

Dear Readers,

It is our pleasure to invite you to the 3rd International Scientific Conference “Novelties in Sport Science”. This conference provides a perfect opportunity for all the researchers, practitioners and the people who have a keen interest in learning about the new advancements in sports science to come together and share their knowledge. The variety of topics presented in this collection of papers shows how alive and developing this field and is how it can benefit the health, performance, and education of people. The present proceedings of this year’s conference reveal novelty and interdisciplinarity of the research. From exploring the role of probiotics in athletic performance and intestinal health to the ethical contrasts between martial arts and Western sports, these studies reflect the rich interplay between tradition and innovation. Groundbreaking tools, such as the "Ski Easy" methodology, and transformative findings in areas like injury prevention and active aging illustrate how science can shape the future of sports and physical activity.

This year, a special emphasis is placed on sustainability and inclusivity. Presentations addressing sustainable sports tourism in Vojvodina and global initiatives for environmentally responsible sports practices showcase the role of sports science in advancing the United Nations' Sustainable Development Goals. Equally compelling are the contributions that explore how education and technology are transforming sports, from teaching English to sports professionals to leveraging wearable devices for cardiovascular health.

The contributions from authors worldwide reflect the conference's mission to foster collaboration and innovation. Whether addressing injury recovery, enhancing youth engagement through cognitively enriched activities, or developing new tools for talent identification, the works presented here demonstrate the power of sports science to improve the quality of life across diverse populations.

I extend our heartfelt gratitude to all authors, reviewers, and collaborators for their invaluable contributions to this event. I also wish to thank the organizing committee for their dedication and effort in making this conference a reality.

Let this conference inspire meaningful discussions, foster international cooperation, and pave the way for new advancements in our field. Together, we continue to push the boundaries of sports science, ensuring its relevance and impact in an ever-changing world.

Patrik Drid and Damjan Jakšić



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Abstracts from the 3rd International Scientific Conference on “Novelties in Sport Science”

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A1 Efficacy of *Lactobacillus plantarum* supplementation on sports performance and intestinal damage (I-FABP) in physically active men

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Exercise and Quality of Life 2024, **16(3)**: A1

Background

The potential benefits of probiotic supplementation have gathered significant interest in sports science. However, there is limited evidence on the efficacy and mechanism of action of *Lactobacillus plantarum* on sports performance. Therefore, this study aimed to investigate the effects of *Lactobacillus plantarum* consumption on sports performance and a marker of gut damage.

Materials and methods

Twenty physically active males (34.5±7.4 years; 1.78±0.07 m; 79.20±4.68 kg) volunteered for this double-blind, randomized, placebo-controlled, parallel study. Participants completed an intense exercise session, after which perceived exertion was assessed and blood samples were taken to measure the concentration of intestinal damage marker (I-FABP). Twenty-four hours later, participants rated

their perceived recovery and performed sports performance tests, including the Countermovement Jump, Running Anaerobic Sprint Test, and YOYO-IR1. Participants then began a 4-week supplementation period, with 10 participants receiving a placebo (1 capsule per day) and the remaining 10 receiving a capsule containing 10 billion CFU of *Lactobacillus plantarum*. The initial testing protocol was repeated at the end of the supplementation period.

Results

The study results showed significant improvements in the YOYO IR1 test for the experimental group (PRE: 1253.33 ± 440.91 vs. POST: 1502.22 ± 481.29, $p < 0.05$, effect size: -1.33) compared to baseline. Additionally, while other variables did not reach statistical significance, positive trends were observed in BMI, RPE, GI survey results, and I-FABP levels.

Conclusions

The findings indicate that *Lactobacillus plantarum* may enhance performance and reduce gut damage in athletes involved in aerobic sports, particularly during competition periods with reduced recovery time.

A2 Parallels and divergences: A comparative analysis of martial arts and western sports ethics

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Exercise and Quality of Life 2024, **16(3)**: A2

Background

This presentation explores the ethical frameworks of martial arts, tracing their origins to Eastern philosophical and religious traditions, and juxtaposes them with the ethics of Western sports derived from Greek agonal pedagogy.

Materials and methods

By examining the historical and cultural underpinnings of martial arts, we uncover a deeply philosophical approach that integrates physical discipline with

moral and ethical contemplation. This analysis reveals both parallels and distinctions between Eastern martial ethics and the moral constructs of Western sports, influenced by figures like Thomas Arnold and the codification of athletics in the West.

