前 言

本刊主要收录Web of Science核心合集数据库有关体教融合、体医融合、奥林匹克教育、冰雪运动、体育工程、反兴奋剂、文化与新闻传播领域的最新研究成果。

Web of Science核心合集包括Science Citation Index Expanded (SCIE)、社会科学引文索引(SSCI)、艺术和人文引文索引(A&HCI)、Emerging Sources Citation Index (ESCI)、Conference Proceedings Citation Index (CPCI)、Book Citation Index (BKCI)等，是科学及学术研究的全球原创引证索引。其涵盖超过250个自然科学、社会科学、艺术和人文学科。

本刊旨在利用Web of Science核心合集平台为广大师生提供有关目前热点的最新研究内容。检索出的数据采用书目共现分析系统（Bicomb V2021）对文献信息进行提取，包括期刊、关键词、标题、发文年份等，相同含义的字段去重且批量合并，同时去除没有实质意义的字段，对所提取的字段进行频次统计，形成高频矩阵，并使用社会网络分析软件Ucinet绘制成知识图谱，进行共词聚类分析。

本期选录体教融合方面的文献20篇，体医融合方面的文献15篇，冰雪运动方面的文献14篇，体育工程方面的文献13篇，反兴奋剂方面的文献10篇。

目 录

责任编辑：马赛迈

体教融合

本期体教融合学术研究共检索到英文相关文献188篇，研究热点主要集中在小学体育教学、体育教学中技能习得的实用方法、学生体育活动分析、体育教师教育等方面。检索结果如下：1）关键词共词分析。提取关键词757个，经过数据清洗后关键词为726个，词频为3及以上的关键词有31个，累计百分比为30.48%，高频关键词有体育教育、体育活动、教师、教师教育、动机等，生成可视化知识图谱（见下图）。2）来源期刊分析。涉及期刊173种，其中载文7篇及以上的期刊有3种，所载文献累计百分比为35.84%，刊载体教融合前三位的期刊分别为：Retos-nuevas Tendencias en Educacion Fisica Deporte Y Recreacion，Journal of Physical Education Recreation and dance, Sport Education and Society（JCR学科分区Q2、Q3、Q2）。3）学科交叉分析。引用文献总计7609篇，最多频为8次，排名前三的文献分别为*Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1.6 million participants*和*Using thematic analysis in psychology*。4）学术关注度分析。文献级别用量最多的是11次，排名前三位的文献分别为：*Health promotion in physical education through digital media: a systematic literature review*、*The impact of typical school provision of physical education, Physical activity and sports on adolescent physical health: A systematic literature review and meta-analysis*、*Game on! Enhancing primary physical education through a Rosenshine-inspired approach*。
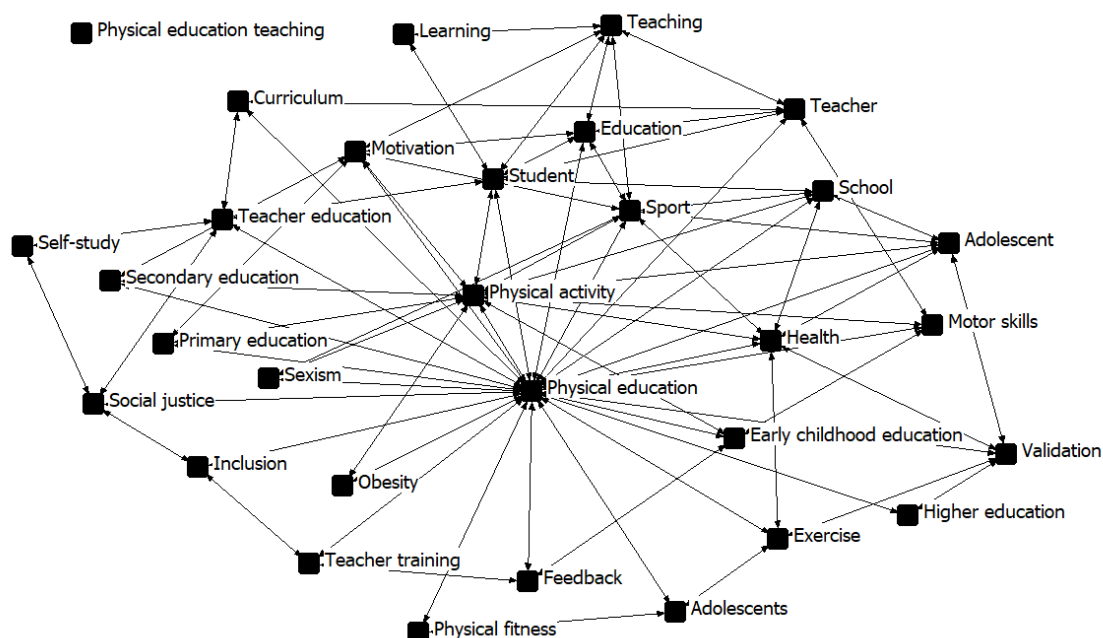
Li, C., Zhang, C (2024). Exploring the Current Landscape of Primary School Physical Education Within the Framework of the New Curriculum Reform: A Quality Evaluation Model Perspective. J Knowl Econ. https://doi.org/10.1007/s13132-024-01873-5

ABSTRACT

The advent of the knowledge economy necessitates a transformation in educational paradigms, especially in primary education. This paper examines the recent shift in physical education (PE) within elementary schools, emphasizing a holistic and student-centered approach aligned with the principles of the knowledge economy. It scrutinizes the current landscape of PE evaluation in three primary schools in Longshan County, using surveys of 20 teachers and 300 students, exploring practices, challenges, and perceptions of multiple assessment methodologies. The study finds that contemporary curriculum reforms advocate a departure from traditional, singular academic evaluations. Instead, they emphasize multifaceted assessments incorporating physical fitness, sportsmanship, and attitudes toward healthy living. This shift reflects a broader educational trend prioritizing comprehensive student development over academic achievement. It underscores the integration of diverse evaluations in PE curricula as essential for capturing the multifarious aspects of student growth in line with a more nuanced, knowledge-driven educational context. Through this investigation, the paper contributes significantly to the dialogue in educational strategies within the knowledge economy, highlighting the importance of dynamic, adaptable evaluation systems. These findings underscore the necessity for educational reforms that respond to the evolving demands of society, advocating for policies and practices that foster both theoretical and practical advancements in the realm of PE in primary education. This research offers insights for educators, policymakers, and researchers, aiming to refine evaluation methodologies and enhance learning outcomes in line with the evolving requirements of the knowledge economy.

Li Y, Yu H (2024). Assessment of Pedagogical Contributions toward Enhancing Physical Activity within the Secondary School Physical Education Curricula in Southwestern China. Sustainability.; 16(5):1862. https://doi.org/10.3390/su16051862

ABSTRACT

Students enrolled in secondary schools often fail to engage in moderate to vigorous levels of physical activity (MVLPA) due to inadequacies in their physical education programs. Physical education teachers (PETs) foster student involvement in MVLPA. Consequently, it becomes imperative to identify and scrutinize factors pertaining to PETs that could influence students' MVLPA within secondary school settings, an area that has been relatively overlooked in China. To address this gap, the present study delved

into MVLPA among secondary school students in southwest China with the following objectives: (i) to assess students' MVLPA alongside PET characteristics and teaching behaviors during physical education classes; (ii) to explore discrepancies in PET behaviors and characteristics; and (iii) to establish connections between students' MVLPA and PET behaviors and characteristics during physical education sessions. A questionnaire survey was administered to 54 full-time PETs across nine secondary schools in Chengdu, China, aimed at gathering data on their personal and professional attributes. Additionally, a system for observing fitness instruction time was employed to document PET instructional traits, while accelerometers were utilized to track students' MVLPA. The study objectives were investigated using multiple statistical analyses. The findings indicate that PETs do not meet the recommended 50% MVLPA time allocation during physical education sessions. Noteworthy patterns emerged, revealing that PETs with 1-5 years of teaching experience allocated less time to student observation and more time to classroom management compared to their counterparts with 6-10 years and over 10 years of teaching experience. Moreover, MVLPA time invested in lessons led by male PETs (B = -3.221) was significantly higher than time spent in lessons led by female PETs, which was attributed to PET gender. Furthermore, students under the tutelage of PETs with 6-10 years of teaching experience (B = 3.101) and those with over 10 years of experience (B = 2.989) exhibited significantly higher MVLPAs than under those with 1-5 years of teaching experience. Additionally, PET attitudes such as observation (B = 1.621) and promoting (B = 1.317) behaviors during physical education sessions were positively correlated with students' MVLPA. A regression analysis revealed that PET characteristics and behaviors explained 21.3% of students' MVLPA variance. This study offers insights into PETs' pivotal role in promoting physical activity. It underscores the ramifications for students' MVLPA in the Chinese educational context.

Norah N. Alali, Howie J. Carson & Dave Collins (2024). A Pragmatic Approach to Skill Acquisition for Physical Education: Considering Cognitive and Ecological Dynamics Perspectives, Quest, DOI: 10.1080/00336297.2023.2298931

ABSTRACT

Learning theories provide philosophically informed, basic principles for understanding the mechanisms through which people learn based on a combination of field or laboratory studies. Unfortunately, however, there are several clear conflicts between theoretical approaches and common methods in teaching. Consequently, key challenges among teachers relate to knowing which theoretical approach to adopt and, therefore, methods to apply. This contradiction is even more confusing since some arguments from each approach are coherent with current practice, whilst others are either inconsistent, unclear or even counter to established teaching views. In short, the implications for teachers are, at best, suboptimal. Accordingly, this paper aims to explore the differences in theoretical perspectives and thence, to propose that there is a need

for multiple approaches, possibly used in combination. We hope to offer clearer guidance for practitioners and provide some direction to promote better application from researchers.

Simpson, T., Finlay, M., Simpson, V., Asadi, A., Ellison, P., Carnegie, E., & Marchant, D (2024). Autonomy-Supportive, External-Focus Instructions Optimize Children's Motor Learning in Physical Education. Journal of Motor Learning and Development (published online ahead of print 2024). Retrieved Mar 22, 2024, from https://doi.org/10.1123/jmld.2023-0040

ABSTRACT

An external focus of attention and autonomy support are identified as key factors to optimize motor learning; however, research in children is limited. Moreover, research has failed to examine these factors in ecologically valid motor learning settings, like physical education. Therefore, the present study examined the effects of external focus of attention when delivered using autonomy-supportive or controlling instructional language on children's motor learning. Thirty-three novice participants (10.30 +/- 0.52 years) practiced a land-based curling task under supportive (external-focus instructions delivered with supportive language), controlling (external-focus instructions delivered with controlling language), or neutral (external instructions embedded in the task aim) conditions before completing a retention and transfer test. The supportive group produced higher positive affect after practice and greater accuracy in the retention test compared with the other groups. The findings provide support for the OPTIMAL (optimizing performance through intrinsic motivation and attention for learning) theory of motor learning that combining an external focus and autonomy support conditions improves motor learning.

Tora Storesund Tremoen & Pål Lagestad (2024) Norwegian physical education teachers' assessment after the introduction of a new curriculum – LK20, Sport, Education and Society, DOI: 10.1080/13573322.2024.2320182

ABSTRACT

In 2020, a new curriculum, Kunnskapsloftet 2020 (LK20), was introduced in Norwegian schools. This study investigated how physical education (PE) teachers in upper secondary schools have changed their assessment practice following the introduction of LK20. To achieve this, nine individual in-depth interviews were conducted with PE teachers from six upper secondary schools in Norway. Using NVivo 12, the teachers' experiences were analysed, and corresponding categories of meaning were created. The results indicated that there were changes in their assessment practice after the introduction of LK20. The PE teachers found it more difficult in LK20 to distinguish between grades, and greater room for interpretation was identified. The results also suggested that PE teachers have become more concerned with the pupils'

development over time, rather than with achieving a specific, predetermined goal, and that LK20 better facilitates this aim. PE teaching also seemed to be characterised by a greater amount of play after the introduction of LK20, which teachers viewed as being positive for most pupils. Finally, the analysis pointed to a need in the teachers for more professional support outside of their own immediate circle of colleagues. The results are discussed in relation to Fullan (2016) and one of his key phases according to education policy-driven reforms - the implementation phase. Our findings, and those of other research, identify a need for skills development work and/or courses for PE teachers in assessment.

Xue, Y., Li, N (2024). Research and application of multimedia compression technology in online physical education teaching task. SIViP. https://doi.org/10.1007/s11760-024-03012-8

ABSTRACT

Traditional physical education teaching methods are facing increasingly severe challenges. This article studies how to use network technology more reasonably in college physical education teaching and better serve college physical education teaching. The purpose is to comprehensively analyze the requirements of physical education teaching and teaching management in universities, and to plan in detail the functions of the physical education teaching management system to better meet the needs of the development of physical education teaching in universities. Starting from the current development status of online teaching management platforms in Chinese universities, this paper conducts research on the existing problems of online teaching management platforms in higher physical education institutions. Using a questionnaire survey method, this study investigates and analyzes the current situation of online teaching platforms and course resources in 12 domestic higher sports colleges and universities. Starting from the actual situation of online education in physical education teaching in universities, a management platform model that organically combines online teaching platforms and digital teaching resource libraries is proposed. This study indicates that multimedia compression technology has important research value and broad application prospects in online physical education teaching. Through the application of this technology, the quality of online physical education teaching can be greatly improved, teaching costs can be reduced, and a more high-quality and efficient learning experience can be provided for students.

Kilian Mandrillon, Florent Desplanques & Léa Gottsmann (2024). Towards an integration of physical activity and environmental awareness: analysis of students' activity in physical education, Physical Education and Sport Pedagogy, DOI: 10.1080/17408989.2024.2319059

ABSTRACT

Background: The need for greater attention to Environmental Education (EE) is increasing as awareness of the environmental emergency grows. However, Physical Education (PE), through its physical dimension and the diversity of activities that can take place in nature, seems to provide a favourable context for creating a sense of belonging to the environment, while actively pursuing greater human awareness of our negative impact on it. Purpose: With this focus, we were interested in the behaviour of students within programmes integrating PE and EE, in outdoor activities, like orienteering. Methods: A Mixed Methods Research (MMR) approach was used to analyse the activity and experiences of 6th grade students during traditional orienteering lessons and during 'environmental' orienteering lessons. Accelerometric measurements of movements and audio recordings via dictaphone USB keys were undertaken to assess students' levels of physical activity (PA) in both conditions and to evidence their communications. Findings: Our results show a preservation of the active dimension of the lessons since the students' PA levels are significantly higher during the 'environmental' condition compared to traditional lessons. Three student profiles emerge from analyses of audio recordings, highlighting heterogeneity of concerns between orienteering content, observation of the environment and off-task discussions. Conclusions: These results demonstrate the usefulness of MMR for analysing students' physical and cognitive activity in PE lessons. Data obtained show that it is possible to integrate environmental content into PE programmes, without compromising the active characteristic of the lesson.

Jin Yan, Philip J. Morgan, Jordan J. Smith, Sitong Chen, Angus A. Leahy & Narelle Eather (2024). Pilot randomized controlled trial of a game-based intervention for teaching basketball in Chinese primary school physical education, Journal of Sports Sciences, DOI: 10.1080/02640414.2024.2319457

ABSTRACT

This study aimed to examine the preliminary efficacy and feasibility of implementing a tailored version of the MASTER coach education programme in Chinese primary schools to support physical education (PE) teachers' basketball lesson design and delivery. A total of 20 primary schools in Beijing, China were recruited, with one PE teacher and their class (N = 715 students aged 10-13 yrs) from each school included in the study and randomly allocated to the MASTER intervention (n = 10) or control group (n = 10). Compared to the control group, a significant difference was observed in the MASTER group for the proportion of playing-form activities delivered during PE (27.65, 95% CI [20.27, 35.03]) and for teachers'

perceptions of confidence (23.92, 95% CI [15.87, 31.92]) and competence (24.12, 95% CI [10.28, 24.71]) to teach. Significant differences between groups were observed for students' perceived athletic competence (3.56%; 95% CI [3.15, 3.96]), enjoyment (11.83%; 95% CI [10.98, 12.69]), well-being (8.51%; 95% CI [7.02, 10.00]), intrinsic motivation (+0.74%; 95% CI [0.30, 1.17]), introjected motivation (-2.24%; 95% CI [-2.77, -1.70]), and external motivation (-0.49%; 95% CI [-0.90, -0.08]). The MASTER programme was effective in improving teaching practices in Chinese primary schools, and in facilitating improvements in teacher and student outcomes.

