik om tekst in te voeren.

Conclusion: These results indicate that PEA supplementation for five days following a muscle damaging exercise did not aid in the muscle recovery process.

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The vision on talent

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Introduction: Football is recognized as the world's most popular sport with an estimated 265 million players, leading to its extensive study and business-oriented evolution of football clubs. The importance of scouting is amplified by these clubs' business approaches. Scouts in football often rely on their personal judgment, applying practical knowledge and cultural context to identify potential talent. In the talent identification process, the use of objective diagnostic tools is often combined with subjective evaluations by coaches. This two-dimensional decision-making model, integrating both objective and subjective evaluations, leads to an improvement in decision validity. Therefore the aim of this pilot study is to look at which attributes scouts and coaches prioritize when looking at talented players.

Methods: The pilot study's participant group will include 8 to 10 soccer scouts or coaches, organized into four categories based on their level of experience and certification status. These participants will be selected internally by the Department of Movement and Sport Sciences at Ghent University. The visual materials to be used in the study will be compiled clips from four soccer tryout games for the U15 National Youth Team of the RBFA. To track and analyze where and how participants will focus their attention during the game footage, they will be outfitted with eye-tracking goggles provided by Pupil Labs.

Results: The data collection will be ongoing.

Conclusion: Klik of tik om tekst in te voeren.

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VBSW

Translating ramp V̇O2 into constant power output: mathematic modelling of the V̇O2/PO relation above GET

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Introduction: Exercise tests characterized by a linear increase in power, the so-called ramp tests, are often used in research and practice to evaluate aerobic performance both in test subjects, athletes and patients. Due to continuous monitoring of gas exchange, such a test provides non-invasive measurement in which simultaneous submaximal and maximal performance capacities are assessed, while being time efficient as well. However, a major difficulty in current practice, is to translate the measured $\dot{V}O_2$- and power- output into constant-intensity exercise (CWR). A different work rate forcing function established during RI exercise testing causes $\dot{V}O_2$ kinetics to "lag behind", especially above the gas exchange threshold (GET) where both the mean response time (MRT) and the $\dot{V}O_2$ slow component (SC) affect this delay. Recently, Caen et al. (2020) validated a twofold correction strategy, based on the assumption that the slope of the 2nd portion modelled over CWR tests (above GET) was linear. This assumption however is not been established in current literature and can therefore not be accepted as a standard. With respect to this statement, this study aimed 1) to mathematically model the $\dot{V}O_2$/PO relationship above the GET and investigate whether it develops in a linear or non-linear fashion. And 2) to get a better understanding in regards to the occurrence and progression of the SC above the GET.
Methods: Fourteen participants (seven men and seven women) performed one ramp incremental exercise test and X amount of CWR tests, whereby the first CWR corresponded to the corrected power output at GET. In consecutive tests, power output increased by 10W each time until $\dot{V}O_2$max was reached. During all tests, heartrate (HR) was monitored and gas exchange was measured breath by breath. Blood lactate samples were also taken and analysed for verification of GET and RCP. The $\dot{V}O_2$/PO relationship for the different CWR-, as well as for RI-, exercise test was modelled.
Results: Preliminary data of test subject 1 suggests that the relationship across different CWR test's in the heavy intensity domain can be mathematically modelled in a linear fashion (R_2 =0,9922).
Conclusion: /
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Effect of collagen intake during repeated sprint training in trained sprinters

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Introduction: Recent data indicated that collagen peptide (CP) supplementation improves rate of force development during exercise. Given the primary importance of this parameter in sprint performance, we investigated if CP ingestion could improve muscular function and sprint performance during repeated sprint training in trained sprinters.

Methods: Using a double-blind, cross over design, 11 well trained sprinters were subjected to a 14-day intervention period. This intervention period consists of a 1-week loading protocol followed by a 1-week period involving three repeated-sprint training (15x30m sprint) sessions interspersed by 48h recovery. During the 14-day period subjects receive either 20g/day of CP or 20g/day maltodextrin as a placebo (CON), both enriched with 0.3% v/v vitamin C. Following a 2-week washout period, the intervention is performed with the other nutritional supplement. Experimental sessions were performed (i) before the first sprint training (pre), and 48h following the (ii) first (mid), and (iii) third sprint training (post). Experimental measurements included (i) 30m sprint performance with time intervals at 5, 10 and 30m, (ii) isometric knee-extension strength, (iii) counter movement performance, (iv) drop jump performance, and (v) perceived muscle soreness. The data are analyzed using a 2-way repeated-measures ANOVA, with a post-hoc Tukey comparison test.