Results

A particular focus is given to the ethical personalism inherent in martial arts, characterized by a commitment to nonviolence and the personal development of virtues through disciplined practice.

Conclusions

The discussion extends to the implications of these ethical practices for broader educational and social systems, advocating for a holistic understanding of sports ethics that encompasses both individual actions and community values.

A3

New needs – new tools: The “Ski easy” approach

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Exercise and Quality of Life 2024, **16(3)**: A3

Background

Alpine skiing has undergone significant transformation in recent years. Advances in ski equipment boost enjoyment and accessibility, but a societal shift toward sedentary lifestyles has led to a declining interest in outdoor sports. This poses new challenges, such as participants with limited motor and functional abilities and higher risk of injuries. Adapting teaching methods and enhancing ski instructors' skills have become crucial to improve guest experiences and safety. For young children, incorporating games and visual aids into lessons is essential to foster better understanding and engagement. To address these needs, the Erasmus+ project SKIEASY has brought together nine

partners to develop a Unified Teaching Model (UTM) for ski instructors and students.

Materials and methods

The development of the UTM tools employs a combination of scientific research and educational methodologies, focusing on creating user-friendly tools for ski instructors and ski beginners. Key components include defining five stages of ski skills acquisition; conducting kinematic analysis to develop detailed graphic materials; establishing standardized terminology across five communication areas; translating materials and developing IT solutions, such as a static website and unified animations.

Results

The SKIEASY Mobile Application offers an array of valuable resources designed to support ski instructors and learners such as: multilingual dictionaries in 15 languages with audio pronunciations, covering essential topics (ski equipment, body parts, the ski environment, techniques, teaching aids, and useful phrases). Additionally, the app features 13 video animations illustrating a 5-step UTM, complemented by pocket manuals available in 8 languages. All these didactic materials, along with many others, are freely accessible through the SKIEASY website (<https://www.skieasy.eu>), providing comprehensive tools to enhance ski instruction.

Conclusions

Why is teaching made easy with SKIEASY? The UTM embodies a structured and coherent methodology, aligning with the project's core principles: Educational, Accessible, Simple, and Youthful. These tools empower both instructors and students by enhancing clarity, streamlining teaching methods, and fostering a deeper understanding of skiing fundamentals.

A4

Parallels and divergences: A comparative analysis of martial arts and western sports ethics

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Exercise and Quality of Life 2024, **16(3)**: A4

Background

Sustainable sports tourism combines recreational activities with environmental stewardship and socio-economic benefits, making it a vital contributor to global development. Recognized by the UN 2030

Agenda as an essential enabler of sustainable development, sport promotes tolerance, respect, empowerment, and inclusion while advancing health, education, and peace. The International Olympic Committee (IOC) and other organizations have launched sustainability-focused initiatives to guide sports tourism on a responsible path. Europe, with a significant 38.01% revenue share in 2022, exemplifies the economic potential of sports tourism, driven by a growing number of athletes, events, and international visitors. However, this growth often comes at a cost, such as environmental degradation, urban congestion, and social inequities.

Materials and methods

Unplanned expansion of sports tourism in recent decades has tested the carrying capacities of many destinations, leading to issues like deforestation, overcrowding, noise pollution, and ecosystem disruption. Effective management of these challenges requires adopting sustainability principles to balance growth with preservation. This includes fostering local community involvement, respecting environmental limits, and developing long-term strategies for equitable and inclusive benefits.

Results

This presentation delves into the dual nature of sports tourism—its potential to stimulate regional economies, create jobs, and strengthen community bonds, alongside its environmental and social risks. Strategies discussed include promoting eco-friendly practices, leveraging existing infrastructure, and integrating sustainable policies into planning.

Conclusions

DEPART project serves as a case study, showcasing efforts to build on regional competitive advantages and avoid fragmentation. When adopting integrated approaches, sustainable sports tourism can transform destinations into resilient hubs, enhancing experiences while supporting the UN Sustainable Development Goals

A5

Sports tourism: Thematic analysis of the challenges in Vojvodina

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Exercise and Quality of Life 2024, **16(3)**: A5

Background

There is a growing global demand for environmentally friendly and culturally enriching travel experiences. As sports tourism is a rapidly developing sector in Vojvodina, this study aimed to analyze the current state and challenges of sustainable sports tourism.