Wang, Q., Zainal Abidin, N.E., Aman, M.S. et al (2024). Cultural moderation in sports impact: exploring sports-induced effects on educational progress, cognitive focus, and social development in Chinese higher education. BMC Psychol 12, 89. https://doi.org/10.1186/s40359-024-01584-1

ABSTRACT

Background: This research examines the nuanced challenges confronting Chinese university students within the dynamic milieu of Chinese education. The study comprehensively investigates factors encompassing educational progress, social development, cognitive focus, and Psychological Well-being (PWB), specifically emphasizing the role of sports participation. Methods: To scrutinize the moderation-mediation nexus between cultural context and social development, a distribution of 500 questionnaires was administered to Chinese university students, yielding 413 responses, corresponding to an 82.6% response rate. Methodologically, this study employed moderation and mediation analyses, incorporating statistical techniques such as a principal component matrix, factor analysis, and hierarchical regression. Findings: Prominent findings underscore the significant impact of age on educational progress, shaping the trajectory of academic advancement. Cumulative Grade Point Average (CGPA) emerges as a promising metric, establishing a link between academic performance and educational progress. Active involvement in sports and physical activities (PSPA) positively affects academic performance and study habits. Participation in sports teams and clubs (ISTC) enriches social development by nurturing interpersonal relationships, teamwork, and leadership skills. Sports activities (ESA) correlate with enhanced cognitive focus and improved psychological well-being. Significantly, the findings unveil a nuanced association between Perceived Social Development Through Sports (PSDTS) and educational progress. Conclusions: Cultural Context (CC) moderates PSDTS, Sport-induced Cognitive Focus (SICF), and PWB, influencing educational progress. This study emphasizes the need for enhanced support systems-academic guidance, awareness, sports programs, and cultural competence training-to advance student well-being and academic achievement in China, fostering an empowering educational environment for societal progress.

ABSTRACT

Background: The transition from primary school to secondary school has negative effects on a significant part of the student body, such as a substantial decrease in self-esteem, motivation, academic performance and the risk of bullying and school dropout school. Social support and school factors are positively associated with transition success; thus, they need to be strengthened in transition programmes. In this sense, the application of pedagogical models that address affective and social domains could set a suitable framework to develop positive transition programmes. Purpose: The aim of this work was to test the impact of a programme consisting in a Service-Learning experience embedded in a Sport Education season on social and school transition facilitators within a positive school transition framework. Methods: A total of 17 teachers, 130 secondary school students (age: 15-16), and 305 primary school students (age: 11-12 years) across five established Sport Education networks participated in this study. The networks were composed of one secondary school group and between two and four primary school groups. The programme comprised between 18 and 21 physical education lessons for each secondary school group, and between 14 and 18 physical education lessons for each primary school group. The data were obtained in multiple time points through focus groups with students and primary school teachers, interviews with secondary school teachers and researchers' field diaries. Findings: Results evidenced the development of facilitators in the social and school factors. Regarding the social factor, the programme created a positive relationship between primary school and secondary school students and increased quantity and quality of the relationship between students of the same age, as well as expectations of social support in the new stage. Within the school factor, the development of facilitators of school connectedness and a feeling of safety was verified. A shift in primary school students' ideas and expectations about the transition was identified, which included a greater sense of security and more positive expectations. Conclusions: The Sport Education Service-Learning programme appears to be effective in developing school and social facilitators to promote positive school transition. Results suggest that Sport Education facilitates a positive and respectful relationship between equals, while Service-Learning is a highly suitable framework for relationships with older students. The long-term impact on social relationships established during programmes with a positive focus is suggested as prospective research.

Dylan Scanlon, Maura Coulter, Kellie Baker & Deborah Tannehill (2024). The enactment of the Socially-Just Teaching Personal and Social Responsibility (SJ-TPSR) approach in physical education teacher education: Teacher educators' and pre-service teachers' perspectives, Physical Education and Sport Pedagogy, DOI: 10.1080/17408989.2024.2319071

ABSTRACT

Background: Research in teacher education practice explicitly highlights how learning to teach teachers is a complex, messy, sophisticated process, filled with uncertainty and perpetual challenges. While this applies to all aspects of teacher education, we focus here on the process of learning to teach pre-service teachers (PSTs) how to teach about, through, and for social justice (pedagogies) by enacting the Socially-Just Teaching Personal and Social Responsibility (SJ-TPSR) approach. Purpose: This research was guided by the following research question: What are the realities of enacting a SJ-TPSR approach in physical education teacher education (PETE)? Method: Utilising a collaborative self-study approach two physical education teacher educators, supported by two critical friends, enacted the SJ-TPSR approach in a 10-week outdoor and adventure activities module with pre-service generalist primary school teachers. Data included: critical friend meetings, pedagogical decision-making documents and interviews with the teacher educators and PSTs. Findings: The findings revolve around three categories: (i) Teaching about teaching and learning about teaching the SJ-TPSR approach; (ii) The importance of learning together; and (iii) A pedagogy of vulnerability needed? The findings demonstrated the need to take a gradual approach to teaching about teaching the SJ-TPSR approach and learning about teaching along with the SJ-TPSR approach. It was a daunting experience but reflection and sharing our thoughts mitigated most of these feelings. The importance of learning together was highlighted by both teacher educators. Co-constructing this new knowledge with the PSTs further supported this process. Finally, when enacting a new pedagogical approach, particularly in the area of social justice, required an additional pedagogical approach that of vulnerability. Discussion: Our collaborative self-study on the enactment of the SJ-TPSR approach is an explicit example of reframing pedagogy and practice not only from a social change and social justice perspective, but about, through, and for social justice and change. We first reconceptualised the TPSR approach to the SJ-TPSR approach from a social justice perspective, but then examined our practice and developed practices that also support the teaching and learning about, through, and for social justice. The practices developed have implications for the enactment of the SJ-TPSR approach which hold possibilities for other innovative practices (e.g. layering), and also for self-study research, namely ways in which collaborative self-study can be conducted and in which self-study can work from a social change and social justice perspective Conclusion: We trust that sharing our journey thus far will support others interested in enacting the SJ-TPSR approach, and that we, in turn, can learn from others enacting, examining, and articulating their experiences with the approach.

Diloy-Peña, S., Abós, Á., Sevil-Serrano, J., García-Cazorla, J., & García-González, L. (2024). Students' perceptions of physical education teachers' (de)motivating styles via the circumplex approach: Differences by gender, grade level, experiences, intention to be active, and learning. European Physical Education Review, 0(0). https://doi.org/10.1177/1356336X241229353

ABSTRACT

Grounded in self-determination theory, an integrative and fine-grained circumplex model, based on teachers' autonomy support, structure, control, and chaos, has been proposed. The present study aimed to examine possible differences in students' perceptions of physical education (PE) teachers' motivating and demotivating styles and the eight different approaches, respectively, regarding students' socio-demographic variables, and different affective, cognitive, and behavioral outcomes. A sample of 669 Spanish secondary students aged 12-17 years (mean age (Mage) = 14.65; standard deviation (SD) = 1.47; 52% girls) participated in this cross-sectional study. Boys reported significantly higher values in the chaotic style and the domineering approach than girls. Second- and third-cycle students (Year 10, Year 11, and Year 12) reported significantly higher values in autonomy-supportive and structuring styles, and significantly lower values in the domineering approach than first-cycle students (Year 8 and Year 9). Second-cycle students (Year 10 and Year 11) reported significantly higher values in the demanding approach than first-cycle students (Year 8 and Year 9). Third-cycle students (Year 12) reported significantly lower values in the awaiting approach than the first-cycle students (Year 8 and Year 9). Finally, as a whole, students who reported positive experiences in PE, high learning, and high intention to participate in physical activity reported significantly higher values in autonomy-supportive and structuring styles, as well as the demanding approach, and significantly lower values in the chaotic style. The results highlight the importance of PE teachers adopting motivating styles and avoiding demotivating styles, especially with boys and lower grade levels, to promote meaningful experiences in PE and an active lifestyle.

Matilda Lindberg (2024). Disciplinary literacy and verbal language in physical education, Sport, Education and Society, DOI: 10.1080/13573322.2024.2318394

ABSTRACT

Supporting pupils' development regarding subject knowledge and disciplinary literacy is a complex and challenging task for teachers. Research shows that language-integrated physical education (PE) can assist children's language development. However, it tends to reduce the time for physical activity, which is problematic since youth's physical inactivity is a growing problem. This article examines how teachers can emphasize disciplinary literacy and stimulate pupils' use of verbal language to enhance their learning in PE in a culturally and linguistically diverse context in Sweden. In this practice-based research study grounded

in action research methodology, 20 ten-year-old pupils with culturally and linguistically diverse backgrounds participated with a teacher-researcher in 10 PE lessons in which disciplinary literacy and verbal language were intertwined with exploratory circus assignments. The theoretical framework is based on Biesta's concept of risk. Data were collected through participant observation, video observation, interviews, and field diary. The data analysis was abductive, oscillating between the theory and the data. A thematic analysis was carried out. The results show that the exploratory circus assignments offered opportunities to emphasize disciplinary literacy and stimulate pupils' use of verbal language. Focusing on language to ensure all pupils could partake and develop knowledge required time, which encroached on the pupils' opportunity to be physically active. This was resolved through adding time before the PE lesson to activate the pupils' background knowledge, anchor the language, and create pre-understanding. Further, including all pupils was challenging, and the pupils had different expectations regarding PE. The findings suggest that inviting pupils to speak involves an embedded risk in communication, but also carries dialogical potential. In collaboration with teaching colleagues, PE teachers can support and strengthen the pupils' literacy development.

Saiz-González, P., Coto-Lousas, J., Iglesias, D., & Fernandez-Rio, J (2024). Construction and Assessment of the Physical Activity and Physical Education Importance for Parents Scale. Perceptual and Motor Skills, 0(0). https://doi.org/10.1177/00315125241235416

ABSTRACT

A recent systematic review reported positive associations between parents and children's physical activity participation. Moreover, parents' perceptions of the importance and value of physical activity can influence their children's participation in it. Our aim in this study was to develop and validate an instrument to assess parents' perceptions of the importance of physical activity and physical education. After first creating the instrument, we conducted content and exploratory factorial validation and reliability analyses of it with 93 parents (M age = 44.76, SD = 6.05, range = 31-66 years; 73 females, 20 males). The result was a 9-item instrument, with items assessed on a 5-point Likert scale and grouped into three factors: (a) importance of physical education; (b) importance of engaging in physical activity or sport; and (c) importance of joining your children in physical activity or sport. In a second confirmatory factor analysis with 224 parents (M (age) = 44.53, SD = 6.07; 174 or 77.7% females and 50 or 22.3% males) we confirmed the factor validity and reliability previously analyzed (chi(2) = 42.77, df = 24, p = .011, GFI = 0.96, NFI = 0.98, NNFI = 0.99, CFI = 0.99, RMSEA = 0.06 (90% CI: 0,04, 0.08), SRMR = 0.04, ECVI = 0.04, CR = 0.70-0.87). Thus, the new Physical Activity and Physical Education Importance for Parents Scale (PAPEIPS) is a valid and reliable instrument for measuring parents' perceived importance of physical activity and physical education.

Treschman, P., Stylianou, M., & Brooks, C (2024). A scoping review of feedback in physical education: Conceptualisations and the role of teachers and students. European Physical Education Review, 0(0). https://doi.org/10.1177/1356336X241230829

ABSTRACT

Given the important role of feedback in student learning, this scoping review investigated how feedback has been conceptualised and examined, and how the teacher and student have been positioned in feedback processes in physical education (PE) research. Following recommended processes for conducting a scoping review, 110 papers were included, and data were extracted and synthesised to address the aim. Findings identified a lack of conceptual and theoretical underpinnings, and considerable variability in feedback terminology used in PE. Feedback was mainly positioned as being transmitted verbally from the teacher to the student to evaluate performances. Research methods mainly focused on the teacher's feedback behaviours, with less attention given to how the student receives, interprets, and uses feedback to advance their learning. Based on the findings, we recommend that future feedback research in PE is underpinned by theory and frameworks that acknowledge the active role of both the teacher and the student in the feedback process. Additionally, given the critical element of feedback effectiveness is not in the provision of feedback, but how it is interpreted and used, research methods that further consider how students engage with feedback opportunities are required. If we are to maximise feedback's learning potential, future PE research and practices should consider how students can be further activated in the feedback process.

Brandon Foye (2024). The evolution of teaching physical education online during the COVID-19 pandemic, Curriculum Studies in Health and Physical Education, DOI: 10.1080/25742981.2024.2315184

ABSTRACT

This study examined the evolution of online teaching for fourteen New England K-12 physical education teachers during the COVID-19 pandemic. Commencing where Foye and Grenier ([2021]. Teaching during a pandemic. Physical educators' reflections on teaching remotely. Journal of Online Learning Research, 7, 133-151.) left off, the current study contrasts participants' experiences in the spring of 2020 with their experiences during the 2020-2021 academic year. Participants engaged in semi-structured interviews. Interview data underwent thematic analysis, with Whittle et al.'s (2020. Emergency remote teaching environment: A conceptual framework for responsive online teaching in crises. Information and Learning Sciences, 121(5/6), 311-319.) emergency remote teaching environments framework providing contextualisation for the study. Three sizeable differences emerged from March 2020 to the 2020-2021 academic year: participants widely utilised synchronous teaching environments, which they unanimously

preferred to asynchronous environments; blended learning environments allowed for face-to-face engagement; participant concerns regarding student accountability and lacking interpersonal socialisation dropped from March 2020. Participant experiences are utilised to help guide future online physical education practices.

Gamze Beyazoğlu & Oğuz Özbek (2024). The attitudes of physical education teachers towards teaching students with disabilities: a qualitative research in Turkey, International Journal of Inclusive Education, DOI: 10.1080/13603116.2024.2317723

ABSTRACT

This qualitative research examines the attitudes of physical education teachers in schools towards people with disabilities using the theory of planned behaviour. Fourteen (eleven male, three female) physical education teachers who work in a province in Turkey and have 6-25 years of teaching experience participated in the study. An interview form with semi-structured questions was used to collect the data for the study. The interviews focused on the in-class attitudes of the participants towards students with disabilities. The data of the study were analyzed thematically. It was determined that most of the participants exhibited negative attitudes towards students with disabilities while teaching them in physical education classes. In addition to the emergence of culture-specific themes, it was observed that even though the participants received adequate support from their administrators and colleagues, they failed to include students with disabilities in their classes through inclusive education philosophy in the field of adapted physical education.

Jayne D. Greenberg, Hans van der Mars, Thomas L. McKenzie, Rebecca A. Battista, Jamie F. Chriqui, Kelly Cornett, Kim C. Graber, Ben D. Kern, Jared A. Russell, Dianne S. Ward & Wesley J. Wilson (2024). The Role of Physical Education Within the National Physical Activity Plan, Journal of Physical Education, Recreation & Dance, 95:2, 7-16, DOI: 10.1080/07303084.2023.2291641

ABSTRACT

The Education Sector of the recently updated National Physical Activity Plan (NPAP, 2023) was developed to assist schools, early care and education centers, and colleges and universities to establish policies and provide programmatic opportunities to support all students in adopting physically active lifestyles. The 2023 Education Sector strategies target K-12 education, preschool and early childhood education, as well as college and university contexts to develop and advocate for strong policies that promote physical education and physical activity for all students. Successful implementation of the Education Sector strategies has the potential to support high-quality program delivery. Specific to school physical education programs, the

strategies' adoption has the capacity for a broad, lifelong impact. This article presents an overview of the Education Sector strategies and their related tactics, along with objectives specific for K-12 school physical education programming.