Results: The data collection is currently ongoing, and only data from the first intervention period has already been collected. A main effect of time ($p = 0.02$) was observed for drop jump performance, indicating that drop jump performance increased from pre to both mid and post (both $p = 0.04$ *vs.* Pre). An interaction effect ($p = 0.04$) was observed for 5m sprint times, but post-hoc comparisons did not indicate any significant effect. None of the other parameters was affected by either the training or nutritional intervention.

Conclusion: The collected data indicate that CP supplementation does not impact the response to repeated-sprint training. But it should be highlighted that this is based on only a subset of the data given that data collection is still ongoing.

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Klik of tik om tekst in te voeren.

VBSW

Motor learning in trouble! Research in adults with Developmental Coordination Disorder

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Introduction: Developmental Coordination Disorder (DCD) significantly affects skilled movement coordination, influencing an individual's daily activities. This study is part of a broader project examining the evolution of motor behavior and brain structure/function during motor task learning in individuals with DCD. Specifically, this section investigates the differences in motor learning over a short and longer period in adults with DCD compared to typically developing (TD) peers, considering both group and individual perspectives.

Methods: Thirteen participants with DCD and thirteen TD individuals (18-35y) engaged in an 18-session, 6-week balance training program on a rolla bolla. Motor learning was assessed at four time points: baseline (-6-weeks), pre (0-weeks), mid (+3-weeks) and post (+6-weeks) by measuring the amount of time participants could keep their balance on the loose or fixed role (maximum 120 seconds), with the latter condition requiring control of less degrees of freedom. RMANOVA's were used for time by group interaction effects.

Results: For the loose role, no significant differences in motor learning were observed between groups ($p=0.744$, $\eta_p^2=0.012$). However, individual data showed slower and more heterogenic learning in adults with DCD. On the fixed role, the DCD group displayed a significantly slower learning pattern compared to TD peers ($p \leq 0.001$, $\eta_p^2=0.324$), both after 3 and 6 weeks of training.

Conclusion: The loose role was feasible for both groups which was surprising given the control of more degrees of freedom. Instead, participants had more time to correct their balance. However, individuals with DCD exhibited significant heterogeneity and slower learning compared to TD peers. For the fixed role, adults with DCD displayed limited improvement over time, suggesting either the task was too demanding or there was insufficient time for learning. Both findings could underscore the importance of adopting an individualized and differentiated approach for individuals with DCD.

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The link between sleep and mental fatigue (MF): how are sleep quality, quantity and chronotype associated with the response to MF?

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Introduction: Mental fatigue (MF) has previously been associated with different aspects of sleep, but some of these links remain unclear. Therefore, this study aimed to investigate how sleep quality, quantity and chronotype are associated with the response to MF.

Methods: In this randomized, counter-balanced, cross-over study, 70 healthy adults (38 males, 32 females; 31 ± 9 years; rVO2max 47.86 ± 9.20 ml/kg-1/min-1) performed a 45-min Stroop task during the intervention and watched a documentary in the control condition. MF was measured by a Visual Analogue Scale, and a Go/NoGo task was performed to determine cognitive response to MF. Physical performance was assessed by a 15-min self-paced cycling time trial (TT). Sleep quality and quantity were assessed by the Pittsburgh Sleep Quality Index, and chronotype by the Single Item Chronotyping Scale. Self-reported caffeine consumption was assessed by the Caffeine Consumption Questionnaire. For each outcome, a Delta was calculated to summarize results into one dependent variable. Controlling for self-reported caffeine consumption, Analyses of Variance were executed to assess differences between chronotypes. Multiple linear regressions were executed to investigate whether sleep quality, sleep quantity, and caffeine consumption are associated with the response to MF.

Results: No significant differences in MF response were found between chronotypes (VAS: p = 0.241; Go Reaction Time: p = 0.566; Go Accuracy p = 0.626; NoGo Accuracy p = 0.639; TT: p = 0.676). Moreover, no significant association was found between sleep quantity, sleep quality, and caffeine consumption with the response to MF (VAS: p = 0.530; Go Reaction Time: p = 0.515; Go Accuracy p = 0.857; NoGo Accuracy p = 0.831; TT: p = 0.457).