Materials and methods

Our study included 30 interviews conducted between August and September 2024 in AP Vojvodina in R. Serbia. The interviews were constructed around four themes: Sustainability (Impact), Policy and Funding, Event Management and Promotion, Market Trends, and Customer Expectations. This study is a part of the Interreg Europe project DEPART – Support the Development of a Sustainable Sports Tourism in Europe (Reg.no. 02C0622).

Results

The development of more sustainable sports tourism in Vojvodina faces many challenges, such as insufficient formal strategies, lack of funding (both for large and small events), promotion, collaboration, and systematic support. In addition, there is a growing trend towards active, eco-friendly activities and sports tourism.

Conclusions

Despite the addressed issues, Vojvodina has a good basis for tourism development and great potential for the demand for active tourism and sustainable sports tourism. Brand differentiation can contribute to a better image and visibility of Vojvodina and to the attraction of foreign tourists.

A6

Anterior cruciate ligament injury prevention programs in team sports: A systematic review

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Exercise and Quality of Life 2024, **16(3)**: A6

Background

As the demands of modern sports continue to evolve, the rate of injuries among athletes is increasing. One of the most common injuries in

basketball and football, particularly among both male and female athletes, is anterior cruciate ligament (ACL) damage. Various injury prevention programs have been developed to address this issue, but their long-term effectiveness remains to be determined. To systematically review ACL prevention programs for basketball and football players and evaluate their effectiveness in reducing injury risk.

Materials and methods

A comprehensive literature search was conducted using PubMed (Medline). The review focused on randomized controlled trials (RCTs), prospective cohort studies, and descriptive laboratory studies that examined ACL injury prevention programs.

Results

Nine studies met the inclusion criteria and were included in the analysis. The majority of the studies reported a significant reduction in ACL injury risk associated with prevention programs. The evidence indicates that multifaceted training interventions, comprising neuromuscular training, stretching, proprioceptive exercises, resistance training, plyometric exercises, landing mechanics optimization, core stability training, dynamic stabilization, and agility drills, demonstrate moderate to strong efficacy in mitigating ACL injury risk.

Conclusions

This systematic review underscores the efficacy of ACL and knee injury prevention programs in mitigating the risk of lower extremity, knee, and ACL injuries in team sports. To maximize effectiveness, these programs should prioritize interventions targeting lower extremity muscle strength and balance enhancement, specifically tailored for team-sport athletes.

A7

From classroom to workplace: Importance of teaching English for sports purposes

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Exercise and Quality of Life 2024, **16(3)**: A7

Background

Today's open labour market, the internationalization of business, the development of digital technology, multiculturalism, and the global spread of knowledge have contributed to an increase in the need to use the English language. In other

words, although the European Union tries to direct the labour market towards the acquisition of different foreign languages apart from English, it is expected that English continues to play the role of the leading language in the future, especially in helping graduates find a job in sports profession (European Commission, 2008). In addition, while previously Croatian was the main and often only language of instruction, university teaching staff are now expected to teach their courses in English, making English for Specific Purposes an integral part of their teaching inventory thus making the students' enrolment more inviting. In addition to communication, the present study has the following objectives: 1) to analyze students' attitudes towards the need to use English for Specific Purposes (ESP) for sport as a profession as an integral part of courses delivered in English; 2) to provide feedback on students' attitudes towards the importance of learning English for sports profession for their future job; 3) to examine students' attitudes towards the importance and necessity of creating adequate teaching materials to master English at tertiary level.

Materials and methods

The study sample comprised 91 randomly selected sports students from the University of Split, Croatia. The study was conducted from 2022 to 2023. Data was collected using an adapted questionnaire.

Results

Students strongly believe that ESP should be an integral part of the courses delivered in English. They have also showed strong positive attitudes towards the importance of learning ESP for sports as a profession and their future employability. However, study reveals that students believe that it is important to create teaching materials for ESP adapted to non-native speakers of English but not so significantly.

Conclusions

The study shows that students strongly believe that ESP should be taught through available courses at the faculty. due to its numerous benefits: from upgrading their knowledge of English skills, and expanding their understanding of transferrable skills, to helping them improve their general English knowledge needed for future job in sports field inside and outside of Croatia. It can also be concluded that this type of analysis has an important role in creating further steps in terms of raising awareness of the importance of teaching ESP at the tertiary level, as well as incorporating ESP at all faculties as its obligatory subject.