John T. Hackworth (2024). Using Humor in the Health/Physical Education Classroom to Create an Enjoyable Learning Environment, Journal of Physical Education, Recreation & Dance, 95:2, 41-48, DOI: 10.1080/07303084.2023.2291643

ABSTRACT

The purpose of this article is to show that health and physical education (HPE) teachers who implement humor in the classroom intentionally create a more relaxed classroom environment, build stronger relationships with students, and engage students in the learning process. Humor used as an instructional strategy eases teacher stress and engages students, leading to a comfortable and welcoming classroom climate. Students feel connected, relaxed and calm when humor is implemented in the classroom. Three theories of humor are briefly described, with Incongruity Theory identified as the primary way to conceptualize using humor in the classroom as a teaching practice. Different kinds of humor are introduced that can be implemented in the classroom. This article also identifies the types of humor considered inappropriate for the classroom. Strategies for implementing humor as a pedagogical practice are discussed to help HPE teachers reach the laugh-into-engagement effect.

Adam Keath, James Wyant & Brooke Towner (2024). ChatGPE: Does Artificial Intelligence Have a Place in the Physical Education Setting?, Journal of Physical Education, Recreation & Dance, 95:2, 59-61, DOI: 10.1080/07303084.2023.2292941

ABSTRACT

AI tools can revolutionize physical education (PE) by assisting teachers in various ways, such as curriculum development, providing feedback, enhancing content knowledge and data analysis, and promoting student engagement. This article explores various ways in which PE teachers can utilize AI tools like ChatGPT to improve their instruction and enhance the quality of their programs.

体医融合

　　本期体医融合学术研究共检索到英文相关文献99篇，研究热点主要集中在身体活动对冠心病、糖尿病、癌症等慢性病的影响及远程运动康复指导的效果等方面。检索结果如下：1）关键词共词分析。提取关键词271个，经过数据清洗后关键词有257个，词频为2及以上的关键词有23个，累计百分比为31.90%，高频关键词为身体活动、心血管疾病、康复、糖尿病等，生成可视化知识图谱（见下图）。2）来源期刊分析。涉及期刊56种，其中载文2篇及以上的期刊有3种，累计百分比为10.71%，刊载体医融合前三位的期刊分别为：BMC Medicine（JCR学科分区Q1），BMC Musculoskeletal Disorders（JCR学科分区Q2、Q4），Medicine & Science in Sports & Exercise（JCR学科分区Q1）。3）交叉学科分析。引用文献总计2654篇，最多的频次为7次，排名前三的文献分别是：*ATS statement: Guidelines for the six-minute walk test*、*World Health Organization 2020 guidelines on physical activity and sedentary behavior*、*Exercise/Physical activity in individuals with type 2 diabetes: A consensus statement from the american college of sports medicine*、*Quantity and quality of exercise for feveloping and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: Guidance for prescribing exercise*。4）学术关注度分析。文献级别用量最多的是8次，排名前两位的文献分别为：*Bibliometric analysis of traditional Chinese exercises in stroke rehabilitation from 2003 to 2022 using CiteSpace*、*Effects of mind-body exercise on body constitution and circadian rhythm in people with suboptimal health status*、*Effect of tele-exercise to promote empowered movement for individuals with spinal cord injury (TEEMS) program on physical activity determinants and behavior: A mixed methods assessment*。
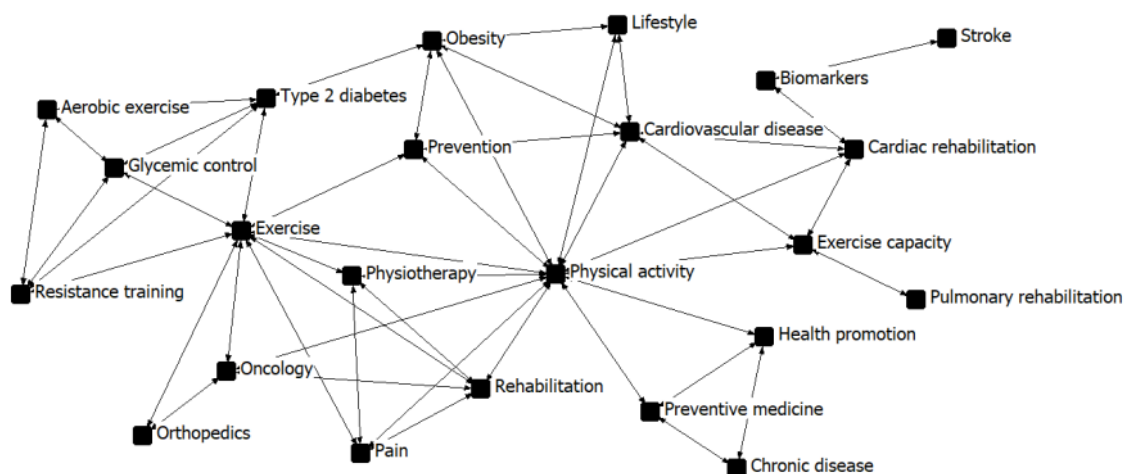
ABSTRACT

Objective: We investigated relationships among predictors of improvement in exercise capacity after cardiac rehabilitation programs in patients after acute myocardial infarction. Methods: We carried out a secondary analysis of data from 41 patients with a left ventricular ejection fraction >= 40% who underwent cardiac rehabilitation after the first myocardial infarction. Participants were assessed using a cardiopulmonary exercise test and stress echocardiography. A cluster analysis was performed, and the principal components were analyzed. Results: Two distinct clusters with significantly different (P = .005) proportions of response to treatment (peak VO2 >= 1 mL/kg/min) were identified among patients. The first principal component explained 28.6% of the variance. We proposed an index composed of the top 5 variables from the first component to represent the improvement in exercise capacity. The index was the average of scaled O2 uptake and CO2 output at peak exercise, minute ventilation at peak, load achieved at peak exercise, and exercise time. The optimal cutoff for the improvement index was 0.12, which outperformed the peak VO2 >= 1 mL/kg/min criterion in recognizing the clusters, with a C-statistic of 91.7% and 72.3%, respectively. Conclusion: The assessment of change in exercise capacity after cardiac rehabilitation could be improved using the composite index.

ABSTRACT

Aims: A randomized controlled trial was conducted to examine the effects of a home-based music-paced physical activity programme guided by Information-Motivation-Strategy (IMS) model and Self-determination theory on exercise-related outcomes for patients with coronary heart disease (CHD) after cardiac rehabilitation (CR). Methods and results: A total of 130 patients with CHD from a regional CR centre in Hong Kong were recruited and randomly allocated into intervention (n = 65) or control groups (n = 65). The intervention group received theory-guided practical sessions on performing prescribed home-based physical activity with individualized synchronized music, and follow-up telephone calls. The

primary outcome was exercise capacity. Secondary outcomes included exercise self-efficacy, physical activity level, and exercise self-determination. Data were collected at baseline, 3 months, and 6 months after study entry. The generalized estimating equations model was used to assess the intervention effects. Patients with CHD in the intervention group demonstrated significantly greater improvements in exercise capacity at 3 months [beta = 35.68, 95% confidence interval (CI) 2.69-68.68, P = 0.034] and significantly improved exercise self-efficacy at 6 months (beta = 3.72, 95% CI 0.11-7.32, P = 0.043) when compared with the control group. However, no significant group differences were found in physical activity level and exercise self-determination. Conclusion: The study findings provide evidence on an innovation on improving the exercise capacity and exercise self-efficacy of patients with CHD. The music-paced physical activity guided by the IMS model and Self-determination theory requires further investigation on its long-term effects in future studies. Clinical trial registration ChiCTR-IOR-17011015.

Shen H, Xu Y, Zhang Y, Ren L, Chen R (2024). Correlation Between Diaphragmatic Excursion and Exercise Tolerance Improvement Following Pulmonary Rehabilitation in Patients with Chronic Obstructive Pulmonary Disease-Obstructive Sleep Apnea Overlap Syndrome. Int J Chron Obstruct Pulmon Dis.19:63-75. https://doi.org/10.2147/COPD.S437698

ABSTRACT

Purpose: We assess the predictive value of diaphragm excursion (DE) in enhancing exercise tolerance following pulmonary rehabilitation (PR) among patients with COPD-OSA overlap syndrome. Material and Methods: This prospective cohort study enrolled 63 patients diagnosed with COPD-OSA overlap syndrome who actively participated in a PR program from January 2021 to May 2023. Among these, 58 patients successfully completed the 20-week PR program, with exercise tolerance assessed through the measurement of six-minute walk distance (6MWD), and DE evaluated by ultrasonography. The responder to PR in terms of exercise ability was defined as a patient who showed an increase of >30m in 6MWD. The cutoff value for predicting PR response based on DE was determined using receiver operating characteristic (ROC) curves. Results: Following the PR program, significant improvements were observed in mMRC, 6MWD, DE during deep breathing, and diaphragm thickness fraction (DTF). Of the participants, 33 patients (57%) were classified as responders, while 25 patients (43%) were considered non-responders. Baseline values of FEV1% predicted, 6MWD, DE during deep breathing, DTF, and PaO2 exhibited a significant elevation in responders as compared to non-responders. The changes of 6MWD were positively associated with the baseline values of DTF and DE during deep breathing, FEV1% predicted and PaO2, while negatively correlated with baseline value of mMRC. The predictive performance in terms of the area

under the ROC curve for determining responder's DTF was found to be 0.769, accompanied by a sensitivity of 85% and specificity of 68%, using a cutoff value at 17.26%. Moreover, it was observed that DE during deep breathing could predict the area under the ROC curve for responders to be 0.753, with a sensitivity of 91% and specificity of 56% at a cutoff value of 3.61cm.Conclusion: Diaphragm excursion serves as a valuable predictor for determining the enhancement of exercise tolerance following PR in patients with COPD-OSA overlap syndrome.

Niyazi A, Yasrebi SMA, Yazdanian M, Mohammad Rahimi GR (2024). High-Intensity Interval Versus Moderate-Intensity Continuous Exercise Training on Glycemic Control, Beta Cell Function, and Aerobic Fitness in Women with Type 2 Diabetes. Biological Research For Nursing. 0(0). doi:10.1177/10998004241239330

ABSTRACT

Objective: This study aimed to compare the effects of High-Intensity Interval Training (HIIT) and Moderate-Intensity Continuous Training (MICT) on glycemic control, beta-cell function, and aerobic fitness in women with Type 2 Diabetes Mellitus (T2DM). Methods: Thirty-six women with T2DM were assigned equally to HIIT, MICT, and control (CON) groups. Participants in the exercise cohorts underwent a 12-week training regimen (three sessions per week), while the CON group maintained an inactive lifestyle. Glycaemia variables, beta-cell function, maximal oxygen uptake (VO2max), lipid profiles, and body composition were assessed at baseline and post-intervention. Results: Both HIIT and MICT interventions led to significant improvements in glucose, insulin, HbA1c, and insulin resistance index. Moreover, visceral adiposity index (VAI), lipid accumulation product (LAP), total cholesterol (TC), and low-density lipoprotein (LDL) levels significantly decreased in the HIIT and MICT groups after 12 weeks. Triglyceride (TG) levels decreased only after MICT, while high-density lipoprotein (HDL) levels increased after both interventions. Maximal oxygen uptake (VO2max), body mass, body mass index (BMI), and waist circumference (WC) significantly improved in all exercise groups. Notably, the HIIT group showed greater reductions in body mass compared to MICT. Nevertheless, beta-cell function remained unaltered after these two exercise regimens. Conclusion: Both HIIT and MICT interventions effectively managed T2DM in women, regardless of exercise intensity. The HIIT regimen can be considered for time-efficient lifestyle interventions in people with T2DM.

Nakata, Akimi, Satoshi Osuka, Tomoya Ishida, Yuki Saito, Mina Samukawa, Satoshi Kasahara, Yuta Koshino, Naoki Oikawa, and Harukazu Tohyama (2024). "Trunk Muscle Activity and Ratio of Local Muscle to Global Muscle Activity during Supine Bridge Exercises under Unstable Conditions in Young Participants with and without Chronic Low Back Pain" Healthcare 12, no. 5: 514. https://doi.org/10.3390/healthcare12050514

ABSTRACT

Core exercises on an unstable surface increase trunk muscle activity, especially for local muscle groups. Therefore, there is a possibility that exercises on an unstable surface would be effective in the rehabilitation of non-specific chronic low back pain (NSCLBP). The present study assessed trunk muscle activities during bridge exercise on the floor and two kinds of unstable surfaces, i.e., a balance ball and the BOSU, for individuals with and without NSCLBP. This study enrolled 17 and 18 young participants with and without NSCLBP, respectively. In the balance ball condition, both groups showed a significant increase in erector spinae activity compared to the floor condition, and the increase in activity was significantly greater in the NSCLBP group than in the control group (p = 0.038). On the other hand, neither group showed significant changes in trunk muscle activities in the BOSU condition compared to those in the floor condition. The control group showed a significant increase in internal oblique/transversus abdominis activity under the balance ball condition (p = 0.020), whereas there were no significant changes in these muscle activities between the balance ball and floor conditions in the NSCLBP group. The present study showed that participants with NSCLBP significantly increased muscle activity of the erector spinae, one of the global back muscles, on the balance ball in spite of small effects on muscle activity of the internal oblique/transversus abdominis, which is one of the local abdominal muscles. Therefore, attention should be paid to the application of bridge exercises on the balance ball for individuals with NSCLBP.

Taylor, E.M., Cadwallader, C.J., Curtin, D. et al (2024). High-intensity acute exercise impacts motor learning in healthy older adults. npj Sci. Learn. 9, 9. https://doi.org/10.1038/s41539-024-00220-2

ABSTRACT

Healthy aging is associated with changes in motor sequence learning, with some studies indicating decline in motor skill learning in older age. Acute cardiorespiratory exercise has emerged as a potential intervention to improve motor learning, however research in healthy older adults is limited. The current study investigated the impact of high-intensity interval exercise (HIIT) on a subsequent sequential motor learning task. Twenty-four older adults (aged 55-75 years) completed either 20-minutes of cycling, or an equivalent period of active rest before practicing a sequential force grip task. Skill learning was assessed during acquisition and at a 6-hour retention test. In contrast to expectation, exercise was associated with reduced

accuracy during skill acquisition compared to rest, particularly for the oldest participants. However, improvements in motor skill were retained in the exercise condition, while a reduction in skill was observed following rest. Our findings indicate that high-intensity exercise conducted immediately prior to learning a novel motor skill may have a negative impact on motor performance during learning in older adults. We also demonstrated that exercise may facilitate early offline consolidation of a motor skill within this population, which has implications for motor rehabilitation.

Huang, CY., Hsieh, MS., Hsieh, PC. et al (2024). Pulmonary rehabilitation improves exercise capacity, health-related quality of life, and cardiopulmonary function in patients with non-small cell lung cancer. BMC Cancer 24, 211. https://doi.org/10.1186/s12885-024-11977-5

ABSTRACT

Background: Lung cancer significantly impairs exercise capacity and health-related quality of life (HRQL). Pulmonary rehabilitation (PR) has demonstrated positive effects on exercise capacity and HRQL in lung cancer patients. However, its impact on cardiopulmonary function needs further exploration. The aim of this study was to explore the effects of PR on cardiopulmonary function, exercise capacity and HRQL in patients with lung cancer. Methods Patients with lung cancer were enrolled in a 12-week PR program. Each participant underwent a thorough evaluation, which included spirometry, cardiopulmonary exercise testing, respiratory muscle strength test, and evaluation of HRQL using the Chronic Obstructive Pulmonary Disease Assessment Test (CAT). Results Fifty-six patients completed the PR program. Following PR, exercise capacity significantly improved, as evidenced by increased peak oxygen uptake and work rate (both $p < 0.05$). Exertional symptoms were notably reduced, including leg soreness and dyspnea at peak exercise, accompanied by a decrease in the CAT score (all $p < 0.05$). Furthermore, improvements in cardiopulmonary function were observed, encompassing respiratory muscle strength, ventilatory equivalent, tidal volume, stroke volume index, and cardiac index at peak exercise (all $p < 0.05$). Conclusions PR demonstrated notable enhancements in cardiopulmonary function, exertional symptoms, exercise capacity, and HRQL in patients with lung cancer.