Conclusion: These results seem to indicate that the response to MF is not affected by sleep quality, quantity, and chronotype. Henceforth, other factors might be at play in mechanisms of MF.

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Microbial game changers: impact of antibiotic (mis)use on training adaptations, immunity, injury, and exercise performance

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Introduction: Athletes frequently resort to antibiotics, potentially driven by prophylactic measures and swift initiation of treatment upon the onset of early infection symptoms. The demanding nature of training and competition heightens athletes' susceptibility to infections. Regardless of the purpose, antibiotic-induced disturbances in the microbiome have been linked to compromised adaptations to exercise training. This literature review examines the intricate relationship between antibiotic (mis)use and its impact on sports performance.

Methods: Narrative review

Results: Rodent studies demonstrate that antibiotic treatment diminishes training adaptations in aerobic exercise performance, muscle mitochondrial biogenesis, and blood flow. Similarly, antibiotic interference disrupts muscle hypertrophy and fiber type shifts associated with weighted wheel running. A causal role for the gut microbiome is supported by findings showing increased muscle and whole-body oxidative capacity in sedentary mice following fecal microbiota transplantation from trained counterparts. In humans, both cross-sectional and interventional studies confirm exercise as a modulator of the gut microbiome, increasing microbial diversity and short-chain fatty acid production. These microbiota-produced metabolites play pivotal roles in gut barrier integrity, endotoxins-related systemic inflammation, immune response, and mental well-being. Frequent antibiotic use, disturbing the gut microbiome, could be postulated to compromise training adaptations, increase infection risk, and impact mental resilience. Some antibiotics may also contribute to musculoskeletal injuries.

Conclusion: Antimicrobial agents have revolutionized healthcare, however, a careful consideration of their use is paramount for athletes aspiring to achieve peak performance. The intricate interplay between antibiotics, the gut microbiome, and overall well-being highlights the need for a judicious approach to preserve both health and athletic excellence.

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Understanding the dynamic impact of coaching; the positive influence of autonomy-supporting, structuring, and demanding behavior on team cohesion

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Introduction: In an ever-growing effort to discover antecedents of optimal performance in sports, researchers have uncovered the significance of team cohesion, thus showcasing the importance for coaches to adopt cohesion-promoting behaviors. However, researchers have only related single general coaching behaviors to cohesion, whereas recent findings have emphasized the need for (1) investigating coach behaviors in a more fine-grained manner, and (2) looking into combinations of coach behaviors. The current study investigated which coaching behaviors are specifically related to changes in team cohesion. Autonomy-supporting (i.e., participation, attuning), structuring (i.e., guiding, clarifying), and demanding behaviors are hypothesized to predict cohesion since these, respectively, allow coaches to attune with athletes' perspective, create clear goals and structure, and might be needed to push the team to achieve goals and keep everyone on the same page.

Methods: Data of 13 Volleyball teams was collected at three different time points, over three months. These teams were situated throughout Flanders, Belgium, and played from regional to international level. The final sample consisted of 141 athletes (103 women, M_{age} = 20.3, SD_{age} = 4.3) and their perceptions of need-supportive coach behavior as well as team cohesion were measured using validated questionnaires. Finally, given the nested structure of the data, multilevel regression was conducted.

Results: Preliminary results confirm the hypotheses as autonomy-supportive, structuring, and demanding coach behavior predicted team cohesion. However, the magnitude of the underlying coach behavior in relation to each other, is yet to be determined.

Conclusion: Besides supporting the increasing importance of investigating specific coach behaviors, the current paper highlights the positive relationship they have with team cohesion. This elucidates the importance for coaches to not only adopt different types of structuring and autonomy-supportive behaviors but even illustrates the potentially positive role of top-down demanding behaviors in which coaches will push the team to ensure alignment.

