

前言

《体育信息报导》是由北京体育大学图书馆于1998年创刊,并于2013年和首都体育学院图书馆合办的内部资料性刊物;其办刊宗旨是为各体育系统的工作者提供高质量的体育科研前沿信息。栏目涉及体教融合、体医融合、冰雪运动、体育工程、反兴奋剂主题的相关研究。《体育信息报导》十分注重文献的来源和质量,主要选自Web of Science核心合集数据库中近一季度发表的研究热点及发展前沿。

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。

《体育信息报导》每年出版四期,本期共筛选2022年1-3月文献摘要63篇,其中体教融合16篇,体医融合17篇,冰雪运动8篇,体育工程14篇,反兴奋剂8篇。

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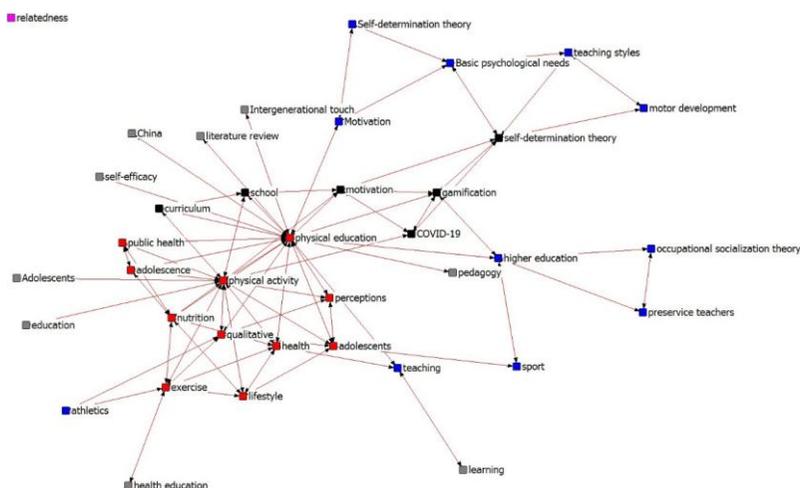
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体教融合

本期体教融合学术研究共检索到英文相关文献142篇，研究热点主要集中在体育教学模式转型、体育教师培养、体育教学内容等方面。就检索导出的数据采用书目共现分析系统（Bicomb V202007）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。检索结果如下：1）关键词共词分析。提取关键词565个，经过数据清洗后关键词有556个，词频为2及以上的关键词有39个，累计百分比为25.18%，高频关键词有体育活动、高等教育、青少年、自我决定理论、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66种，其中载文3篇及以上的期刊有13种，所载文献累计百分比为57.04%，刊载体教融合前三位的期刊分别为：Sustainability（JCR学科分区Q2、Q3），International journal of environmental research and public health（JCR学科分区Q1、Q2），Physical education and sport pedagogy（JCR学科分区Q1）。3）学科交叉分析。引用文献总计6088篇，最多的频次为6次，分别为*Self-determination theory applied to physical education: A systematic review and meta-analysis*、*Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions*。



Alfrey, L. and J. O'Connor (2022). "Transforming physical education: an analysis of context and resources that support curriculum transformation and enactment." *Physical Education and Sport Pedagogy*.

ABSTRACT

Background: This paper presents a counter-narrative to the long-held belief that Physical Education (PE) is impermeable to change. Transforming and enacting curriculum is incredibly challenging and sometimes impossible but if teachers have particular resources available to them over time, this makes 'radical reform more, rather than less likely' [Kirk, D. 2009. *Physical Education Futures*. London: Routledge]. Purpose: This paper addresses the on-going and pervasive issue of sustainable curriculum transformation and enactment in PE. More specifically, the purpose of this research is to examine the source, nature and purpose of resources that made curriculum transformation and enactment possible in one school. Data collection and analysis: As part of an exemplary case study, 7 Secondary PE teachers and one Principal from an Australian Secondary school engaged in the process of curriculum transformation and enactment. Data consisted of semi-structured individuals (3) and paired interviews (6) and field notes. We drew upon the notion of 'contextual dimensions' and 'activity layers' to support the analysis. Findings suggest that the teachers were supported by resources that spanned different contextual dimensions (situated, material, external contexts and professional culture) and layers of activity. The most valued resources identified by the teachers were (i) structural and networked support; (ii) sustained leadership; (iii) a clear vision for PE in their school; (iv) professional learning; (v) time. Conclusion: The findings suggest that while changes in policy do not necessarily prompt change in practice, particular kinds of policy are necessary if the change is to be viewed as possible and worthwhile by teachers. In this study, a layered policy landscape acted as a catalyst for the teachers to reimagine what PE could look like in their school. Moving from vision to action, it was the interplay of resources across the contextual dimensions and activity layers that the teachers drew on to support curriculum transformation and enactment.