Lin, Q., Zhao, Q., Xiao, Q. et al (2024). Cardiopulmonary exercise test combined with red blood cell distribution width to predict cardiovascular complication of thoracic surgery. Sci Rep 14, 3782. https://doi.org/10.1038/s41598-024-54220-8

ABSTRACT

Cardiovascular complications in patients undergoing thoracic surgery, which physicians have a limited ability to predict, are often unavoidable and resulting in adverse outcome. Cardiopulmonary exercise testing (CPET), the gold standard of cardiopulmonary function evaluation, has also been proved to be a

preoperative risk assessment tool. Meanwhile, elevated red blood cell distribution width (RDW) has surged as a biochemical marker in the occurrence of cardiovascular disease. However, it is yet unclear the value of CPET combined with RDW in predicting cardiovascular complications after thoracic surgery. 50 patients with cardiovascular complications after thoracic surgery were collected as the case group, and 100 thoracic surgery patients were recruited as the control group, with the same gender, age +/- 2 years old, and no postoperative complications. After admission, all patients underwent CPET and RDW inspection before surgery, and the results were recorded. The CPET parameter oxygen pulse (VO2/HR) and RDW of the case group were lower than those of the control group (P < 0.05), and the ventilation/carbon dioxide production (VE/VCO2 slope) was significantly higher than control group (P < 0.01). The biochemical parameters hemoglobin (Hb) and Glomerular filtration rate (GFR)) of the case group were lower than those of the control group (P < 0.05), the homocysteine (hCY), creatinine (Cr), operation time and blood loss of the case group were higher than those of the control group (P < 0.05). The RDW had a negative correlation with VO2 max in both overall and control group. The combination of VO2/kg and RDW had the highest diagnostic value in predicting cardiovascular complications. The combination of VO2/kg and RDW has predictive diagnostic value and is more suitable for predicting postoperative complications of thoracic surgery.

Bennell, K.L., Keating, C., Lawford, B. et al (2024). Effectiveness of a telehealth-delivered clinician-supported exercise and weight loss program for hip osteoarthritis – protocol for the Better Hip randomised controlled trial. BMC Musculoskelet Disord 25, 138. https://doi.org/10.1186/s12891-023-07131-0

ABSTRACT

Background: Hip osteoarthritis (OA) is a leading cause of chronic pain and disability worldwide. Self-management is vital with education, exercise and weight loss core recommended treatments. However, evidence-practice gaps exist, and service models that increase patient accessibility to clinicians who can support lifestyle management are needed. The primary aim of this study is to determine the effectiveness of a telehealth-delivered clinician-supported exercise and weight loss program (Better Hip) on the primary outcomes of hip pain on walking and physical function at 6 months, compared with an information-only control for people with hip OA. Methods: A two-arm, parallel-design, superiority pragmatic randomised controlled trial. 212 members from a health insurance fund aged 45 years and over, with painful hip OA will be recruited. Participants will be randomly allocated to receive: i) Better Hip; or ii) web-based information only (control). Participants randomised to the Better Hip program will have six videoconferencing physiotherapist consultations for education about OA, prescription of individualised home-based strengthening and physical activity programs, behaviour change support, and facilitation of other self-management strategies. Those with a body mass index > 27 kg/m(2), aged < 80 years and no

specific health conditions, will also be offered six videoconferencing dietitian consultations to undertake a weight loss program. Participants in the control group will be provided with similar educational information about managing hip OA via a custom website. All participants will be reassessed at 6 and 12 months. Primary outcomes are hip pain on walking and physical function. Secondary outcomes include measures of pain; hip function; weight; health-related quality of life; physical activity levels; global change in hip problem; willingness to undergo hip replacement surgery; rates of hip replacement; and use of oral pain medications. A health economic evaluation at 12 months will be conducted and reported separately. Discussion: Findings will determine whether a telehealth-delivered clinician-supported lifestyle management program including education, exercise/physical activity and, for those with overweight or obesity, weight loss, is more effective than information only in people with hip OA. Results will inform the implementation of such programs to increase access to core recommended treatments.

Stuber, J.M., Mackenbach, J.D., de Bruijn, GJ. et al (2024). Real-world nudging, pricing, and mobile physical activity coaching was insufficient to improve lifestyle behaviours and cardiometabolic health: the Supreme Nudge parallel cluster-randomised controlled supermarket trial. BMC Med 22, 52. https://doi.org/10.1186/s12916-024-03268-4

ABSTRACT

Background: Context-specific interventions may contribute to sustained behaviour change and improved health outcomes. We evaluated the real-world effects of supermarket nudging and pricing strategies and mobile physical activity coaching on diet quality, food-purchasing behaviour, walking behaviour, and cardiometabolic risk markers. Methods: This parallel cluster-randomised controlled trial included supermarkets in socially disadvantaged neighbourhoods across the Netherlands with regular shoppers aged 30-80 years. Supermarkets were randomised to receive co-created nudging and pricing strategies promoting healthier purchasing (N = 6) or not (N = 6). Nudges targeted 9% of supermarket products and pricing strategies 3%. Subsequently, participants were individually randomised to a control (step counter app) or intervention arm (step counter and mobile coaching app) to promote walking. The primary outcome was the average change in diet quality (low (0) to high (150)) over all follow-up time points measured with a validated 40-item food frequency questionnaire at baseline and 3, 6, and 12 months. Secondary outcomes included healthier food purchasing (loyalty card-derived), daily step count (step counter app), cardiometabolic risk markers (lipid profile and HbA1c via finger prick, and waist circumference via measuring tape), and supermarket customer satisfaction (questionnaire-based: very unsatisfied (1) to very satisfied (7)), evaluated using linear mixed-models. Healthy supermarket sales (an exploratory outcome) were analysed via controlled interrupted time series analyses. Results of 361 participants (162 intervention, 199 control), 73% were female, the average age was 58 (SD 11) years, and 42% were highly educated.

Compared to the control arm, the intervention arm showed no statistically significant average changes over time in diet quality (beta - 1.1 (95% CI - 3.8 to 1.7)), percentage healthy purchasing (beta 0.7 (- 2.7 to 4.0)), step count (beta - 124.0 (- 723.1 to 475.1), or any of the cardiometabolic risk markers. Participants in the intervention arm scored 0.3 points (0.1 to 0.5) higher on customer satisfaction on average over time. Supermarket-level sales were unaffected (beta - 0.0 (- 0.0 to 0.0)).Conclusions: Co-created nudging and pricing strategies that predominantly targeted healthy products via nudges were unable to increase healthier food purchases and intake nor improve cardiometabolic health. The mobile coaching intervention did not affect step count. Governmental policy measures are needed to ensure more impactful supermarket modifications that promote healthier purchases. Trial registration Dutch Trial Register ID NL7064, 30 May 2018, https://www.onderzoekmetmensen.nl/en/trial/20990

Pinxia Wu and Yu Liu (2024).The Clinical Effects of Pharmacotherapy Combined with Blood Flow Restriction and Isometric Exercise Training in Rehabilitating Patients with Heart Failure with Reduced Ejection Fraction.Rejuvenation Research.Feb.33-40.http://doi.org/10.1089/rej.2023.0070

ABSTRACT

Heart failure with reduced ejection fraction (HFrEF) is associated with reduced cardiac function and impaired quality of life. Blood flow restriction (BFR) training is emerging as a potential adjunctive therapy. This study aimed at evaluating the efficacy of combination of BFR and isometric exercises on cardiac function, functional status, and quality of life in HFrEF patients. Totally 44 patients with HFrEF were equally divided into a control group and a combined treatment group. Both groups received standard pharmacotherapy and upper limb exercise, with the combined group also undergoing BFR and isometric exercise training. We assessed demographic and clinical characteristics, New York Heart Association (NYHA) functional classification, cardiac function parameters, serum Brain Natriuretic Peptide levels, physical capacity via the 6-minute walking test, and quality of life using the Heart Failure Questionnaire (Minnesota Living with Heart Failure Questionnaire). Post-treatment, the combined group significantly improved in NYHA classification (p = 0.012), with more patients shifting to a better class. Cardiac function improved in both groups, with the combined group showing a greater increase in mean left ventricular ejection fractions (p < 0.001), and reductions in left ventricular end-diastolic and end-systolic diameters (p < 0.05). The addition of BFR training to standard pharmacotherapy with upper limb exercise in HFrEF patients led to significant enhancements in cardiac function, functional status, and quality of life. These findings support the integration of BFR training into conventional HFrEF treatment regimens to maximize patient recovery outcomes.

Yang, H., Liu, S., Chen, J. et al (2024). Perceptions of barriers to and facilitators of exercise rehabilitation in adults with lung transplantation: a qualitative study in China. BMC Pulm Med 24, 65. https://doi.org/10.1186/s12890-024-02882-5

ABSTRACT

Background: Exercise is crucial for pulmonary rehabilitation and improving the prognosis of lung transplantation (LTx) patients. However, many LTx patients in China have low exercise tolerance and compliance, and the reasons behind these challenges have not been fully elucidated. Therefore, this qualitative research aims to identify the barriers to and facilitators of exercise rehabilitation in LTx patients. Methods: From January to July 2023, 15 stable LTx patients were recruited and participated in in-depth, semi-structured, face-to-face interviews at Henan Provincial People's Hospital. The interview transcripts were analyzed using the COM-B model and the Theoretical Domains Framework (TDF).Results: Six general themes including 19 barriers and 14 facilitators for the exercise rehabilitation of LTx patients were identified based on the COM-B model and TDF. The barriers to exercise included physical limitations, insufficient exercise endurance, lack of knowledge, and lack of motivation. The facilitators of exercise included motivation, self-efficacy, perceived significance of exercise rehabilitation, and social support. Conclusion: The study offers detailed insight into the development and implementation of exercise rehabilitation intervention strategies for LTx patients. By combining COM-B model and TDF, the study provides strong evidence that active behavior change strategies are required for LTx patients to promote their participation in exercise rehabilitation. Professional support, pulmonary rehabilitation training, behavior change technology, and digital health tools are essential for strengthening the evidence system for reporting exercise efficacy and effectiveness.

De Las Heras B, Rodrigues L, Cristini J, et al (2024). Measuring Neuroplasticity in Response to Cardiovascular Exercise in People With Stroke: A Critical Perspective. Neurorehabilitation and Neural Repair.0(0). doi:10.1177/15459683231223513

ABSTRACT

Background: Rehabilitative treatments that promote neuroplasticity are believed to improve recovery after stroke. Animal studies have shown that cardiovascular exercise (CE) promotes neuroplasticity but the effects of this intervention on the human brain and its implications for the functional recovery of patients remain unclear. The use of biomarkers has enabled the assessment of cellular and molecular events that occur in the central nervous system after brain injury. Some of these biomarkers have proven to be particularly valuable for the diagnosis of severity, prognosis of recovery, as well as for measuring the neuroplastic response to different treatments after stroke. Objectives: To provide a critical analysis on the

current evidence supporting the use of neurophysiological, neuroimaging, and blood biomarkers to assess the neuroplastic response to CE in individuals poststroke. Results: Most biomarkers used are responsive to the effects of acute and chronic CE interventions, but the response appears to be variable and is not consistently associated with functional improvements. Small sample sizes, methodological variability, incomplete information regarding patient's characteristics, inadequate standardization of training parameters, and lack of reporting of associations with functional outcomes preclude the quantification of the neuroplastic effects of CE poststroke using biomarkers. Conclusion: Consensus on the optimal biomarkers to monitor the neuroplastic response to CE is currently lacking. By addressing critical methodological issues, future studies could advance our understanding of the use of biomarkers to measure the impact of CE on neuroplasticity and functional recovery in patients with stroke.

De Las Heras B, Rodrigues L, Cristini J, et al (2024). Measuring Neuroplasticity in Response to Cardiovascular Exercise in People With Stroke: A Critical Perspective. Neurorehabilitation and Neural Repair.;0(0). doi:10.1177/15459683231223513

ABSTRACT

Background: Rehabilitative treatments that promote neuroplasticity are believed to improve recovery after stroke. Animal studies have shown that cardiovascular exercise (CE) promotes neuroplasticity but the effects of this intervention on the human brain and its implications for the functional recovery of patients remain unclear. The use of biomarkers has enabled the assessment of cellular and molecular events that occur in the central nervous system after brain injury. Some of these biomarkers have proven to be particularly valuable for the diagnosis of severity, prognosis of recovery, as well as for measuring the neuroplastic response to different treatments after stroke. Objectives: To provide a critical analysis on the current evidence supporting the use of neurophysiological, neuroimaging, and blood biomarkers to assess the neuroplastic response to CE in individuals poststroke. Results: Most biomarkers used are responsive to the effects of acute and chronic CE interventions, but the response appears to be variable and is not consistently associated with functional improvements. Small sample sizes, methodological variability, incomplete information regarding patient's characteristics, inadequate standardization of training parameters, and lack of reporting of associations with functional outcomes preclude the quantification of the neuroplastic effects of CE poststroke using biomarkers. Conclusion: Consensus on the optimal biomarkers to monitor the neuroplastic response to CE is currently lacking. By addressing critical methodological issues, future studies could advance our understanding of the use of biomarkers to measure the impact of CE on neuroplasticity and functional recovery in patients with stroke.

Elnaggar, R.K., Osailan, A.M., Elbanna, M.F. et al (2024). Effectiveness of a dose-graded aerobic exercise regimen on cardiopulmonary fitness and physical performance in pediatric survivors of acute lymphoblastic leukemia: a randomized clinical trial. J Cancer Surviv. https://doi.org/10.1007/s11764-024-01534-1

ABSTRACT

Purpose: To determine whether a 12-week supervised dose-graded aerobic exercise (D-GAE) training, when implemented in conjunction with traditional rehabilitation, could help pediatric survivors of acute lymphoblastic leukemia (ALL) enhance their cardiopulmonary capacity and improve their physical performance. Methods: Fifty-eight pediatric survivors of ALL (age 13.78 +/- 2.47 years; boys 60.34%) were assigned at random to either undergo the D-GAE in addition to the traditional physical rehabilitation (D-GAE group; n = 29) or the traditional physical rehabilitation solely (control group; n = 29). The cardiopulmonary fitness (peak oxygen uptake (VO_2peak), ventilatory equivalent (VEq/VO_2), minute ventilation (V-E, L/min), oxygen pulse (O2P), maximum heart rate (HRmax), 1-min heart rate recovery (HRR1), and respiratory exchange ratio (RER)) and physical performance (6-min walk test (6-MWT), timed up and down stairs (TUDS), and 4 x 10-m shuttle run test (4 x 10mSRT)) were assessed on the pre- and post-intervention occasions. Results: The mixed-model ANOVA revealed a meaningful increase of VO_2peak (P = .002), V-E (P = .026), O2P (P = .0009), HRmax (P = .004), and HRR1 (P = .011), and reduction of VEq/VO_2 (P = .003) and RER (P = .003) in the D-GAE group compared with the control group. Besides, the analysis detected a favorable increase in the physical performance for the D-GAE group (6-MWT (P = .007), TUDS (P < .001), 4 x 10mSRT (P = .009)).Conclusion: A 12-week D-GAE program in conjunction with traditional rehabilitation holds promise in enhancing cardiopulmonary fitness and improving the physical performance of pediatric survivors of ALL. Clinicians and physical rehabilitation professionals can, therefore, integrate the D-GAE into the traditional rehabilitation protocols for such a patient population to optimize their cardiopulmonary fitness and physical function, while also facilitating a gradual transition to practice and adaption. Implications for cancer survivors: The favorable outcomes of this study bolster the inclusion of D-GAE as a crucial element in the care and rehabilitation of pediatric survivors of ALL. By embracing these findings, healthcare professionals and oncologists can contribute to mitigating the long-term cardiopulmonary and physical complications associated with cancer treatments and fostering a state of enhanced well-being and increased physical activity among survivors.