A8

Technology and heart health: A new frontier in fitness training

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Exercise and Quality of Life 2024, **16(3)**: A8

Background

Cardiovascular health is crucial for physical fitness and performance. This study explores wearable devices and at-home tools for monitoring cardiovascular metrics, focusing on their role in fitness training and long-term health management.

Materials and methods

Wearable devices like smartwatches (e.g., Apple Watch, Fitbit) and at-home tools such as blood pressure monitors and pulse oximeters were examined for fitness settings. Wearables track heart rate, activity, and calories burned, enabling real-time training adjustments. At-home tools provide non-digital alternatives for tracking vital metrics. Proper calibration and use are essential for accurate data. Research shows wearables effectively track cardiovascular responses in everyday settings, helping to tailor fitness programs. Exercise interventions have proven effective in reducing blood pressure and improving cardiovascular health.

Results

Wearable devices were ranked the top trend in the ACSM 2022 Worldwide Survey of Fitness Trends. They offer continuous tracking of cardiovascular metrics, enabling progress monitoring and health issue detection. Wearable sensors predict cardio-respiratory fitness and provide personalized health recommendations. Blood pressure monitors and pulse oximeters are cost-effective alternatives for clients with chronic conditions or limited access to wearables.

Conclusions

Integrating cardiovascular monitoring tools into fitness programs empowers clients and trainers with valuable insights, enhances exercise prescriptions, supports heart health, and detects potential health concerns early. These technologies bridge fitness and medical care, fostering a holistic health and performance optimization approach.

A9

Factors associated with return-to-play parameters among soccer athletes after anterior cruciate ligament surgery: A systematic review and meta-analysis

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Exercise and Quality of Life 2024, **16(3)**: A9

Background

The objective of the present study was to determine the association between demographic, sport-related, surgical, and psychological factors with return-to-play (RTP) outcomes among soccer players with a history of anterior cruciate ligament (ACL) reconstruction.

Materials and methods

A comprehensive search of Web of Science, Embase, and PubMed was carried out from inception to December 2024. Observational investigations that examined the relationship between demographic, sport-related, surgical, and psychological variables with RTP outcomes, including overall RTP rate, RTP at the preinjury level of competition, and RTP time, among soccer players who were subjected to the ACL surgery were considered as eligible for inclusion.

Results

A total of 16 studies were involved in the final analysis with 3978 respondents (mean age: 22.9 ± 4.5 years; 35% females). The obtained results demonstrated that male sex (odds ratio (OR) = 1.47 [95% confidence interval (CI) 1.15 to 1.86]), younger age (OR = 3.12 [95% CI 2.36 to 4.12]), elite level of play (OR = 7.46 [95% CI 3.30 to 16.85]), patellar tendon autograft (OR = 1.76 [95% CI 1.02 to 3.04]), and absence of cartilage injury (OR = 0.34 [95% CI 0.20 to 0.57]) were associated with increased overall RTP rate among soccer players following ACL reconstruction. With regard to the RTP time, only older age correlated with shorter periods between surgery of the examined ligament and return to sports fields (standardized mean differences = 1.15 [95% CI 0.39 to 1.90]). The findings referring to the qualitative analysis unambiguously indicated that psychological readiness to return to sport was positively associated with the overall RTP rate of the analyzed population.

Conclusions

The current study revealed that male sex, younger age, elite level of play, patellar tendon autograft, and

absence of cartilage injury were positively associated with overall RTP rate, while only older age correlated with earlier RTP time.

A10

Eating habits of children depending on age, gender, and education status of parents

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Exercise and Quality of Life 2024, **16(3)**: A10

Background

A healthy home environment and positive parental role models are the best ways to adopt a healthy diet and an active lifestyle. Early diagnosis and treatment of childhood obesity are prerequisites for preventing obesity in adulthood. This study aimed to investigate how parenting, including sociodemographic characteristics, influences children's eating habits.