Arteaga-Checa, M., et al. (2022). "Application of a Program to Improve Personal Development in Future Physical Education Teachers of the Degree in Education and Its Relationship with Wisdom." *Sustainability* 14(3).

ABSTRACT:

The objective of the present study was to apply an intervention program based on emotional education and self-knowledge in students of the degree in Education to verify changes in wisdom to improve their psychological health and emotional well-being. For this, Three-dimensional Wisdom Scale (3S-WS) was administered before and after the intervention, analyzing aspects related to affective, cognitive and reflective wisdom. The sample consisted of 100 students (40 men and 60 women, aged between 20 and 29 years). After the intervention program, students improved reflective wisdom without an identifiable difference between sexes. On the other hand, men had higher values in all variables than women. In conclusion, the program to improve personal development and self-awareness could be useful to improve wisdom (especially reflective wisdom) in third and fourth year students of the degree in Education specializing in Physical Education. At the same time, it is intended that these students understand the foundations of the intervention so that in the future it can be replicated in their classrooms and contribute to the sustainable development of the 2030 Agenda.

Butler, L. S., et al. (2022). "Physical Literacy in Elementary Physical Education: A Survey of Fundamental Movement Skill Practice Patterns." *Pediatric Physical Therapy* 34(1): 56-61.

ABSTRACT:

Purpose: To describe fundamental movement skill (FMS) practice patterns in the elementary physical education (PE) curriculum. Methods: A cross-sectional survey was sent to PE teachers of grades 1 through 6. Sixty-eight responses were included for analysis. Results: Only 38.2% of teachers taught all 12 FMS components. Compared

with PE teachers for grades 4 to 6, a significantly higher proportion of PE teachers for grades 1 to 3 taught all 12 FMS and used direct instruction methods. For children falling behind, only 8.8% reported referring to an exercise program and no PE teacher sought a health care referral. A video abstract can be found in Supplemental Digital Content 1 (available at: <http://links.lww.com/PPT/A342>).

Casado-Robles, C., et al. (2022). "Effect of a Sport Education-based teaching unit in Physical Education on high school students' social networks and quantitative sociometry scores: A cluster randomized control trial." *Revista De Psicodidactica* 27(1): 66-75.

ABSTRACT:

The present study aimed: (a) to examine the effect of the Sport Education-based teaching unit on students' sociometric status and quantitative relationship indices from a macro-analysis perspective (classroom-group level); and (b) to study the effect of the program on students' relationships using a quantitative and visual analysis from a micro-analysis perspective (within the Sport Education subgroup teams level) in the Physical Education setting. One hundred and sixty-five high school students (46.7% females; M-age = 14.0 +/- 1.1 years old) from six pre-established classes were cluster-randomly assigned into the experimental (n = 108) or control groups (n = 57). Both groups carried out a six-week intervention program (two Physical Education lessons a week). The experimental group followed the Sport Education model, while the control group methodology was based on direct instruction. Results of the Multilevel Linear Model showed that there were no significant differences in students' sociometric indices nor sociometric status from a macro-analysis perspective. However, the results of the McNemar's test and the visual analysis of social networks within-teams in the experimental group showed that the students' relationships changed favorably within-team after the Sport Education program increased positive nominations and reduced negative nominations. In conclusion, these results suggest that the Sport

Education model facilitates initiating new positive social relationships and removing negative relationships in within-team students.

Fernandez-Gavira, J., et al. (2022). "Development of Emotional Competencies as a Teaching Innovation for Higher Education Students of Physical Education." Sustainability 14(1).

ABSTRACT:

The objective of the work presented is to develop emotional competencies in higher-education students by following Bisquerra's five-block model. With the methodological support of adventure pedagogy and gamification, students improve their emotional competencies, as well as the basic competencies of the degree in Physical Activity and Sport Sciences and the specific ones of the subject. The proposal, which is entitled "In search of my Avatar", aims to make sure that, in their future as sports professionals, they will be able to serve their customers in a fully competent way. The work presented proposes different activities of emotional education to work transversally in higher education, ranging from conflict management and the use of language to improve the relationship with oneself and with others. The proposal was developed for the Degree in Sports Science and for the subject of Physical Activity and Sport in the Natural Environment, but with certain adaptations, it could be transferred to any university-degree subject.