冰雪运动

　　本期冰雪运动学术研究共检索到英文相关文献233篇，研究热点主要集中在气候变化对滑雪业的影响、滑雪运动的动力学分析、滑雪运动员的运动损伤和生化指标研究以及冰雪运动装备对该运动的影响等方面。检索结果如下：1）关键词共词分析。提取关键词147个，经过数据清洗后关键词有132个，词频为2及以上的关键词有13个，累计百分比为20.55%，高频关键词为越野滑雪、单板滑雪、滑冰、气候变化、冬季旅游等，生成可视化知识图谱（见下图）。2）来源期刊分析。涉及期刊27种，其中载文2篇及以上的期刊有4种，累计百分比为34.48%，排名第一的期刊是Applied Sciences Basel（JCR学科分区Q3、Q2、Q3、Q2）和Frontiers in Sports and Actives Living。3）交叉学科分析。引用文献总计1287篇，最多的频次为3次，排在第一位的文献是：*The Training of Olympic Alpine Ski Racers*和 *A critical review of climate change risk for ski tourism*。4）学术关注度分析。文献级别用量最多的是21次，排名前三位的文献分别为：*Modernity, aesthetics, and nation re-branding in Olympics: A multimodal discourse analysis of the opening ceremony of the 2022 Beijing Winter Olympic Games*、*Semi-supervised deep learning for lithium-ion battery state-of-health estimation using dynamic discharge profiles*、*Response of organic aerosol in Beijing to emission reductions during the XXIV Olympic Winter Games*。
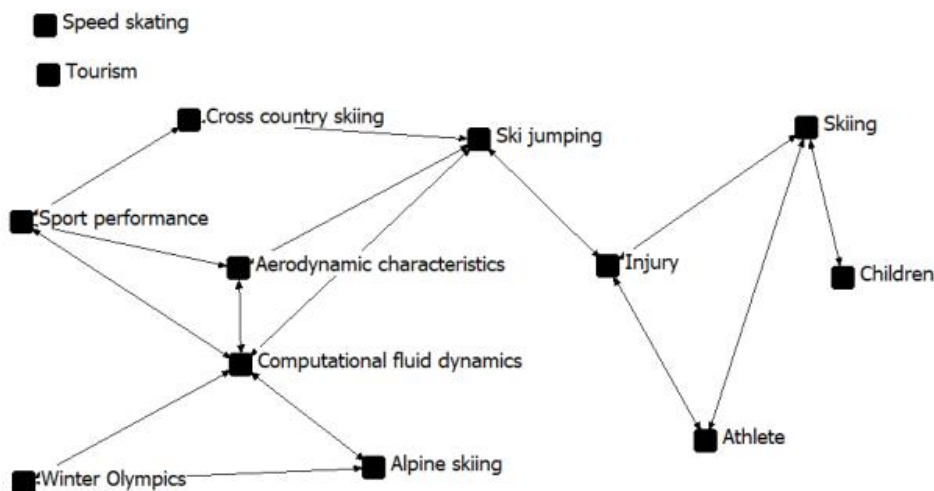
ABSTRACT

In Alpine skiing, the influence of the environment wind on the athlete is crucial. To accurately analyze the coupling effect of environment wind speed, wind direction, and the athlete's skiing process, this paper establishes the kinematic equations of the athlete based on Newtonian classical mechanics and computational fluid dynamics (CFD) and proposes a discretization method for the course. Simulation results were obtained by using CFD to obtain digital twins for the course and its surroundings. The simulation results were also used as input to the wind parameters to analyze the athletes' sliding performance. The Downhill Process in Alpine Skiing (DPAS) model was constructed to validate the actual downhill course in the Beijing Olympic Winter Games. An analytical framework for downhill skiing with way inhomogeneous winds was demonstrated to be a good simulation and validation of our analytical framework, proving its good simulatability and reliability. The downhill process is also subdivided into four phases: start-up acceleration phase, core acceleration phase, intermittent acceleration phase, and endurance sprint phase, based on the velocity-time curve derived from the actual course simulation. Tactical skiing strategies for skiers to improve their performance are proposed for the different stages of the process. We believe that the DPAS model can also be applied to other parts of Alpine skiing such as slalom, giant slalom, and super-G, and that the results can be used to suggest tactical strategies to improve performance.

ABSTRACT

With the rapid development of the Chinese ski tourism industry, there has been a surge in public enthusiasm for participating in ski tourism. However, ski tourists exhibit a low per capita skiing frequency, indicating room for improvement in their loyalty. Based on Stimulus-Organism-Reaction (SOR) theory, this study examines the impact of ski servicescape on tourist loyalty, positing that physical servicescape, social servicescape and social symbolic servicescape within the ski servicescape all exert a significant positive effect on flow experience and meaningful experience. However, natural servicescape does not demonstrate a significant effect on either flow experience or meaningful experience. Furthermore, both flow experience and meaningful experience significantly contribute to tourist loyalty. Additionally, the gender of ski tourist

moderates the relationships between ski servicescape and tourist loyalty. The present study contributes to the existing research on servicescape and tourist loyalty by providing empirical evidence from the Chinese ski market, thereby offering a theoretical foundation and methodological guidance for the design and management of ski servicescape.

Yu, Z., Liu, Y., Hao, Y., Wu, Y., Liu, Y., & Zhou, F. (2024). Wearable snow friction measurement device for cross-country skiing. Tribology International, 193, 109339. https://doi.org/10.1016/J.TRIBOINT.2024.109339

ABSTRACT

Friction on snow surface, especially in relation to winter sports, is difficult to measure directly because of its complexity and variability. In this work, a wearable snow friction measurement device for cross-country skiing was designed and constructed to calculate the friction force and monitor movement signals through the logical placement of three-component sensors and connection parts on skis. Both theoretical simulation and experiments have been conducted, which proved that the deformation of cross-country skis outputs few abnormal force signals during applying large load. Through the static validation in the laboratory, the output accuracy and stability of the device were confirmed. To verify the availability of the device, measurements on a skiing treadmill were conducted, and the results showed that the device can work well and distinguish the different friction behaviors of various waxes. More important, through the ski field test, the device was able to monitor the technical actions and evaluate the frictional coefficient of different ski waxes on snow surface comprehensively, which provides a scientific reference for athletes and coaches in routine training.

Daniel Scott & Robert Steiger (2024). How climate change is damaging the US ski industry, Current Issues in Tourism, DOI: 10.1080/13683500.2024.2314700

ABSTRACT

Since the mid-twentieth century, warming in mountain regions has outpaced the global rate, with important regional implications for snowpacks and the ski industry. Recent climate litigation by communities in the State of Colorado signals the need to assess how observed changes in climate may have damaged the ski industry. This study presents a novel application of the SkiSim2.0 ski operations model at 226 ski areas across 4 US regional ski markets to assess what the ski industry could have looked like if post-1970s anthropogenic climate change had not occurred. Relative to 1960-1979, modelled average ski seasons (with snowmaking) in the 2000-2019 period have shortened between 5.5 and 7.1 days. National direct economic losses associated with lost skier visits and increased snowmaking costs are estimated at US$252 million

annually. For the 2050s, regional ski seasons are projected to shorten between 14-33 days (low emissions) and 27-62 days (high emissions). The associated national direct economic losses range from US$657 to 1352 million annually. Climate change is an evolving business reality for the US ski industry. The economic damage already done is clear and the extent of future damages is dependent on the success of Paris Climate Agreement.

Jusa Impiö & Jim Parry (2024). Freeride skiing – the values of freedom and creativity, Journal of the Philosophy of Sport, DOI: 10.1080/00948705.2024.2308899

ABSTRACT

Freeride skiing is the fastest-growing sector of the skiing industry, but there are no studies analyzing its nature and values. First, we provide descriptions of freeride skiing and competitive freeride skiing, trying to analyzing the nature of these activities in comparison and contrast with conceptions of traditional sport and nature sport. Whilst freeride skiing must be seen in some sense as a nature sport, competitive freeride skiing is best seen within the category of traditional sport. However, these 'new' sports raise questions about the adequacy of our current categories, leading us to our second task, which was to identify and discuss the values of freeride skiing. We identify freedom and creativity as primary values, which lead to a greater rapport with nature, and a greater attention to risk, danger and safety, as concomitant values. Finally, we briefly indicate further values of the activity, such as responsibility, community and preservation of the practice.

Viciana, J., Gómez-López, P.J., Ocaña-Wilhelmi, F.J., Guijarro-Romero, S., Mayorga-Vega, D. (2024). Effect of learning to ski with an indoor skiing carpet compared to the real snow setting on alpine skiing technique, anxiety levels, and autotelic experience in university students. A pilot randomized controlled trial. International Journal of Sport Psychology, 55(1), 59-77. doi:10.7352/IJSP.2024.55.059

ABSTRACT

The aim was to compare the effects of an alpine skiing learning intervention initiated in an indoor carpet setting (ICS) with the snow setting (SS) on the alpine skiing turn technique, state of anxiety, and autotelic experience. Thirty-four students (4 females) aged 18-37 years were randomly divided into indoor carpet skiing (ICSG; first two classes in an ICS, and the two last classes in the SS) or snow (all classes in the SS) groups. Statistically significant differences were only detected in the cognitive anxiety levels between both groups for the second day of the program and in the alpine skiing turn technique at the first day of practice in the SS for both groups, in favor of the ICSG in both cases ($p < 0.05$). The ICS seems to be a useful and effective setting for learning to ski in relation to motor learning and anxiety than THE SS.

Yang, Y., Sun, X., Hu, L., Ma, Y., & Bu, H. (2024). How Ski Tourism Involvement Promotes Tourists' Low-Carbon Behavior?. Sustainability, 15(13), 10277.

ABSTRACT

China's ski tourism industry has grown tremendously in the past few years, leading to an increasing amount of tourism-related carbon emissions with negative environmental impacts. Although the government and other market participants are trying to solve the problem from both legislative and technological perspectives, encouraging tourists to engage in low-carbon behavior may play a more important role. This study aims to explore how tourism involvement influences ski tourists' low-carbon behavior. A sampling survey was conducted to collect 422 valid responses from two ski resorts (indoor and outdoor). Findings from structural equation modeling revealed a significant positive impact of tourism involvement on both low-carbon tourism behavior and low-carbon daily behavior, and this impact can be serially mediated by place attachment and environmental responsibility. In addition, we confirmed that the impact of ski tourism involvement on place attachment is more significant for outdoor ski resorts compared with indoor ones. This study expands the categories of destinations for research on ski tourism and low-carbon behavior. It provides implications for encouraging visitor pro-environmental behavior while corroborating the social value of ski tourism in addressing environmental issues. It also offers insights for government low-carbon campaigns, business management practices, and individuals with actionable attitudes. However, it is worth noting that this study was conducted in a single latitude region and did not conduct a comparative analysis with different locations across latitudes. Future research could investigate skiers in cities of different latitudes to gain a more comprehensive understanding.

Yanaka, T., Nakamura, M., Yamanobe, K., & Ishige, Y. (2024). Changes in roller skiing economy among Nordic combined athletes leading up to the competition season. Frontiers in Sports and Active Living, 6, 1320698. https://doi.org/10.3389/FSPOR.2024.1320698/BIBTEX

ABSTRACT

The purpose of this study was to compare roller skiing economy during different training phases in Nordic combined (NC) athletes and determine the aerobic and anaerobic factors responsible for changes in skiing economy. Seven elite NC athletes underwent incremental load tests on a large buried treadmill in both spring and autumn using roller skis. Measurements included oxygen uptake, respiratory exchange ratio, and blood lactate concentration. Roller skiing economy was calculated from aerobic and anaerobic energy system contributions, and overall roller skiing economy was determined by combining the two. Comparisons were made between the skiing economies obtained in the two measurement sessions. Physical characteristics and incremental test performance remained consistent between the two measurement

sessions. The overall skiing economy at each speed significantly improved toward the competition season (p < 0.05). Similarly, the contribution of anaerobic energy system at each speed showed significant improvement (p < 0.05). In contrast, the contribution of aerobic energy system did not change between the two measurement sessions. This study reveals that NC athletes enhance their skiing economy at the same speed during submaximal efforts in preparation for the competition season. This improvement is predominantly associated with an improvement in the contribution of anaerobic energy system.

Torvinen, Petra, Keijo S. Ruotsalainen, Shuang Zhao, Neil Cronin, Olli Ohtonen, and Vesa Linnamo (2024). Evaluation of 3D Markerless Motion Capture System Accuracy during Skate Skiing on a Treadmill. Bioengineering 11, no. 2: 136. https://doi.org/10.3390/bioengineering11020136

ABSTRACT

In this study, we developed a deep learning-based 3D markerless motion capture system for skate skiing on a treadmill and evaluated its accuracy against marker-based motion capture during G1 and G3 skating techniques. Participants performed roller skiing trials on a skiing treadmill. Trials were recorded with two synchronized video cameras (100 Hz). We then trained a custom model using DeepLabCut, and the skiing movements were analyzed using both DeepLabCut-based markerless motion capture and marker-based motion capture systems. We statistically compared joint centers and joint vector angles between the methods. The results demonstrated a high level of agreement for joint vector angles, with mean differences ranging from -2.47 degrees to 3.69 degrees. For joint center positions and toe placements, mean differences ranged from 24.0 to 40.8 mm. This level of accuracy suggests that our markerless approach could be useful as a skiing coaching tool. The method presents interesting opportunities for capturing and extracting value from large amounts of data without the need for markers attached to the skier and expensive cameras.

Zhang, Q., Yim, B., Kim, K. and Tian, Z (2024). The role of destination personality in the relationship between destination image and behavioral intention among ski tourists, International Journal of Sports Marketing and Sponsorship, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/IJSMS-08-2023-0170

ABSTRACT

Purpose: The aim of this study was (1) to investigate the relationship between destination image (DI), destination personality (DP) and behavioral intention (BI) in the context of ski tourism and (2) especially the role of DP in the relationship between DI and BI among ski tourists. Design/methodology/approach: We collected data using WJX.CN (N = 400) to test the hypothesized model. Confirmatory factor analysis (CFA) was used to examine the psychometric properties of the measurement model and partial least

squares structural equation modeling (PLS-SEM) was used to test the hypotheses. Findings: The results show that DI directly affects DP and partially affects BI, while DP directly affects ski tourists' BI. In addition, the indirect effect of DP between affective image and BI was significant, showing full mediation, and the indirect effect of DP between cognitive image and BI was significant, showing a partial mediation effect. Originality/value: The findings enrich the ski tourism literature, contribute to the development of ski tourism in destination cities and the strategic marketing of ski resorts and provide recommendations for ski tourism researchers and marketers.