Materials and methods

The study involved 1,479 primary school children and their parents from the Vojvodina region (Republic of Serbia). 795 boys and 756 girls participated in the study. The average age of the boys was 8.17 years (SD = 0.58), and the average age of the girls was 8.09 years (SD = 0.60). Data were collected through a questionnaire, which mothers completed in 81.8% of cases. The questionnaire consists of descriptive information (age, gender, educational status), and The Children's Eating Behavior Questionnaire (CEBQ). In earlier studies, good validity of the CEBQ questionnaire was established (Sleddens, Kremers, & Thijs, 2008; Wardle, Guthrie, Sanderson, & Rapoport, 2001). The CEBQ consists of eight subscales divided into two categories: "food approach" and "food avoidance".

Results

Boys showed statistically significantly higher results in the category of food approach, while girls in the category of food avoidance. Parents' ages were categorised into three groups: 20-29, 30-39, and 40-49 years. Children whose parents were in the youngest age group showed higher scores in the food approach, while scores in the food avoidance subcategory were highest in children whose parents were middle-aged. A higher level of parental education has a positive impact on children's eating

habits. Children from urban areas have better eating behaviour than children from rural areas.

Conclusions

The results of this research show that the family plays a significant role in influencing and shaping children's lifestyle behaviour.

A11

Recovery of handball players after anterior cruciate ligament surgery: A retrospective study

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Exercise and Quality of Life 2024, **16(3)**: A11

Background

Knee surgery, often necessary due to an anterior cruciate ligament tear, results in muscle atrophy and strength deficits, particularly in the quadriceps and hamstring muscles. This study aimed to compare the results of isokinetic and isotonic exercise in handball players on the torque restoration quadriceps after knee surgery.

Materials and methods

A sample of 18 subjects was analyzed, and divided into two groups according to the type of rehabilitation protocol applied. The isokinetic group consisted of 9 male subjects aged 24.33 ± 2.35 years, with a protocol based on isokinetic quadriceps exercise. The isotonic group consisted of also 9 male subjects, aged 25.78 ± 4.18 years, with an exercise program with additional resistance, i.e. isotonic exercise in the gym, to strengthen the quadriceps. Before starting the rehabilitation treatment, an initial isokinetic test was performed at an angular speed of $60^\circ/s$ in all subjects. After 3 and 6 weeks of rehabilitation treatment, control tests were performed in the same way as in the initial test.

Results

Based on ANOVA analysis of repeated measurements, significantly better results were determined for the isokinetic group in comparison with the isotonic group for outcome Knee extensor (ANOVA, $F = 234.98$, $p = 0.000$; isokinetic group); (ANOVA, $F = 27.36$, $p = 0.000$; isotonic group). Also for the outcome of Knee flexor the isokinetic

group had better results (ANOVA, $F = 478.22$, $p = 0.000$ isokinetic group); (ANOVA, $F = 53.68$ $p = 0.000$; isotonic group)

Conclusions

Based on the results of our study, we can conclude that isokinetic training has a better impact on participants following ACL surgery compared to isotonic training. The results showed that athletes in the isokinetic group could return to the field after six weeks of training and 18-24 weeks post-surgery.

A12

The concept and determinants of active aging

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Exercise and Quality of Life 2024, **16(3)**: A12

Background

Active aging (AA) is essential for the well-being of the growing older adult population. Defined by the World Health Organization (WHO), active aging optimizes health, participation, and security to enhance seniors' quality of life (QoL). Understanding the determinants that influence active aging is crucial for developing effective interventions.

Materials and methods

A comprehensive literature review examined studies focused on various dimensions of active aging, including physical health, social engagement, mental well-being, and environmental influences. Qualitative and quantitative data were synthesized to delineate the core components of the active aging framework.

Results

Influential determinants include the physical environment, access to health and social services, social engagement, personal factors, economic status, and behavioral choices. Evidence shows that favorable physical and social environments correlate with higher QoL scores in older adults. Regular physical activity boosts physical health and fosters social integration, while economic stability and access to supportive services are vital for promoting an active lifestyle.

Conclusions

Recognizing and addressing the determinants of active aging allows policymakers and communities to create targeted interventions that facilitate healthy

aging. Strategies incorporating physical, social, and economic elements are essential for enhancing the quality of life for seniors, ultimately leading to more vibrant and engaged aging populations.

A13

Physical activity and quality of life in clinically affected youth: A systematic review

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Exercise and Quality of Life 2024, **16(3)**: A13

Background

Physical activity (PA) is a critical determinant of quality of life (QoL) in children and adolescents. However, the relationship between PA, and QoL in clinically affected youth remains underexplored. This study aimed to review the effects of PA on QoL in children and adolescents with chronic health conditions.