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Validation of markerless motion capture for estimating lower limb joint reaction forces during treadmill running and walking

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Introduction: Motion capture is one of the most used tools in biomechanics research. The most widely used motion capture system is optical marker-based motion capture, where reflective markers are placed on anatomical landmarks and tracked by infra-red cameras. Marker based motion capture has major drawbacks, like soft tissue artefact, errors in marker placement, inter-operator, and inter-session variability. Both placing the markers and data processing take a lot of time and need to be done by trained professionals. Markerless motion capture offers an alternative method for collecting full body motion capture, without the need for markers and a reduced data collection and manual processing time. The aim of this study is to add to the lack of validation of markerless motion capture for estimating joint reaction forces and contributing to the implementation of a novel pipeline that incorporates markerless motion capture data into OpenSim

Methods: 42 healthy adults (36M & 6F, 24.1 ± 5.8yr) with no gait abnormalities performed both walking (5 & 6km/h) and running (8, 9, 10 & 12km/h) on an instrumented treadmill. Data of both systems was recorded simultaneously. Results of the marker-based motion capture will be analysed in OpenSim via a custom MATLAB script. No established method is available for analysing the Theia3D markerless data in OpenSim, so we will be using an unpublished method for integrating markerless motion capture data from visual3D into OpenSim.

Results: Due to the necessity of using an unpublished and unfinished method for integrating markerless motion capture data into OpenSim, no preliminary results have yet been found.

Conclusion: Other validation studies have already shown promising results for the ankle and knee joints. Markerless motion capture can become a valid alternative for full body motion capture but more validation and effort for establishing pipelines hast to be done.

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Backyard running: pushing the boundaries of human performance

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Introduction: Ultrarunning gains popularity and little is known about the physiological and psychological responses, especially in backyard running events that distinguish themselves from traditional ultra-marathons through their intermittent nature, extended duration, and heightened sleep deprivation. The aim of this study was to determine physical performance, physiological resilience, cardiovascular responses as well as cognitive functioning during a backyard running event.

Methods: Twelve male ultrarunners (38 ± 8 years old, BMI: 23.5 ± 1.6 kg/m², VO_{2max}: 60.8 ± 4.7 ml/min/kg) were monitored before, during and after the event (cluster-sampling). Cognitive performance was determined using a cognitive test battery before, during and after the event. To minimize learning effects, participants practiced each cognitive test before the actual assessments. During the event the rating of perceived exertion (RPE), lactate and heart rate (HR) were assessed. Physical performance was investigated using the total amount of completed laps and running speed per lap.

Results: Athletes completed 34 ± 17 laps equalling 227.8 ± 113.9km with average speeds starting at 9.0 km/h and slowing down to 7.5 km/h at the end of the event. Physiological resilience (i.e. HR/running speed) altered between athletes, with significantly lower values in the more proficient backyard runners (> 35 laps) at the end of the event (p<0.050). HR and lactate levels remained constant, whereas a progressive increase in RPE was noticed (p≤0.001). A significantly worsened reaction time was observed for several cognitive tasks after the event (p≤0.050).

Conclusion: To conclude, these observations underscore the pivotal role of cognitive performance in constraining extreme ultra-endurance running. It also suggests that implementing strategies that enhance psychomotor speed could potentially have a positive effect on one's performance in such demanding endurance activities, including backyard running. At last, backyard running events showcase varying physiological resilience, emphasizing its role in differentiating top-performing athletes.

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Effect of exogenous ketosis on physiological and muscular adaptations during a 5-week live high, train low training camp

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Introduction: Athletes constantly seek performance optimization methods, with altitude training camps – specifically the 'Live High, Train Low' method – gaining prominence. LHTL allows athletes to train optimally at sea level while capitalizing on the physiological and muscular benefits from extended hypoxic exposure. However, current research on its superiority over the 'Live Low, Train Low' method yields inconclusive results. Notably, ketone ester (KE) supplementation shows promise in stimulating adaptations that are relevant in the context of altitude training, but it may also counteract hypoxia benefits. This research aims to investigate the impact of KE supplementation on physiological and muscular adaptations during a 5-week LHTL protocol.

Methods: This double-blind, placebo-controlled, parallel interventional study spans over 6 weeks, involving 2 conditions: LHTL with a KE supplement and LHTL with a placebo. Subjects will train in normoxia, while residing (75h/week) at simulated altitude. Following the 5-week protocol, an additional hypoxia-free week of training is included to simulate the return to sea level. Test days are scheduled before the protocol, at 5 weeks and at 6 weeks. Assessments involve a DXA-scan, providing insights into bone mineral density and overall body composition. The 30-minute simulated time trial (TT30) on the cycle ergometer evaluates endurance and performance, while the VO2max test measures the maximum oxygen consumption, helping in assessing the potential impact of KE supplementation on aerobic capacity.