Oronowicz, J., Seil, R., Härterer, H., Moksnes, H., Ekas, G. R., Cabri, J., Mouton, C., Frenzel, G., & Tischer, T. (2024). Anterior cruciate ligament injuries in elite ski jumping reliably allow return to competition but severely affect future top performance. Knee Surgery, Sports Traumatology, Arthroscopy, 32(3), 616–622. https://doi.org/10.1002/KSA.12076

ABSTRACT

Purpose: In recent years, anterior cruciate ligament (ACL) injuries have been frequently observed in ski jumping. However, available data in this discipline are very scarce. Therefore, the purpose of this study was to investigate whether an ACL injury in elite-level ski jumping limits the performance level after ACL reconstruction (ACLR).Methods: Both male and female elite-level ski jumpers from five national A-teams who suffered an ACL injury were identified retrospectively by searching available media reports and Federation Internationale de Ski (FIS) database. World Cup (WC) results and time-out-of-competition before ACL injury and after ACLR were compared. Only athletes who suffered the injury during or after the 2009-2010 season and who participated in at least one WC competition before the injury were included in this study. The level of athletes' performance from two full seasons before until three seasons after the injury was compared. Results: Eighteen elite-level ski jumpers (11 males/seven females) were eligible for the study. All male and four female athletes returned to professional competition after ACLR. One female athlete ended her career due to prolonged recovery and two have not yet recovered due to a recent injury. The mean return-to-competition (RTC) time was 14.6 months in males and 13.5 months in females. The mean WC placement decreased after the ACL injury: two seasons before injury the mean position was 17.9 +/- 11.0 (n = 12), one season before it was 22.4 +/- 12.8 (n = 15). After recovery, the mean placement in seasons 1-3 was: 26.4 +/- 8.9 (n = 7), 25.7 +/- 10.3 (n = 13), 33.6 +/- 12.2 (n = 10) (p = 0.008). Among the athletes returning to competition, only six males and three females reached their preinjury level and only one male and one female (compared to seven males and three females preinjury) reached an individual top-3 placement after ACLR, accounting for less than 10% of podiums compared to preinjury. Conclusion: Only 60% of the professional ski jumpers reached the preinjury level and less than 15% reached a top-3 placement after the ACL injury. These results support the fact that ACL tear during a ski jumping career

may be a significant factor limiting high-level performance. In terms of clinical relevance, the findings implicate the need to analyse the reasons of these very low rates of return to elite-level performance, to analyse ACL injury and RTC rates at lower levels of performance and to develop specific prevention strategies in order to reduce the number of ACL injuries in this sport.Level of EvidenceLevel IV.

Hu, Qi, Weidi Tang, and Yu Liu (2024). Computational Fluid Dynamics Simulation Study on Aerodynamic Characteristics under Unfavorable Conditions during Flight Phase in Ski Jumping. Applied Sciences 14, no. 4: 1390. https://doi.org/10.3390/app14041390

ABSTRACT

Objective: The stability of the flight phase in ski jumping is crucial for athletes' performance and safety. This study aims to investigate the influence of unfavorable conditions on aerodynamic characteristics and flight stability through computational fluid dynamics (CFD) numerical simulations. Methods: The ski jumper and the skis are considered a multi-body system. A detailed three-dimensional (3D) model of this multi-body system under a commonly observed posture during flight is established. The Partially Averaged Navier-Stokes (PANS) turbulence model is employed, and CFD simulations are conducted to predict the aerodynamic characteristics of the multi-body system under lateral environmental wind and asymmetric postures during the flight phase. The conditions of asymmetric postures include yaw rotation and roll rotation. Results: (1) Lateral environmental wind generated a yaw force, yaw moment, and roll moment, which influenced the lift, drag, and pitch moment of the athlete. These forces and moments were relatively small at lower wind speeds (less than 3 m/s) and became more significant at higher wind speeds (greater than 4.5 m/s). (2) Under the influence of yaw rotation or roll rotation, the multi-body system exhibited a noticeable yaw force, yaw moment, and roll moment, all showing a monotonic increasing trend. Moreover, they had a significant impact on the lift, drag, and pitch moment of the multi-body system. Conclusion: (1) The influence of unfavorable conditions was complex, resulting in a significant yaw force, yaw moment, and roll moment on the multi-body system. The adverse effects of roll rotation were generally greater than those of yaw rotation. (2) The multi-body system exhibited self-stabilizing tendencies in yaw and roll. This phenomenon can provide a solution to maintain flight stability by employing appropriate yaw or (and) roll rotation angles, effectively compensating for or even eliminating the adverse effects of lateral environmental wind. (3) Understanding the mechanisms of how unfavorable conditions affect aerodynamic characteristics and stability during flight in ski jumping can provide valuable assistance for real-time prediction and decision making during competitions, as well as scientific guidance for training athletes' stable flight control and techniques for improving their sport performance.

Kurpiers, N. (2024). Alpine Skiing with Childhood Cancer Survivors: Concept and Benefits. B&G Bewegungstherapie Und Gesundheitssport, 40(01), 25–31. https://doi.org/10.1055/A-2223-0107

ABSTRACT

Cancer is a highly malignant disease with an enormous impairment of the patients' lives, specifically in children and adolescents. Physical activity and sports have been proven to have a beneficial influence on the patients' physical, mental and social wellbeing likewise. This article introduces a specific family-oriented wintersports week as a rehabilitation project and its underlying concept which is embedded into a broader comprehension of health, coping, resilience and general wellbeing. It gives insights into the preparation and execution of the journey with regard to contents of the activities, the teaching and the logistics, but also the responsibility and the particular meaning of soft skills such as interpersonal sensitivity. Various aspects that are involved and need to be considered concerning a successful rehabilitation are partly explained and partly just mentioned with the pointer to further sources for information. The teaching way for skiing for example is a vital component in the concert with many other aspects that are part of a preparatory seminar at the University of Hildesheim for sports students that accompany this event, however, this topic is too complex to get fully covered within this article. This contribution points out different points of view on the rehabilitation activities and the effects of the whole week as such. Thus we take a look on the patients, the families, the clinic staff and also the students. Under the bottom line we can refer to many promising, helpful and in the end 'healing' aspects of this rehabilitation journey that is an interdisciplinary scientific project on the one hand (sports medicine, psychology, psychotherapy, human genetics, sports science), however, it is also still a valuable follow-up-care-project that was evaluated particularly positive by the participants over the years.

Lindblom, H., Pernett, F., Schagatay, E. et al (2024). Effect of exercise intensity and apnea on splenic contraction and hemoglobin increase in well-trained cross-country skiers. Eur J Appl Physiol. https://doi.org/10.1007/s00421-024-05428-z

ABSTRACT

The human spleen acts as a reservoir for red blood cells, which is mobilized into the systemic circulation during various conditions such as hypoxia and physical exertion. Cross-country (XC) skiers, renowned for their exceptional aerobic capacity, are regularly exposed to high-intensity exercise and local oxygen deficits. We investigated a putative dose-dependent relationship between splenic contraction and concomitant hemoglobin concentration ([Hb]) elevation across four exercise intensities in well-trained XC skiers. Fourteen male XC skiers voluntarily participated in a 2-day protocol, encompassing a serial apnea test and a VO2max test (day 1), followed by three submaximal exercise intensities on a roller skiing treadmill

corresponding to 55, 70, and 85% of VO2max (day 2). Spleen volume was measured via ultrasonic imaging, and venous blood samples were used to determine [Hb] levels. Baseline spleen volume was similar (266(35) mL) for all conditions (NS). Notably, all conditions induced significant splenic contractions and transient [Hb] elevations. The VO2max test exhibited the most pronounced splenic contraction (35.8%, p < 0.001) and a [Hb] increase of 8.1%, while the 85% exercise intensity led to 27.1% contraction and the greatest [Hb] increase (8.3%, < 0.001) compared to baseline. The apnea test induced relatively smaller responses (splenic contraction: 20.4%, [Hb] = 3.3%, p < 0.001), akin to the response observed at the 70% exercise intensity (splenic contraction = 23%, [Hb] = 6.4%, p < 0,001) and 55% (splenic contraction = 20.0%, [Hb] = 4.8%, p < 0.001). This study shows a discernible dose-dependent relationship between splenic contraction and [Hb] increase with levels of exercise, effectively distinguishing between submaximal and maximal exercise intensity.

体育工程

本期体育工程学术研究共检索到英文相关文献171篇，研究热点主要集中在人工智能的应用、可穿戴传感器、计算机智能算法等在体育方面的应用。检索结果如下：1）关键词共词分析。提取关键词515个，经过数据清洗后关键词有507个，词频为2及以上的关键词有39个，累计百分比为24.21%，高频关键词为人工智能、机器学习、体育教育、量子计算等，生成可视化知识图谱（见下图）。2）来源期刊分析。涉及期刊108种，其中载文2篇及以上的期刊有11种，累计百分比为61.11%，刊载体育工程前两位的期刊分别为：Optical and Quantum Electronics （JCR学科分区Q2、Q2、Q3），Sensors（JCR学科分区Q2、Q2、Q2）。3）交叉学科分析。引用文献总计4621篇，最多的频次为3次，并列排名第一的文献分别是：*Applying the brakes in tennis: How entry speed affects the movement and hitting kinematics of professional tennis players*、*A Systematic Review of Methods and Criteria Standard Proposal for the Use of Principal Component Analysis in Team's Sports Science*、*Low-Cost Polyanion-Type Sulfate Cathode for Sodium-Ion Battery*、*Temperature, hydrostatic pression and composition x effects on intersubband energy levels in ZnSe/ZnSxSe1-x core-shell quantum dot*、*Novel Wearable Optical Sensors for Vital Health Monitoring Systems-A Review*、*Node Connection Strength Matrix-Based Graph Convolution Network for Traffic Flow Prediction*。4）学术关注度分析。文献级别用量最多的是65次，排名前三位的文献分别为：*Porous Conductive Textiles for Wearable Electronics*、*A Flexible and Stretchable MXene/Waterborne Polyurethane Composite-Coated Fiber Strain Sensor for Wearable Motion and Healthcare Monitoring*、*Polyvinyl alcohol/chitosan based nanocomposite organohydrogel flexible wearable strain sensors for sports monitoring and underwater communication rescue*。
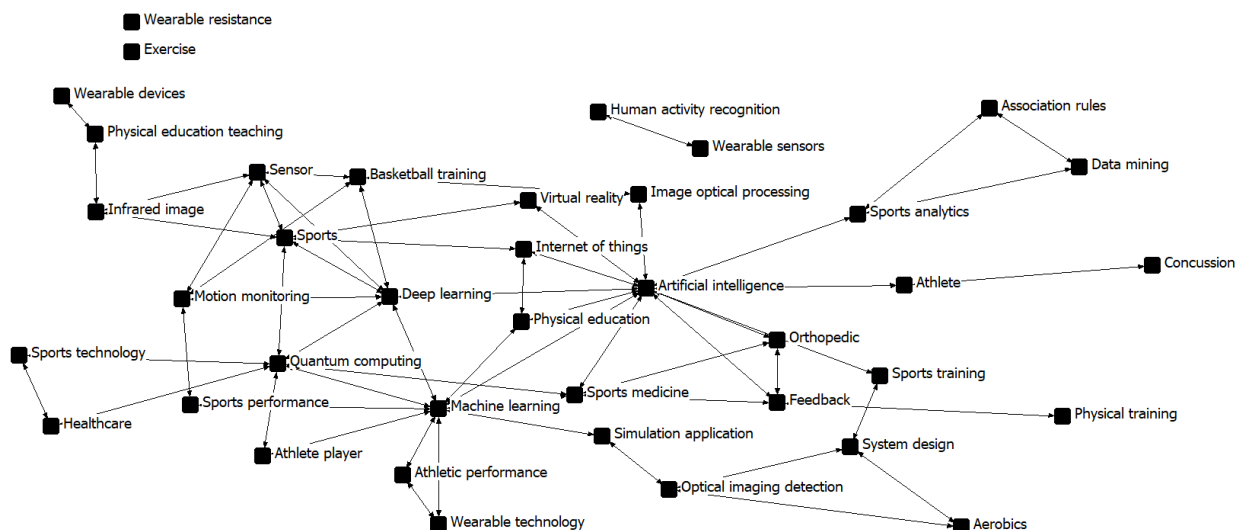
ABSTRACT

The integration of artificial intelligence (AI) technologies is evolving in different fields of cardiology and in particular in sports cardiology. Artificial intelligence offers significant opportunities to enhance risk assessment, diagnosis, treatment planning, and monitoring of athletes. This article explores the application of AI in various aspects of sports cardiology, including imaging techniques, genetic testing, and wearable devices. The use of machine learning and deep neural networks enables improved analysis and interpretation of complex datasets. However, ethical and legal dilemmas must be addressed, including informed consent, algorithmic fairness, data privacy, and intellectual property issues. The integration of AI technologies should complement the expertise of physicians, allowing for a balanced approach that optimizes patient care and outcomes. Ongoing research and collaborations are vital to harness the full potential of AI in sports cardiology and advance our management of cardiovascular health in athletes.

ABSTRACT

Precision medicine techniques pinpoint the characteristics of people with uncommon treatment outcomes or distinct medical requirements. Artificial intelligence (AI) fuels the system's ability to think and learn, generates insights through complex computing and inference, and enhances clinical decision-making through enhanced intelligence. The main advantage of AI in sports medicine is its capacity for prediction. In order to forecast possible injuries, machine learning algorithms may examine enormous volumes of data, such as an athlete's training regimen, medical history, and performance indicators. A new area of study called photonic quantum information has emerged as a result of recent advancements in technology enabling the production, control, and detection of individual single photons. Realising single photon switches, creating photonic quantum circuits with specialised uses, and using new photonic states for optical metrology that goes beyond conventional optics are some examples of this advancement. Based on the author's previous and present efforts, the current state of photonic quantum information technology is reviewed in this review paper. Sports medicine professionals will need to have a basic working

understanding of the strengths in the future, much way doctors presently need to understand the business of medicine.

Huang, J., Lv, Q. & Zeng, X (2024). Application of wearable sensors based on infrared optical imaging in mobile image processing in basketball teaching. Opt Quant Electron 56, 499. https://doi.org/10.1007/s11082-023-06148-y

ABSTRACT

The existing basketball teaching system can only capture images through the camera, and can not get the subtle movements of the players in real time. The combination of wearable sensor technology and moving image processing technology has injected new vitality into the field of sports, improved the training efficiency and level of athletes, and realized the comprehensive monitoring and analysis of sports. The aim of this research is to develop a wearable sensor based on infrared optical imaging technology for real-time capture of basketball players' movements and image processing. By embedding infrared sensors into the sports equipment of basketball players, the key movement data of the players can be obtained in real time. The collected infrared image is analyzed and recognized by image processing algorithm, and the athlete's joint position and movement trajectory are extracted. Through experimental verification, the wearable sensor proposed in this paper can capture the movement of athletes with high precision and carry out effective image processing, which has a good application prospect in basketball teaching. The system can obtain the athletes' action data in real time, and analyze and evaluate it accurately through image processing, which provides a strong support for basketball teaching.

Lingtao Wen, Zebo Qiao, Jun Mo(2024). Modern technology, artificial intelligence, machine learning and internet of things based revolution in sports by employing graph theory matrix approach[J]. AIMS Mathematics, 9(1): 1211-1226. doi: 10.3934/math.2024060

ABSTRACT

The sports industry is gaining popularity with time and all the countries are investing a lot of money for fame and entertainment around the world. To ensure the high quality of sports, modern techniques such as machine learning (ML), artificial intelligence (AI) and the Internet of Things (IoT) are playing a very optimistic role. Various IoT-grounded smart sensors are implemented with integration in AI and ML for the safety and high performance of the players. Based on the numerous applications of modern technologies, it is very convenient to capture different body movements of the players and avoid any severe injuries and long-term health issues. AI and IoT-driven smart devices are revolutionizing the analysis of athletes'

training and performance, offering precise insights for their improvement. This article delved into the remarkable strides made in scientific sports, highlighting how computer-based elements are reshaping the sports landscape for athletes and spectators alike. These innovations enable real-time health monitoring, prevent accidents, capture diverse postures and analyze sporting outcomes. By extensively reviewing existing literature, key features have been identified and prioritized. Using the graph theory matrix approach (GTMA), this piece compared and ranks available alternatives based on these selected features. Moreover, the parameter matrix and normalized matrix were reported in tabulated form and the ranks for ten paradigms are illustrated graphically for better visualization.