Materials and methods

A systematic review of clinical trials published between 2019 and 2024 was conducted using the PubMed database. Inclusion criteria were randomized clinical trials in English involving clinically Affected Youth. Five studies were selected from an initial pool of 102 articles, evaluating the impact of PA interventions on QoL.

Results

Results reveal that exercise interventions significantly improve QoL outcomes in these populations. Specifically, a 16-week resistance-aerobic program reduced anxiety and improved QoL in domains of physical, social, and emotional functions, and psychological status in children with type 1 diabetes, while a 12-week physical and dietary intervention benefited those with inflammatory bowel disease. Stretching and isometric exercises improved QoL domains, such as general health, physical and emotional function, reduced fatigue, and remising the symptoms in children with chronic kidney disease. Clinical Pilates was effective for juvenile idiopathic arthritis in reducing pain and improving physical fitness, core stability, and physical, emotional, and social function. Resistance training with a high-protein diet enhanced conditions for Fontan patients improving cardiac output, leg and core strength, physical functioning, and general health. All these studies demonstrate

notable improvements in cardiorespiratory form, muscle strength, and endurance which represent an important part of QoL. These findings emphasize the importance of tailored PA programs in improving QoL and managing symptoms in young patients with chronic conditions.

Conclusions

PA is crucial in determining QoL in children and adolescents. Addressing the global inactivity crisis requires multidisciplinary, evidence-based interventions that integrate regular PA within daily routines, involving schools, families, and community institutions. Tailored PA programs for children and adolescents with chronic conditions demonstrate significant potential to improve QoL and symptom management.

A14

Physical fitness and body composition in elderly women

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Exercise and Quality of Life 2024, **16(3)**: A14

Background

Aging is a physiological process that appears in every individual and results in a decline in all functions. It is also defined as all irreversible structural and functional changes that occur at the molecular, cellular, tissue, organ, and system levels. Physiological changes that occur with aging are accompanied by changes in body composition, which potentially influence the physical fitness of the elderly population. Therefore, the aim of this study was to analyze the relationship between physical fitness and body composition in elderly women.

Materials and methods

Thirty elderly women (age: 69.37 ± 3.66 years; body height: 162.58 ± 6.14 cm; body weight: 70.09 ± 8.39 kg; body mass index: 26.54 ± 2.99) participated in the study. The parameters of body compositions, including fat mass (%) and muscle mass (%), were analyzed using bioelectrical impedance. The physical fitness (static balance, dynamic balance, lower limb strength, isometric handgrip strength) was tested for the Single-leg stance test, 8-foot-up-and-go test, 30-s Chair Stand test, and Handgrip test.

Results

The Pearson coefficient correlation shows the relationship between fat mass (%) and dynamic balance ($r = 0.392$, $p = 0.000$) and lower limb strength ($r = -0.377$, $p = 0.004$). Likewise, a relationship was found between muscle mass (%) and lower limb strength ($r = 0.508$, $p = 0.000$) and static balance ($r = 0.545$, $p = 0.002$). The results of this study indicate that body composition characteristics, including fat mass (%) and muscle mass (%), demonstrate no statistically significant relationship with isometric handgrip strength.

Conclusions

The parameters of body composition that include fat mass (%) and muscle mass (%) in elderly women have a relationship with physical fitness. Specifically, fat mass negatively correlated with dynamic balance, which means that elderly women with lower results in fat mass (%) achieved better results in test 8-foot up-and-go. The muscle mass (%) positively correlated with static balance and lower limb strength. Therefore, elderly women with greater muscle mass (%) achieved better results in Lower limb strength and dynamic balance. This study revealed that body composition parameters are related to physical fitness in elderly women.

A15

Sleep quality in wrestlers

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Background

Wrestling, as many other Olympic sports, requires the development of numerous physical, technical and tactical components during preparation and training, followed by adequate rest and recovery, which also includes good quality sleep. There is ample data regarding recovery after rapid weight loss, but data on wrestlers' sleep patterns during the training process is lacking. With sleep being one of the most important parameters, the purpose of this study was to evaluate sleep quality in wrestlers and determine the differences between the sexes.