Results: The analysis revealed no significant differences in bone mineral density, TT30 and VO2max between the ketone and placebo group, indicating comparable outcomes between interventions.

Conclusion: The intricate interplay of KE supplementation and altitude training demands additional research for a deeper understanding of their combined effects on physiological and muscular adaptations.

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The effect of ketone ester supplementation on haematological factors during a Live High-Train Low protocol.

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Introduction: To benefit from the adaptations to altitude, endurance athletes adopt the Live High-Train Low principle (LHTL). When staying at altitude for a prolonged period of time, blood erythropoietin (EPO) levels elevate which stimulates the production of red blood cells resulting in increased haemoglobin mass. This in turn improves oxygen transport thereby increasing maximal aerobic exercise performance. Previous research showed that ketone ester (KE) supplementation increases EPO levels. Therefore, we hypothesize that KE supplementation may improve haemoglobin mass during LHTL.

Methods: Eight healthy subjects enrolled in a five-week LHTL program. The participants resided at an altitude of 2000 to 3000m for 75 hours per week. Either a 25g ketone ester drink (KE) or an isocaloric control drink (CON) was provided post-exercise and 30 minutes before bedtime. Weekly blood samples were collected to determine haematological characteristics. Total haemoglobin mass and red cell volume (RCV) was determined (i) before, and (ii) after LHTL, and (iii) one week after LHTL using the CO rebreathing method. A two-way repeated measures ANOVA (group x time) was performed to evaluate differences between the experimental groups and over time.

Results: Haemoglobin mass (p = 0.002) and RCV (p = 0.005) increased to a similar extent over time in KE and CON. None of the other haematological parameters were affected by either KE or LHTL.

Conclusion: The LHTL protocol caused an increase in total haemoglobin mass and red cell volume. Despite the previously shown improvement in EPO following KE, this did not translate into an additional increase in haemoglobin mass in response to LHTL.

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Effect of exogenous ketosis during a live high, train low training camp on isokinetic sprint performance

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Introduction: Athletes nowadays regularly include a period of live high – train low (LTHL) to improve exercise performance. Such strategy includes living and sleeping at a moderate altitude of 2000-3000 meters and training below 1000 meters altitude. Interestingly, ketone bodies have recently been shown to induce beneficial responses to altitude exposure, such as an increase in serum erythropoietin. Therefore, our aim was to identify the impact of increasing blood ketone bodies, via oral ketone ester ingestion, during LHTL on exercise performance.

Methods: Eight participants followed a five-week training program and received 25 grams of ketone-ester supplements (KE) or placebo (CON) supplements after training and before sleep. The participants resided at a simulated altitude of 2000 to 3000m for 75h per week. Experimental sessions were performed before (pre) and after (post) the five-week training period and following a 1-week taper period (post +7d). Exercise performance was assessed via an isokinetic sprint test involving 8x10s sprints interspersed by 20s recovery.

Results: Power outputs decreased throughout the different sprints on a given experimental session in both KE and CON. No differences in peak or average power output, or peak lactate were observed between KE and CON, or between the different experimental sessions.

Conclusion: Neither LTHL nor ketone ester ingestion impacts isokinetic sprint performance or peak lactate.

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Sensitivity of different muscle fatigue indicators

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Introduction: There are various well-established methods to measure muscle fatigue. Such indicators of fatigue can be measured through changes in maximal voluntary contraction (MVC), rate of torque development (RTD), and time and frequency components of the electromyography (EMG) signal. The purpose of this pilot study is to determine whether one of these indicators is more sensitive to detect fatigue. This could help sports scientists and clinicians in detecting fatigue faster and more efficiently.

Methods: Four healthy human subjects (21.25 years old ± 2.06) participated in a pilot. Each participant completed two training sessions on two different days consisting of one-minute isometric dorsiflexion contractions on an isokinetic dynamometer. In the fatiguing condition, participants performed these contractions at 40% MVC and in the control condition at 10% MVC. During this task, m. tibialis anterior activity was measured using EMG. Before and after these training sessions, two MVC's followed by five submaximal contractions at 25% MVC and again a MVC were examined. RTD, median frequency of the EMG signal, maximum activation level of the tibialis anterior and peak MVC were computed offline in Matlab after the measurements.