Tian, Z., Dong, F., Hei, X. et al (2024). Application of wearable light imaging device based on particle search algorithm in sports competition motion simulation. Opt Quant Electron 56, 408. https://doi.org/10.1007/s11082-023-05994-0

ABSTRACT

In order to solve this problem, the optical principle and particle search algorithm are combined in this paper. By understanding the principles of optics, the laws and characteristics of light propagation can be better understood. Then, combining with the optical principle, this paper puts forward a motion simulation method based on the optical principle, and carries out practice and test on it. By deeply studying the principle and characteristics of particle search algorithm, this paper applies it to the motion simulation of wearable optical imaging equipment. The existing equipment is simulated and compared with the traditional method. The experimental results show that the wearable optical imaging device based on particle search algorithm has certain advantages and effectiveness in the application of sports competition motion simulation. Compared with traditional methods, the equipment based on particle search algorithm can improve the accuracy and stability of simulation. Through this study, the advantages of the device in improving the performance of motion simulation, there is room for further improvement and application in the future. This has a positive significance for improving the training effect of sports competition and the technical level of athletes.

Biró, Attila, Antonio Ignacio Cuesta-Vargas, and László Szilágyi (2024). "AI-Assisted Fatigue and Stamina Control for Performance Sports on IMU-Generated Multivariate Times Series Datasets" Sensors 24, no. 1: 132. https://doi.org/10.3390/s24010132

ABSTRACT

Background: Optimal sports performance requires a balance between intensive training and adequate rest. IMUs provide objective, quantifiable data to analyze performance dynamics, despite the challenges in

quantifying athlete training loads. The ability of AI to analyze complex datasets brings innovation to the monitoring and optimization of athlete training cycles. Traditional techniques rely on subjective assessments to prevent overtraining, which can lead to injury and underperformance. IMUs provide objective, quantitative data on athletes' physical status during action. AI and machine learning can turn these data into useful insights, enabling data-driven athlete performance management. With IMU-generated multivariate time series data, this paper uses AI to construct a robust model for predicting fatigue and stamina. Materials and Methods: IMUs linked to 19 athletes recorded triaxial acceleration, angular velocity, and magnetic orientation throughout repeated sessions. Standardized training included steady-pace runs and fatigue-inducing techniques. The raw time series data were used to train a supervised ML model based on frequency and time-domain characteristics. The performances of Random Forest, Gradient Boosting Machines, and LSTM networks were compared. A feedback loop adjusted the model in real time based on prediction error and bias estimation. Results: The AI model demonstrated high predictive accuracy for fatigue, showing significant correlations between predicted fatigue levels and observed declines in performance. Stamina predictions enabled individualized training adjustments that were in sync with athletes' physiological thresholds. Bias correction mechanisms proved effective in minimizing systematic prediction errors. Moreover, real-time adaptations of the model led to enhanced training periodization strategies, reducing the risk of overtraining and improving overall athletic performance. Conclusions: In sports performance analytics, the AI-assisted model using IMU multivariate time series data is effective. Training can be tailored and constantly altered because the model accurately predicts fatigue and stamina. AI models can effectively forecast the beginning of weariness before any physical symptoms appear. This allows for timely interventions to prevent overtraining and potential accidents. The model shows an exceptional ability to customize training programs according to the physiological reactions of each athlete and enhance the overall training effectiveness. In addition, the study demonstrated the model's efficacy in real-time monitoring performance, improving the decision-making abilities of both coaches and athletes. The approach enables ongoing and thorough data analysis, supporting strategic planning for training and competition, resulting in optimized performance outcomes. These findings highlight the revolutionary capability of AI in sports science, offering a future where data-driven methods greatly enhance athlete training and performance management.

Yong, Z (2024). Simulation of image optical processing based on artificial intelligence in the motion adaptive adjustment system of aerobics athletes. Opt Quant Electron 56, 343. https://doi.org/10.1007/s11082-023-05925-z

ABSTRACT

Traditional coaches need to rely on experience and intuition to adjust athletes' movements and postures, which

has the problems of strong subjectivity and unstable effects. In this paper, an image optical processing method based on artificial intelligence is proposed to realize the adaptive adjustment of aerobics athletes. The research uses the image optical processing technology to collect and analyze the movement of athletes in the training process and extract the key movement parameters. Then, combined with artificial intelligence algorithm, the extracted action parameters are analyzed and compared, so as to achieve accurate evaluation and adjustment of athletes' actions. Finally, the adjustment plan is applied to the training of athletes, and through real-time monitoring and feedback mechanisms, the athletes' movements and postures are continuously adjusted and optimized. Through experiments and practical applications, the system can accurately determine the movements and postures of athletes, and provide corresponding adjustment plans based on the actual situation. Compared with traditional manual adjustments, the system has higher accuracy and stability, which can effectively improve the technical level and performance ability of athletes.

W. Du, (2024). The Computer Vision Simulation of Athlete's Wrong Actions Recognition Model Based on Artificial Intelligence. in IEEE Access, vol. 12, pp. 6560-6568, doi: 10.1109/ACCESS.2023.3349020.

ABSTRACT

At present, in basketball teaching in China, the traditional basketball training method is for coaches to communicate face-to-face with athletes, observe their basketball movements, and judge the correctness of the movements based on the coach's personal experience. However, this method mainly relies on the subjective judgment of the coach and lacks objective evaluation of athletes, making it impossible to objectively evaluate their performance. This article mainly studies an athlete's incorrect action recognition model based on artificial intelligence algorithms and computer vision, and constructs an athlete's incorrect action recognition model based on a dual channel 3D convolutional neural network (CNN). In this project, spatial attention mechanism (SA) was introduced into 3D CNN. By using inter frame difference information that can represent significant changes in athletes' motion status, and combining it with grayscale video data, accurate recognition of athletes' incorrect actions was achieved. The simulation results show that as the number of basketball technical errors increases, the recognition accuracy of this method decreases slowly. When the number of basketball technical errors reaches 400, the accuracy of action recognition is still as high as 87.552%. This indicates that this method can control the error rate within a reasonable range, improve the ability to identify basketball technical errors, and provide strong support for basketball teaching. In addition, the experimental results of this method also include various other achievements in performance calculation, further verifying its superiority in identifying basketball technical errors.

Ojha, A., Narain, S., Raj, A. et al (2024). Dynamic virtual reality horror sports enhanced by artificial intelligence and player modeling. Multimed Tools Appl. https://doi.org/10.1007/s11042-024-18414-6

ABSTRACT

Dynamic Virtual Reality (VR) has revolutionized gaming and entertainment industries by providing immersive experiences that take users to new locations. This study presents a novel and exciting idea called virtual reality horror sports, which combines aspects of horror with sports in the VR medium. We provide a novel approach to developing adaptive VR horror games by combining player modeling approaches with an adaptive means-based system that learn about each player's individual fears and adjust the game's content accordingly. This work presents two significant advances: a unique method for determining a player's specific fears via game data and machine learning methods and an adaptive game system that employs agents to monitor players' terror experiences and restrict exposure to components that they find upsetting. Additional evidence from user studies and statistical significance testing suggests that our method may boost the stress and anxiety felt by gamers, resulting in rewarding gaming experience. When VR, horror and sports are all brought together, the outcome may compel and absorbing entertainment experience. Players will be immersed in a virtual environment that is both realistic and exciting. A dynamic virtual reality horror sports experience improved by Artificial Intelligence (AI) and player modeling provide a novel and comprehensive form of entertainment by fusing physical activity, customization and immersion in a single package. An endeavor of this kind has the potential to advance state of VR and artificial intelligence in gaming while also offering exciting and memorable adventures for gamers.

Liu, J., Ren, T (2024). Economic impact of quantum sports technologies on healthcare artificial intelligence based study. Opt Quant Electron 56, 168. https://doi.org/10.1007/s11082-023-05745-1

ABSTRACT

Due to its capacity to handle data in fundamentally novel ways and produce computational powers that were previously unreachable, the multidisciplinary subject of quantum computing has recently grown quickly and attracted significant interest from both academia and business. The full impact of quantum computing on healthcare has not yet been fully explored, despite its promise. The technology makes several important security recommendations. Healthcare has issues and obligations related to data privacy, and security is a crucial component. Quantum computing and its applications have positive effects on healthcare. This tool is useful for making healthcare predictions about a person. The models of technological evolution that were used in this study show the main technological trajectories in quantum computing (QC) as well as computers as well as their rates of development, which point to ground-breaking

directions in quantum technology like quantum optics, quantum data, quantum method, quantum entanglement, quantum communication, and quantum cryptography with sports technology.

Shi, M (2024). Application of VR image technology based on near infrared spectroscopy imaging in motion analysis. Opt Quant Electron 56, 510. https://doi.org/10.1007/s11082-023-06167-9

ABSTRACT

The combination of near-infrared spectroscopy imaging and virtual reality image technology brings new opportunities to the field of motion analysis. The development of related technologies can improve the accuracy and efficiency of motion analysis, and then promote the research and application in the field of motion analysis. This study aims to explore the application potential of virtual reality image technology based on near-infrared spectral imaging in motion analysis, in order to evaluate the effectiveness and feasibility of this technology in the process of capturing and analyzing human motion. The research collects the relevant experimental data, uses the virtual reality image technology to transform these data into visual moving images, and obtains the relevant information of motion analysis by analyzing the feature parameters in the moving images. Finally, statistical methods were used to verify the results. The results show that the virtual reality image technology based on near infrared spectrum imaging shows good effect in motion analysis. By using near-infrared spectroscopy imaging, it is possible to accurately capture subtle changes in human movement and convert them into visualized images. This kind of image analysis provides a deep understanding of the movement process and can be used in many aspects such as sports performance evaluation and sports injury prediction.

de Paula Oliveira, T., Newell, J (2024). A hierarchical approach for evaluating athlete performance with an application in elite basketball. Sci Rep 14, 1717. https://doi.org/10.1038/s41598-024-51232-2

ABSTRACT

In this paper, we present the ON score for evaluating the performance of athletes and teams that includes a season-long evaluation system, a single-game evaluation, and an evaluation of an athlete's overall contribution to their team. The approach used to calculate the ON score is based on mixed-effects regression models that take into account the hierarchical structure of the data and a principal component analysis to calculate athlete rating. We apply our methodology to a large dataset of National Basketball Association (NBA) games spanning four seasons from 2015-2016 to 2018-2019. Our model is validated using two systematic approaches, and our results demonstrate the reliability of our approach to calculate an athlete's performance. This provides coaches, General Managers and player agents with a powerful tool to gain deeper insights into their players' performance, make more informed decisions and ultimately improve

team performance. Our methodology has several key advantages. First, by incorporating the hierarchical structure of the data, we can obtain valuable information about an athlete's contribution within their team. Second, the use of principal component analysis allows us to calculate a single score, the ON score, that captures the overall performance of an athlete. Third, our approach is based on classical restricted likelihood methods, which makes the calculation faster than Bayesian methods typically requiring 1000 posterior samples. With our approach, coaches and managers can evaluate athletes' performance throughout the season, compare athletes and teams over a year, and assess an athlete's performance during a single game. Our methodology can also complement other ratings and box score metrics to provide a more comprehensive assessment of an athlete's performance as our method uses the hierarchical nature of performance data (i.e. player nested within team over season) which is typically ignored in player rating systems. In summary, our methodology represents a significant contribution to the field of sports analytics and provides the foundation for future developments.

Liu, F., Hang, X (2024). Design of artificial intelligence volleyball teaching intelligent assistant system based on artificial muscle integrated optical equipment. Opt Quant Electron 56, 455. https://doi.org/10.1007/s11082-023-06243-0

ABSTRACT

With the rapid development of artificial intelligence, intelligent auxiliary systems have been widely used in various fields. As a sport, volleyball has high technical requirements, and the traditional volleyball teaching method has certain limitations. Therefore, the purpose of this study is to design an intelligent auxiliary system using artificial muscle integrated optical equipment to realize real-time monitoring and accurate evaluation of volleyball teaching, so as to assist coaches to accurately guide students' movement skills. The system uses artificial muscle integrated optical equipment, and collects the movement data of students in volleyball training in real time through optical sensors. Machine learning algorithms are used to analyze and identify the data to accurately assess the student's movements. The system is equipped with an interactive interface that shows students correct demonstrations of movements and provides real-time feedback and guidance. Through experimental verification, the intelligent assistant system can monitor students' movements in real time, accurately evaluate their technical level, and provide personalized guidance. With the aid of using the system, the volleyball technique level of students has been improved, and the teaching effect has been significantly enhanced.

反兴奋剂

本期反兴奋剂学术研究共检索到英文相关文献48篇，研究热点主要集中在兴奋剂的检测、兴奋剂相关认知、反兴奋剂的道德伦理等方面。检索结果如下：1）关键词共词分析。提取关键词185个，经过数据清洗后关键词有182个，词频为2及以上的关键词有17个，累计百分比为25.95%，高频关键词为兴奋剂、反兴奋剂、世界反兴奋剂机构、运动员等，生成可视化知识图谱（见下图）。2）来源期刊分析。涉及期刊39种，其中载文2篇及以上的期刊有5种，所载文献累计百分比为51.28%，刊载反兴奋剂研究前三位的期刊分别为：Drug testing and analysis（JCR学科分区Q3、Q2、Q3）、Molecules（JCR学科分区Q2、Q2）、 International Journal of Molecular Science（JCR学科分区Q1、Q2）、Drugs-Education Prevention and Policy（JCR学科分区Q4）。3）学科交叉分析。引用文献总计2062篇，最多的频次为3次，近三年文献中排在第一位的文献分别为*Doping Prevalence in Competitive Sport: Evidence Synthesis with "Best Practice" Recommendations and Reporting Guidelines from the WADA Working Group on Doping Prevalence*、*No pain, just gain: Painless, easy, and fast dried blood spot collection from fingertip and upper arm in doping control*、*DropWise: current role and future perspectives of dried blood spots (DBS), blood microsampling, and their analysis in sports drug testing*、*Sports drug testing and the athletes' exposome*。4）学术关注度分析。文献级别用量最多的是9次，排名前三位的文献分别为：*Ambient ionisation mass spectrometry for drug and toxin analysis: A review of the recent literature*、*A biosensor based on nanocomposite of g-C3N4 and polyaniline for detection of fentanyl as a doping agent in sports*、*Chromatographic-mass spectrometric analysis of peptidic analytes (2-10 kDa) in doping control urine samples*。
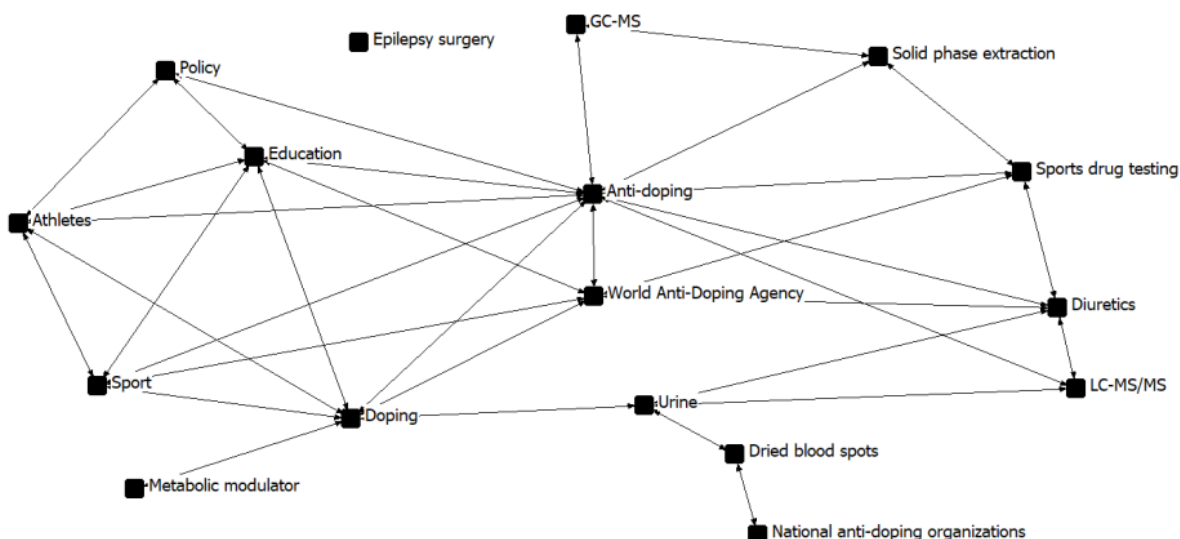
V. Filleul, F. d'Arripe-Longueville, M. Garcia, H. Bimes, E. Meinadier, J. Maillot & K. Corrion (2024). Anti-doping education interventions in athletic populations: a systematic review of their characteristics, outcomes and practical implications, International Review of Sport and Exercise Psychology, DOI: 10.1080/1750984X.2024.2306629

ABSTRACT

The World Anti-Doping Agency (WADA) has made education a central pillar of its programme. However, there is little evidence on the effectiveness of education interventions and validated guidelines are lacking. Furthermore, athletes with different levels of sport participation are affected by doping issues. This systematic review systematically analysed studies of anti-doping education interventions targeting athletic populations to identify the characteristics of effectiveness and the implications. The study followed the PRISMA guidelines with a protocol registered on PROSPERO. Data were collected via an online search of seven databases and two search engines in both English and French. The systematic review included 28 studies of 21 interventions encompassing a variety of educational strategies grounded in the literature and required by the anti-doping institutions. To be effective over time, interventions should use multifaceted approaches including values development, comprise several sessions, and be delivered by well-trained staff. However, these results should be considered with caution as the evidence of their effectiveness is questionable. By exploring the breadth of anti-doping education interventions, this review provides a clear and updated educational framework targeting a broad athletic population. It points to the urgent need to consolidate the assessment of intervention effectiveness.