Materials and methods

This cross-sectional study was conducted on Hungarian and Serbian wrestlers (n=23) who filled out the self-reported Pittsburgh Sleep Quality Index (PSQI). The PSQI assesses sleep onset latency, duration, efficiency, quality, disturbances, medication use, and daytime function in the past month. A score of >5 indicates poor sleep quality. The questionnaire was conducted using Google Sheets and SPSS 19 was used for statistical analyses.

Results

Most respondents were male (n=15). Men declared they train an average of 8 hours per week, while women train 14 hours per week. On average, both groups go to bed and get up at the same time. No statistical difference was seen between groups when comparing the Pittsburgh index. Both groups are near or exceed the threshold value (>5) for poor sleep quality.

Conclusions

Based on the results, both groups demonstrate poor sleep quality according to the PSQI. These results may be beneficial for trainers and other professionals to better understand their athletes and to perhaps incorporate these evaluations into the monitoring process.

A16

The role of fundamental motor skills and abilities: A novel anticipation time measurement system

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Background

Success in sports is intrinsically linked to athletes' ability to perform fundamental motor skills with efficiency and precision. These skills, underpinned by perceptual-motor and physical competencies,

play a critical role in achieving high performance. Among these, anticipation time—the ability to predict the trajectory and endpoint of moving objects—has been recognized as a key determinant in sports performance.

Materials and methods

Despite its importance, existing tools for measuring anticipation time, such as the Bassin Anticipation Timer, present limitations in flexibility and adaptability. This project introduces the design and development of a programmable, wireless anticipation time measurement system tailored for talent identification and skill assessment.

Results

The proposed device addresses key limitations of its predecessors by incorporating advanced features such as adjustable panel dimensions, multi-directional LED stimuli, and customizable configurations. Notably, it will allow for the integration of various shapes, colors, and dynamic stimuli, enhancing its applicability across diverse sports contexts. Additionally, the device will support vertical and horizontal measurement orientations and operates efficiently under varying lighting conditions.

Conclusions

The innovative features of this system will provide more accurate, versatile, and context-specific assessments of anticipation time, contributing to a more precise identification and development of athletic talent. This tool will represent a significant advancement in sports science, with potential applications in training, evaluation, and talent selection.

A17

Correlation between Isokinetic Quadriceps and Hamstring strength with Countermovement jump performance in different team sports professional athletes

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Background

The aim of this study was to determine the relationship between isokinetic knee extensor and flexor strength and countermovement jump performance in elite team sports athletes.

Materials and methods

100 professional team sports athletes (football n=32, handball n=16, basketball n=16, women soccer n=22, basket 3x3 n=14) were enrolled in the study. Relationship between quadriceps strength (left and right leg) and hamstring strength (left and right leg) at 60° with CMJ performance (jump height, peak power, peak force, deceleration) were determined using Pearson's correlations.

Results

Women's soccer showed high correlations between strength in both legs quad/hamstring and peak power ($r=0.65-0.82$, $p<0.001$) and force ($r=0.54-0.74$, $p<0.05$). Men's soccer showed correlations between both quads strength and jump height ($r=0.51-0.53$, $p<0.05$), and both quad/hamstring strength and peak force ($r=0.52-0.72$, $p<0.05$), peak power ($r=0.54-0.83$, $p<0.05$), and deceleration ($r=0.56-0.6$, $p<0.05$). Handball players showed a high correlation between both quadriceps strength and jump height ($r=0.54-0.66$, $p<0.05$) and peak power ($r=0.7-0.8$, $p<0.05$), with both quads correlating with peak force ($r=0.7-0.8$, $p<0.05$), only left hamstring correlating with peak force ($r=0.55$, $p<0.05$), and only left quad with deceleration ($r=0.63$, $p<0.05$). Basketball showed both quads correlating with jump height ($r=0.52-0.54$, $p<0.05$) and peak power ($r=0.5$, $p<0.05$), while 3x3 players showed right quadriceps correlating with CMJ deceleration ($r=0.56$, $p<0.05$).

Conclusions

Study results showed moderate to high association between strength and power attributes, implying that strength training should be regularly included in training schedule of high level team sports players.

A18

Cognitively enhanced physical activity improves executive functions in preschool children: A systematic review and meta-analysis of randomized controlled trials

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Background

Executive functions (EFs) predict school readiness and academic achievement in young children. Cognitively enhanced physical activity (CEPA) i.e. physical activity (PA) performed together with cognitive tasks may significantly improve preschool children's EFs. Given that EFs are crucial for children's intellectual development and later achievements in life, we sought to review the literature on the effects of CEPA on EFs in preschool children.