Results: Data is currently being analyzed.

Conclusion: Klik of tik om tekst in te voeren.

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Klik of tik om tekst in te voeren.

Do baseline cognitive functions predict the impact of mental fatigue on performance?

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Introduction: Mental fatigue (MF) results from exposure to prolonged, intensive cognitive activities. MF induces a subjective feeling of fatigue and has a negative effect on physical performance. However, its impact differs widely between individuals, making it not only harder to understand MF, but also to help individuals that are mentally fatigued. One way we can better understand these differences is by looking at individual features that may underlie them. Therefore, this study aimed to investigate the link between cognitive abilities and the response to MF.

Methods: We employed a randomized, single-blinded, counter-balanced, cross-over research design. Ninety-seven healthy participants initially completed three cognitive tests (sustained attention to response task, psychomotor vigilance task, and N-BACK task) assessing attention, working memory, and response inhibition. In the experimental and control trial, participants respectively engaged in either a 45-minute Stroop task or documentary. Pre- and post-trial, participants rated their feeling of MF using a visual analogue scale. Post-intervention, they completed a Go-NoGo task and a 15-minute time trial to evaluate cognitive and physical performance. Linear regression was used to evaluate the relationship between cognitive abilities and MF effects.

Results: Baseline cognitive functions did not significantly relate with M-VAS scores (F=1.527; p=.204; R^2=.029) or the extent to which MF affects physical performance (F=.591, p=.670; R^2=-.019). Additionally, baseline cognitive functions could not predict the effect of MF on cognitive performance, including reaction time on the Go stimuli (F=.647; p=.630; R^2=-.016) and accuracy on both the Go (F=2.024; p=.098; R^2=.044) and NoGo (F=1.594; p=.183; R^2=.026) stimuli.

Conclusion: Baseline cognitive functions do not forecast subjective feelings of MF or subsequent effects of MF on physical and cognitive performance. More research is needed to fully elucidate the individual response to MF, identify individuals who are more prone to MF and develop preventative strategies in sports performance.

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Post-exercise ketone supplementation improves endurance performance during an 8-week endurance training intervention

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Introduction: Recent research demonstrated that post-exercise ketone supplementation (PEKS) blunts the development of overtraining symptoms and enhances endurance exercise performance during 3-weeks of endurance overload training. However, it is unknown whether PEKS also improves endurance performance during well-balanced training, without development of overtraining symptoms.

Methods: Twenty-six trained cyclists participated in this double-blind, placebo-controlled study in which eight weeks of well-balanced endurance training were performed. Half of the participants received 25 g of a ketone monoester supplement (KE) post-exercise and 30 min before sleeping time, while the other half received an isocaloric placebo (CON). Experimental sessions were held before, after 3 weeks (MID), 7 weeks (POST), and at the end of the training period (POST$_{+taper}$) to assess: 30-minute time-trial performance (TT$_{30min}$) and underlying systemic and peripheral mechanisms.

Results: Blood β−hydroxybutyrate (βHB) concentrations remained around 0.6 ± 0.3mM in CON, while KE supplementation increased βHB concentration to respectively 2.7 ± 0.9mM and 2.9 ± 0.7mM post-exercise and before sleep ($p < 0.001$ *vs.* CON). Interestingly, TT$_{30min}$ performance was 4% higher in KE (302 ± 28W) compared to CON (291 ± 27W, $p < 0.001$) at POST and POST$_{+taper}$ (KE: 306 ± 33W vs. CON: 297 ± 30W, $p = 0.006$). The training intervention increased serum EPO concentration similarly in both groups from PRE (4.28 ± 1.88 mIU.ml^{-1}) to POST (4.69 ± 2.44 mIU.ml^{-1}, $p = 0.015$), and serum GDF-15 ($p = 0.534$ *vs.* CON) levels were not impacted by training or KE. Similarly, muscular signalling pathways implicated in endurance adaptations either increased (PGC-1α, AMPK) or remained similar at POST (SIRT3) and were not altered by KE supplementation (all $p > 0.05$ *vs.* CON).