Lorenz Fiege & Pawel Zembura (2024). 'Athletes' participation in the National Anti-Doping Organisations of Germany and Poland: democratic governance?', International Journal of Sport Policy and Politics, 16:1, 93-115, DOI: 10.1080/19406940.2024.2306331

ABSTRACT

Athletes' participation in sports governance gains momentum at multiple levels and challenges the long-prevailing power relations in organised sport. At the same time, the sport-specific discourse on good governance extends to the field of anti-doping, following low levels of testing effectiveness, untransparent decision-making and ethical misconduct in leading anti-doping authorities. Adopting a case-oriented comparative approach between the National Anti-Doping Organisations (NADOs) of Germany (NADA) and Poland (POLADA), two consecutive data collection steps were applied in mixed-methods design to assess and compare the status quo, and to discuss the future development of athletes' participation in anti-doping through the lens of democratic processes in good governance research. First, document analysis showed important similarities and differences between the organisations' approaches to athletes'

participation. Overall, NADA implements a more democratic and transparent approach than POLADA. Second, expert interviews revealed three key issues in relation to democratic forms of athletes' participation in the two NADOs: athletes' and their representatives' (limited) personal resources and engagement (individual); an adequate degree of codification and institutionalisation of athletes' representation on NADOs' internal bodies (organisational); and NADOs' operational (in-)dependence (political/systemic). Researchers and practitioners are recommended to further examine how NADOs' control functions over athletes and athletes' participation in their decision-making can be adequately balanced as part of aspirations to foster democratic governance in these organisations.

Ian D. Boardley, Martin Chandler, Andrea Petróczi, Laurie Patterson & Susan H. Backhouse (2024). Addressing the unique needs for anti-doping and clean-sport education of para-athletes and athlete-support personnel: an international Delphi study, Drugs: Education, Prevention and Policy, DOI: 10.1080/09687637.2024.2305374

ABSTRACT

Background: There has been a lack of consideration of the specific needs of para-athletes and athlete-support personnel (ASP) when designing anti-doping and clean-sport education. To this, we developed recommendations for anti-doping and clean-sport education addressing the specific needs of these groups. Methods: The Delphi method was used. Stakeholders with relevant expertise were invited to be panel members. In Round 1, the expert panel suggested novel elements for anti-doping and clean-sport education with para-athletes and ASP. These suggestions were integrated within a survey assessing the importance of 28 potential elements. In Round 2, the expert panel completed this survey. In Round 3, panel members ranked the relative importance of each topic area rated highest in Round 2. Based on these rankings, a draft set of recommendations was created. In Round 4, panel members rated the degree to which they accepted these recommendations and the feasibility of their delivery. Results: The results of Round 2 and Round 3 were used to create education recommendations for para-athletes and ASP. In Round 4, most panel members fully accepted the para-athlete and ASP recommendations. Conclusions: Adoption and implementation of the recommendations created should lead to greater engagement, enhanced learning, and more effective education for para-athletes and ASP.

Hassanpour, Mehdi, and Amankeldi A. Salybekov. (2024). "Whispers in the Blood: Leveraging MicroRNAs for Unveiling Autologous Blood Doping in Athletes" International Journal of Molecular Sciences 25, no. 1: 249. https://doi.org/10.3390/ijms25010249

ABSTRACT

The prevalence of autologous blood transfusions (ABTs) presents a formidable challenge in maintaining fair competition in sports, as it significantly enhances hemoglobin mass and oxygen capacity. In recognizing ABT as a prohibited form of doping, the World Anti-Doping Agency (WADA) mandates stringent detection methodologies. While current methods effectively identify homologous erythrocyte transfusions, a critical gap persists in detecting autologous transfusions. The gold standard practice of longitudinally monitoring hematological markers exhibits promise but is encumbered by limitations. Despite its potential, instances of blood doping often go undetected due to the absence of definitive verification processes. Moreover, some cases remain unpenalized due to conservative athlete-sanctioning approaches. This gap underscores the imperative need for a more reliable and comprehensive detection method capable of unequivocally differentiating autologous transfusions, addressing the challenges faced in accurately identifying such prohibited practices. The development of an advanced detection methodology is crucial to uphold the integrity of anti-doping measures, effectively identifying and penalizing instances of autologous blood transfusion. This, in turn, safeguards the fairness and equality essential to competitive sports. Our review tackles this critical gap by harnessing the potential of microRNAs in ABT doping detection. We aim to summarize alterations in the total microRNA profiles of erythrocyte concentrates during storage and explore the viability of observing these changes post-transfusion. This innovative approach opens avenues for anti-doping technologies and commercialization, positioning it as a cornerstone in the ongoing fight against doping in sports and beyond. The significance of developing a robust detection method cannot be overstated, as it ensures the credibility of anti-doping efforts and promotes a level playing field for all athletes.

Bastien, K., Carsten, L., Joar, H., Jacob, B., Henrik, S., Tristan, E., Jonas, S., Francesco, B., & Raphael, F. (2024). Yearly intrasubject variability of hematological biomarkers in elite athletes for the Athlete Biological Passport. Drug Testing and Analysis. https://doi.org/10.1002/DTA.3645

ABSTRACT

Confounding factors including exercise and environments challenge the interpretation of individual Athlete Biological Passports (ABPs). This study aimed to investigate the natural variability of hematological ABP parameters over 1 year in elite athletes compared with healthy control subjects and the validity of a multiparametric model estimating plasma volume (PV) shifts to correct individual ABP thresholds. Blood

samples were collected monthly with full blood counts performed by flow cytometry (Sysmex XN analyzers) in 20 elite xc-skiers (ELITE) and 20 moderately trained controls. Individual ABP profiles were generated through Anti-Doping Administration & Management System Training, a standalone version of the ABP's adaptive model developed by the World Anti-Doping Agency. Additionally, eight serum parameters were computed as volume-sensitive biomarkers to run a multiparametric model to estimate PV. Variability in ELITE compared with controls was significantly higher for the Abnormal Blood Profile Scores (P = 0.003). Among 12 Atypical Passport Findings (ATPF) initially reported, six could be removed after correction of PV shifts with the multiparametric modeling. However, several ATPF were additionally generated (n = 19). Our study outlines a larger intraindividual variability in elite athletes, likely explained by more frequent exposure to extrinsic factors altering hematological biomarkers. PV correction for individual ABP thresholds allowed to explain most of the atypical findings while generating multiple new ATPF occurrences in the elite population. Overall, accounting for PV shifts in elite athletes was shown to be paramount in this study outlining the opportunity to consider PV variations with novel approaches when interpreting individual ABP profiles.

This study outlines a larger intraindividual variability in elite athletes for hematological biomarkers included in the Athlete Biological Passport (ABP). Increased occurrences of atypical variations in blood parameters were observed in elite athletes, likely caused by plasma volume shifts. A better assessment of confounding factors and the development of innovative approaches to estimate plasma volume variations should be pursued. image

Levernæs, M. C. S., Solheim, S. A., Broderstad, L., Zandy, E., Mørkeberg, J., & Dehnes, Y. (2024). Detection of doping substances in paired dried blood spots and urine samples collected during doping controls in Danish fitness centers. Drug Testing and Analysis. https://doi.org/10.1002/DTA.3660

ABSTRACT

The use of dried blood spot (DBS) in anti-doping can be advantageous in terms of collection, transportation, and storage compared with the traditional anti-doping testing matrices urine and venous blood. There could, nonetheless, be disadvantages such as shorter detection windows for some substances compared with urine, but real-life comparison of the detectability of prohibited substances in DBS and urine is lacking. Herein, we present a liquid chromatography-high resolution mass spectrometry (LC-HRMS)-based screening method for simultaneous detection of 19 target analytes from the doping substance categories S1-S5 in a single spot. Ninety-eight urine and upper-arm DBS (Tasso-M20) sample pairs were collected from fitness centers customers notified for doping control by Anti Doping Denmark, and three sample pairs were collected from active steroid users undergoing clinical evaluation and treatment at a Danish hospital. The analytical findings were cross compared to evaluate the applicability of the developed DBS testing menu in

terms of feasibility and analytical performance. To our knowledge, this is the first study to compare the detectability of prohibited substances in DBS and urine samples collected in a doping control setting. Twenty-seven of the urine samples and 23 DBS samples were positive, and we observed a very high concordance (95%) in the overall analytical results (i.e., positive or negative samples for both urine and DBS). Collectively, these results are very promising, and DBS seems suitable as a stand-alone matrix in doping control in fitness centers likely because of the high analyte concentration levels in these samples. We developed a feasible, sensitive, and robust method for simultaneous detection of 19 selected prohibited substances from S1 to S5 in dried blood spots (DBS) and compared the detectability of these prohibited substances in paired DBS and urine samples collected during doping controls in Danish fitness centers.

Petersen, T. S., Holmen, S. J., & Ryberg, J. (2024). AI, doping and ethics: On why increasing the effectiveness of detecting doping fraud in sport may be morally wrong. Journal of Medical Ethics. https://doi.org/10.1136/JME-2023-109721

ABSTRACT

In this article, our aim is to show why increasing the effectiveness of detecting doping fraud in sport by the use of artificial intelligence (AI) may be morally wrong. The first argument in favour of this conclusion is that using AI to make a non-ideal antidoping policy even more effective can be morally wrong. Whether the increased effectiveness is morally wrong depends on whether you believe that the current antidoping system administrated by the World Anti-Doping Agency is already morally wrong. The second argument is based on the possibility of scenarios in which a more effective AI system may be morally worse than a less effective but non-AI system. We cannot, of course, conclude that the increased effectiveness of doping detection is always morally wrong. But our point is that whether the introduction of AI to increase detection of doping fraud is a moral improvement depends on the moral plausibility of the current system and the distribution of harm that will follow from false positive and false negative errors.

Mitchell Naughton, Paul M. Salmon, Hugo A. Kerhervé & Scott McLean (2024). Applying a systems thinking lens to anti-doping: A systematic review identifying the contributory factors to doping in sport, Journal of Sports Sciences, DOI: 10.1080/02640414.2024.2306056

ABSTRACT

The use of performance enhancing substances and methods (known as "doping") in sport is an intractable issue, with current anti-doping strategies predominantly focused on the personal responsibility and strict liability of individual athletes. This is despite an emerging understanding that athletes exist as part of a broader complex sports system that includes governance, policymakers, media, sponsors, clubs, team

members, and athlete support staff, to name a few. As such, there is a need to examine the broader systemic factors that influence doping in sport. The aim of this systematic review was to identify and synthesise the factors contributing to doping and doping behaviours, attitudes, and beliefs and the extent to which this knowledge extends beyond the athlete to consider broader sports systems. The review followed PRISMA guidelines with risk of bias and study quality assessed by the Mixed Methods Appraisal Tool, and identified contributory factors synthesised and mapped onto a systems thinking-based framework. Overall, the included studies were determined to be of high quality. Support personnel, the coach, and the coach-athlete relationship represent key influences on the athletes' decisions to dope. From the evidence presented, doping is an emergent property of sport systems and represents a complex systemic problem that will require whole-of-system interventions. The implications for this and the focus of future research are discussed.

Loria, F., Breenfeldt Andersen, A., Bejder, J., Bonne, T., Grabherr, S., Kuuranne, T., Leuenberger, N., & Baastrup Nordsborg, N. (2024). mRNA biomarkers sensitive and specific to micro-dose erythropoietin treatment at sea level and altitude. Drug Testing and Analysis. https://doi.org/10.1002/DTA.3665

ABSTRACT

Recombinant human erythropoietin (rhEPO) is prohibited by the World Anti-Doping Agency. rhEPO abuse can be indirectly detected via the athlete biological passport (ABP). However, altitude exposure challenges interpretation of the ABP. This study investigated whether 5'-aminolevulinate synthase 2 (ALAS2) and carbonic anhydrase 1 (CA1) in capillary dried blood spots (DBSs) are sensitive and specific markers of rhEPO treatment at altitude. ALAS2 and CA1 expression was monitored in DBS collected weekly before, during, and after a 3-week period at sea level or altitude. Participants were randomly assigned to receive 20 IU kg bw^{-1} epoetin alpha (rhEPO) or placebo injections every second day for 3 weeks while staying at sea level (rhEPO, n = 25; placebo, n = 9) or altitude (rhEPO, n = 12; placebo, n = 27). ALAS2 and CA1 expression increased up to 300% and 200%, respectively, upon rhEPO treatment at sea-level and altitude (P-values <0.05). When a blinded investigator interpreted the results, ALAS2 and CA1 expression had a sensitivity of 92%. Altitude did not confound the interpretation. Altitude affected ALAS2 and CA1 expression less than actual ABP markers when compared between sea level and altitude results. An individual athlete passport-like approach simulation confirmed the biomarker potential of ALAS2 and CA1. ALAS2 and CA1 were sensitive and specific biomarkers of micro-dose rhEPO treatment at sea level and altitude. Altitude seemed less a confounding factor for these biomarkers, especially when they are combined. Thus, micro-dose rhEPO injections can be detected in a longitudinal blinded setting using mRNA biomarkers in DBS.

ABSTRACT

Trimetazidine (TMZ), used for treating stable angina pectoris, has garnered attention in the realm of sports due to its potential performance-enhancing properties, and the World Anti-Doping Agency (WADA) has classified TMZ on the S4 list of prohibited substances since 2014. The purpose of this narrative mini-review is to emphasize the biochemical aspects underlying the abusive use of TMZ among athletes as a metabolic modulator of cardiac energy metabolism. The myocardium's ability to adapt its energy substrate utilization between glucose and fatty acids is crucial for maintaining cardiac function under various conditions, such as rest, moderate exercise, and intense effort. TMZ acts as a partial inhibitor of fatty acid oxidation by inhibiting 3-ketoacyl-CoA thiolase (KAT), shifting energy production from long-chain fatty acids to glucose, reducing oxygen consumption, improving cardiac function, and enhancing exercise capacity. Furthermore, TMZ modulates pyruvate dehydrogenase (PDH) activity, promoting glucose oxidation while lowering lactate production, and ultimately stabilizing myocardial function. TMZs role in reducing oxidative stress is notable, as it activates antioxidant enzymes like glutathione peroxidase (GSH-Px) and superoxide dismutase (SOD). In conclusion, TMZs biochemical mechanisms make it an attractive but controversial option for athletes seeking a competitive edge.