Materials and methods

Web of Science, PubMed and APA PsycINFO were systematically searched using predetermined keywords searched for the relevant literature from inception to June 2024. Only randomized controlled trials that had performed CEPA in healthy preschool children and evaluated EFs were included. Quality appraisal of the included studies was assessed via RoB2 tool. Nine studies of 960 participants met the inclusion criteria and were analyzed.

Results

The most consistent improvements in EFs were found in exergaming studies, which fostered CEPA through interactive video games adjusted for preschool children. The meta-analysis confirmed the significant difference of children participating in CEPA compared to children from the control groups with the length of the program being the main feature that guarantees an improvement in EFs.

Conclusions

The most consistent improvements in EFs were found in exergaming studies, which fostered CEPA through interactive video games adjusted for preschool children. The meta-analysis confirmed the significant difference of children participating in CEPA compared to children from the control groups with the length of the program being the main feature that guarantees an improvement in EFs.

A19

Advancing women's handball: Early insights from a SAQ-focused plyometric training study

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Background

Plyometric training is very effective in improving strength, speed, and agility which are crucial components of athletic ability in handball. This form of training comprises explosive exercises that aim to activate the muscles' stretch-shortening cycle to enhance force output. Although it is used in many sports, there is a lack of research studies specific to its use in female handball players and how it can enhance Speed, Agility, and Quickness parameters.

Materials and methods

This research was conducted on 10 female athletes of the handball team “Srem” from Sremska Mitrovica with the age of 19.60 ± 3.95 years. The participants were divided into two equal groups, consisting of 5 randomly selected players. The study was done for 8 weeks in the mid-season and the test was done before and at the end of the study.

The experimental group underwent additional strength training sessions which were scheduled to be done twice in a week. The additional training involved the use of elastic bands in plyometric exercises. In the course of the study, eight different tests were used in order to assess different aspects of SAQ.

Results

2X2 ANOVA was used and compared the differences between the two groups, and showed that there was a significant improvement in the experimental group to the control group on the various performance parameters. Thus, an increase in the CMJ and both: single-leg left and right jumps was noted.

Conclusions

These findings indicate that plyometric training with elastic bands enhanced the explosive lower body strength that is needed for tasks that demand fast and powerful movement of the lower limbs.

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A20

Evaluation of pain threshold and tolerance in judokas before competition

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Background

The control of pain and the ability to manage pain effectively are essential aspects of sports. This is particularly true for combat sports, where direct physical contact with the opponent is a critical skill for athletes. Athletes are systematically exposed to brief periods of intense pain during training or competition, necessitating the development of effective strategies to cope with such experiences. The aim of this study is to measure the pain threshold of national-level judokas before competition.

Materials and methods

The study involved 30 healthy male judokas with a mean age of 22.37 ± 3.41 years. Pain threshold and tolerance were evaluated using a Baseline® manual pressure algometer. The Baseline® 66 Lb/30 kg dolorimeter consists of a metal probe capable of measuring pressures up to 30 kg in increments of 0.25 kg. Measurements were taken immediately before the competition with participants seated, their right upper limb flexed at the elbow and resting on a table. The measurements were conducted on the back of the hand, between the thumb and index finger.

Results

The pain threshold and tolerance of the athletes were categorized into two groups: ≤ 15 kg and > 15 kg. Accordingly, 13 participants (43.33%) had a pain threshold of ≤ 15 kg, while 17 participants (56.66%) had a pain threshold of > 15 kg, with no significant difference observed between the groups (χ^2 : 0.533; p: 0.465). However, in terms of pain tolerance, 23 participants (76.6%) had a tolerance of ≤ 15 kg, and 7 participants (23.33%) had a tolerance of > 15 kg, with a significant difference observed between the groups (χ^2 : 8.533; p: 0.0035).

Conclusions

The results of the study suggest that judokas exhibit varying sensitivities to pain before competitions. Specifically, a statistically significant difference in pain tolerance was found between the groups ($p < 0.05$). This highlights the importance of individual differences in pain sensitivity before competitions. However, no significant difference was observed in terms of pain threshold. These findings emphasize the need for further research into the pain

adaptation mechanisms of judokas and their impact on athletic performance.