Conclusion: KE supplementation improves endurance exercise performance following well-balanced endurance training, but the underlying mechanisms remains unclear. Therefore, further analyses such as muscle capillarisation and metabolomics are conducted.

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Ketone ester supplementation improves hypoxic tolerance and attenuates acute mountain sickness development

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Introduction: Altitudes beyond the acclimatization threshold often lead to the development of acute mountain sickness (AMS) due to systemic hypoxemia. Given prior findings on ketone ester (KE) supplementation alleviating hypoxia-induced blood and muscle hypoxemia, our study explores the potential of KE to enhance hypoxic tolerance and mitigate AMS development.

Methods: Fourteen healthy, male participants were enrolled in a randomised, double-blind, placebo-controlled crossover study. The protocol consisted of two experimental sessions of 29 hours in a normobaric hypoxic facility (simulated altitude of 4000-4500m), separated by a two-week washout period. Throughout the protocol, participants received either KE or placebo (CON) supplements. Additionally, they completed seven exercise bouts designed to mimic an altitude sojourn and elicit AMS. Physiological characterization was performed after 15min and 4h in hypoxia, and the protocol was terminated prematurely upon the development of severe AMS.

Results: All participants in the KE group stayed longer (n = 8) or equally long (n=6, with n=5 completed protocol in both conditions) in the hypoxic protocol. Total protocol duration increased by 32% with KE on average and even doubled for those developing severe AMS. KE induced hyperventilation, a mild metabolic acidosis, and relative sympathetic dominance throughout the protocol. Notably, KE fully counteracted the progressive hypoxemia observed between 15min and 4h in hypoxia in CON. Simultaneously, KE increased cerebral oxygenation and capillary pO_2 within this timeframe, coinciding with a KE-induced reduction in cerebral oxygen supply, indicative of reduced cerebral oxygen consumption under hypoxic conditions.

Conclusion: These findings suggest that KE supplementation improves hypoxic tolerance and mitigates the development of AMS. This improvement was predominantly mediated through an enhanced arterial and cerebral oxygenation, along with reduced cerebral blood flow and oxygen demands as well as an increased sympathetic dominance.

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Grandparents' levels of physical activity and sedentary behavior when providing versus not providing grandchild care: a within-subject comparison

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Introduction: Differences in physical activity (PA) and sedentary behavior (SB) levels were investigated between a day with grandchild care compared to a so-called non-care day in Flemish grandparents aged 50 years and older. Additionally, grandparents' PA and SB levels of the specific grandchild caregiving moment within the care day (i.e., care moment) were compared against the same specific time frame on the non-care day (i.e., non-care moment).

Methods: Objectively measured PA and SB levels were obtained through ActiGraphs wGT3x(+), which were worn during waking hours for seven consecutive days. Grandparents' PA and SB levels were expressed relative to the total wear time of selected days or moments (i.e., in percentage of time). For this comparative study, data were pooled from three assessment time points. Mixed modelling assessed within-subject differences in relative levels of light-intensity PA (LIPA), moderate-to-vigorous intensity PA (MVPA) and SB between care and non-care days, as well as care and non-care moments.

Results: A total of 166 grandparents (65.4 ± 4.9 years, 64.5% women) were included in the analyses. During the care day (i.e., at T0 and T1) and moment, grandparents showed significantly higher levels of LIPA (Δ=4.0% and Δ=7.9%, respectively) and lower levels of SB (Δ=3.7% and Δ=6.7%, respectively) (all p<0.001) when compared to the non-care day and moment. While there was no difference in MVPA levels between the care and non-care day (Δ=0.3%; p=0.500), significantly lower MVPA levels were observed comparing the care moment with the non-care moment (Δ=1.3%; p=0.029).

Conclusion: The higher LIPA levels and lower SB levels on a care day, which were even more pronounced during the actual care moment, highlight the positive impact of providing grandchild care, potentially improving grandparents' health. Grandparents seem to compensate for lower MVPA levels at the care moment, as on a daily basis these levels nearly changed.