Fernandez-Rio, J. and D. Iglesias (2022). "What do we know about pedagogical models in physical education so far? An umbrella review." Physical Education and Sport Pedagogy.

ABSTRACT:

Background Research on pedagogical models in physical education has exponentially increased over the last two decades [Casey, A., and D. Kirk. 2020. Models-Based

Practice in Physical Education. London: Routledge]. Moreover, several literature reviews on the effectiveness of the different pedagogical models have been conducted. Due to the large amount of research conducted on pedagogical models, there seems to be a need to organize and evaluate the existing evidence to assimilate the main ideas, produce higher-level synthesis of evidence and provide a more solid identification of strengths, weaknesses and gaps of this methodological approach. Purpose To critically examine what is currently known on pedagogical models to provide a broader and contemporary picture on their implementation conducting an umbrella review. This paper aimed to answer the following research questions: (RQ1) Which pedagogical models have been systematically reviewed? (RQ2) Which strengths have been observed? (RQ3) Which weaknesses have been perceived? (RQ4) Finally, which research gaps have been identified? Method The protocol was registered at the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) with the number 202130025 and the DOI number 10.37766/inplasy2021.3.0025. Review studies met the following inclusion criteria: (1) Peer-reviewed journal articles (Journal Citation Reports) published and written in English before 31 December 2020, (2) included participants from elementary, middle and/or high school, (3) conducted in the physical education context, and (4) interventions studies implementing one, several or combined pedagogical models. Exclusion criteria were (1) Not review studies, and (2) Not about pedagogical models' implementation. Findings and conclusion Seventeen review articles were identified, involving 22,109 students (elementary, middle, high school), 1050 teachers and 171 preservice teachers. Two hundred and nine studies involved Sport Education, 84 Games-Centred Approach, 74 Cooperative Learning, 48 Teaching Personal and Social Responsibility, and 23 hybridizations among pedagogical models. A comprehensive literature synthesis is presented on the different pedagogical models and their learning outcomes. Findings showed strong evidence supporting the effectiveness of pedagogical models' implementation to improve students' learning in the different domains (cognitive, social, physical, affective). Nevertheless, some weaknesses were also uncovered by the umbrella review: length of the implementation, time for skilful

play, struggle to implement pedagogical models, poor performance of student-coaches and model fidelity. Teachers and researchers must be aware of these weaknesses uncovered to conduct intervention programs that can really work and produce the claimed outcomes. Finally, reviews also identified several gaps in our understanding of pedagogical models: individuals with special educational needs, girls, low-skilled children, the dynamics of the peer-teaching tasks, body expression and individual sports, and what happens after the initial unit of implementation. They are all discussed to provide guidelines and future lines of research.

Fletcher, T. and M. M. Hordvik (2022). "Emotions and pedagogical change in physical education teacher education: a collaborative self-study." *Sport Education and Society*.

ABSTRACT:

Emotions are foundational to teaching and teacher education practice. They can influence all aspects of the change process, including considerations of relationships, pedagogical and curricular decisions, and organizational structures. While the study of emotions in teaching has increased since the 1990s, less explicit attention has been paid to the role of emotions in teacher education practice. Using a sociocultural perspective on emotion, the purpose of this research was to consider the emotional aspects of pedagogical change experienced by teacher educators. The context in which change occurred was the development and enactment of a blended course (i.e. using face-to-face and online formats) in one physical education teacher education program. Collaborative self-study of teacher education practice methodology guided the research design, including the processes of critical friendship, and data collection and analysis strategies. Emotions were omnipresent throughout the pedagogical change process and were expressed by both the teacher educator whose practice was being examined and the critical friend. Emotions were often experienced in contrasting ways and in tension to each other; for example, trust-distrust, and uncertainty-confidence. The explicit focus on

the emotional dimension brought to life the teacher educators' experiences, taking the analysis beyond the technical and rational implementation of decisions and offering a humanistic perspective on the pedagogical change process. The focus on emotion carries implications for policies and practices related to the ongoing professional development of teacher educators.

Hennig, L. C., et al. (2022). "Physical Health Education preservice teachers' experiences with autobiographical narrative inquiry and transformative pedagogies." *Physical Education and Sport Pedagogy*.