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The CB1 antagonist rimonabant improves skeletal muscle regeneration upon cardiotoxin-induced muscle injury

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Introduction: Skeletal muscle injuries frequently occur in sports. They can exert a lasting, negative impact on daily activities and sport performance. Therefore, injured athletes could benefit from enhanced muscle repair. Recently, the endocannabinoid system has been suggested as a key mediator of muscle recovery. More specifically, endocannabinoid receptor 1 (CB1) was associated with processes relevant for muscle regeneration, including inflammation, apoptosis and myogenicity. However, this was never studied *in vivo* or in the context of muscle injury. Therefore, we investigated the effect of the CB1 antagonist rimonabant on skeletal muscle regeneration upon cardiotoxin (CTX)-induced muscle injury in mice.

Methods: Forty-eight mice were randomized into three conditions. Two groups were intramuscularly injected with CTX to induce muscle injury, while a third healthy control group was injected with saline and was vehicle-treated (VEH). One CTX group was daily treated with rimonabant (RIM), whereas the other CTX group was vehicle-treated (CTX). Mice were sacrificed three and seven days post injury (DPI). Protein expression levels in the m. Tibialis Anterior were determined with western blot analyses. Two-way ANOVA (condition x DPI) and bonferroni-corrected post-hoc comparisons were used.

Results: CTX injury induced muscle strength loss (-235%; $p<0.001$), which was prevented by RIM (+147%; $p=0.001$). Accordingly, RIM treatment attenuated the CTX-induced increase (+~100%; $p<0.05$) in inflammatory markers p-p65NF-κB (-46%; $p=0.007$) and CD80 (-103%; $p=0.049$). Furthermore, the CTX-induced increase (+172%; $p<0.001$) in apoptotic markers cleaved caspase-3 (-138%; $p=0.005$) and cleaved PARP (-70%; $p<0.001$) was reversed by RIM. Lastly, compared to VEH and CTX, RIM increased Pax7 expression (+~126%; $p<0.05$), which is a marker of satellite cell activation.

Conclusion: CB1 antagonism prevented CTX-induced grip strength loss, and CTX-induced muscle inflammation and apoptosis. Further, CB1 antagonism might upregulate satellite cell activation. These findings are promising for the development of novel strategies to enhance muscle regeneration.

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Muscle injury and CB1 antagonist treatment remodel muscle endocannabinoid signaling in mice

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Introduction: Muscle injury and strength loss represent significant challenges in sports medicine and rehabilitation. The endocannabinoid system (ECS), including key endocannabinoids (e.g. 2-AG, AEA, PEA) along with the cannabinoid receptor 1 (CB1) and CB2, regulate processes that are essential for muscle recovery, including satellite cell growth and inflammation. However, it was never studied whether muscle injury and CB1 antagonism affect the ECS in the muscle. Therefore, this study investigated the impact of the CB1 antagonist rimonabant on endocannabinoid signaling following muscle injury in mice.

Methods: Forty-eight mice were randomized into three conditions. Two groups underwent acute muscle injury via cardiotoxin injection in the m. Tibialis Anterior. One injury group was daily treated with rimonabant (RIM) whereas the other group was vehicle-treated (CTX). A third control group received an intramuscular saline injection and was vehicle-treated (VEH). Half of the mice were euthanized at either 3 or 7 days post injury (dpi). Protein expression was determined with western blot analyses, and muscle endocannabinoids with lipidomic analyses.

Results: RIM significantly reduced the CTX-induced increase in 2-AG (+80%; $p=0.01$) and PEA (+60%; $p=0.02$) at 3dpi (2-AG: -49%; $p=0.04$ & PEA: -45%; $p=0.03$). Accordingly, in both CTX conditions, DAGLβ (2-AG synthesis) was higher (3&7dpi: +90; $p<0.01$), while MAGL (2-AG degradation) was lower compared to VEH (3dpi: -64%; $p<0.05$). AEA remained unaffected by injury, whereas NAPE-PLD (AEA synthesis) was lower (3dpi: -63%; $p<0.01$; 7dpi: -34%; $p<0.05$) and FAAH (AEA degradation) was higher (3&7dpi: +167; $p<0.01$) in CTX and RIM compared to VEH. Finally, CB1 but not CB2 expression was higher in CTX and RIM (7dpi: +167%; $p<0.01$ vs. VEH).

Conclusion: CTX injury and rimonabant treatment modulated muscle endocannabinoids, their enzymes and CB1. Future research should further uncover the potential of the ECS to improve muscle regeneration.

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48 VBSW