ABSTRACT:

Background: Issues of social justice require the understanding and intervention of teachers across all subject areas. Teachers must be positioned to uphold fairness for all individuals in their classes while considering the disparities of wealth, opportunities, and social privileges that may impact the student experience. This paper explores the challenges and benefits of choosing transformative teaching methods when preparing preservice teachers to adopt socially just teaching practices. In the study, the experiences of four student participants, shared through autobiographical narrative inquiry, help us to better understand how transformative teaching modalities might best be applied in the Physical and Health Education Teacher Education (PHETE) context to assist student understanding of, and engagement with, social justice concepts. Study aims: The purpose of the study was to (1) better understand how PHETE students experienced transformative teaching methods in the post-secondary classroom, and (2) learn about student tensions, challenges, and successes felt whilst learning through this novel approach. Methods: The study uses narrative inquiry methodology to engage with the individual and shared experiences of participants. Drawing on four preservice teachers' narratives, our study brought to life the struggles PHETE educators and students face in confronting the hardwired 'rules of school' in university contexts. Results: Strong theoretical underpinnings for our methods did not entirely liberate students from their

institutional understanding of learning and achievement. However, students did show greater critical awareness once they felt acknowledged as having individual agency. Conclusion: Our findings expose the shift in student perceptions of PHETE instruction to appreciate more reflexive methods and transformative pedagogies. They signal opportunities for larger institutional shifts, like removing rigid assessment structures which undermine the theories we're implementing.

Martinez-Rico, G., et al. (2022). "Physical Education Teachers' Perceived Digital Competences: Are They Prepared for the Challenges of the New Digital Age?" Sustainability 14(1).

ABSTRACT:

The development of information and communication technologies impose great changes that require teachers to be constantly updated. Therefore, it is interesting to analyze the Digital Competence perceived by teachers and their ability to use digital devices in the classroom. The aim of this study is to investigate the technological resources and difficulties that Physical Education teachers have in schools, in addition to the training and methodological strategies required to adequately teach Physical Education classes in present times. For this, through a previously validated survey, we will observe the Digital Competence of teachers and whether there are differences between genders, according to age and teaching experience. A survey has been undertaken by 50 Physical Education teachers of secondary school students. The results show statistically significant differences according to teaching experience and age. In addition, younger teachers have a better perception of their ability to apply Digital Competence in the Physical Education classroom setting.

Martins, J., et al. (2022). "Participation in Physical Education Classes and Health-Related Behaviours among Adolescents from 67 Countries." *International Journal of Environmental Research and Public Health* 19(2).

ABSTRACT:

The present study sought to examine the associations between participation in physical education (PE) classes and a range of health-related behaviours among adolescents. Secondary analysis of self-reported data from the Global Student Health Survey, collected between 2010 and 2017 from 222,121 adolescents (N = 117,914 girls; 49.0%; aged 13-17 years) from 67 countries and five world regions, was carried out. Participation in PE classes (0, 1-2, ≥ 3 days/week) was the independent variable. Physical activity (PA); sedentary behaviour (SB); active travel to school; fruit, vegetables, and alcohol consumption; and smoking; as well as adopting ≥ 5 of these healthy behaviours; were the dependent variables. Complex samples logistic regressions were performed to explore the associations between participation in PE classes and health-related behaviours. The results revealed that 18.2% of adolescents did not take part in PE classes. A total of 56.7% and 25.1% of adolescents reported participating in PE classes on 1-2 and ≥ 3 days/week, respectively. Only 26.8% of adolescents adopted ≥ 5 healthy behaviours. Participation in PE classes was positively associated with PA, active travel, fruit consumption, and vegetable consumption (only for ≥ 3 days/week), but was negatively associated with meeting SB recommendations, and with not smoking (only for girls and ≥ 3 days/week). Overall, PE participation was positively associated with adopting ≥ 5 healthy behaviours, with favourable results found for those who attended more PE classes. The findings revealed a positive association between participation in PE classes and a range of health-related behaviours among adolescents. This suggests that, worldwide, quality PE should be delivered at least 3 days per week up to daily to promote healthy lifestyles among adolescents.

Munoz-Llerena, A., et al. (2022). "Design of a Methodological Intervention for Developing Respect, Inclusion and Equality in Physical Education." Sustainability 14(1).

ABSTRACT:

The following educational intervention proposal arises from the importance of implementing an education based on fostering values through physical education (PE) lessons. PE has certain characteristics that contribute to enhancing learning at a social, affective and psychological level, in addition to promoting adequate physical development. The proposed design is based on Donald Hellison's personal and social responsibility model (TPSR), whose main objective is to achieve a teaching methodology that can convey values and skills in the lives of youth at risk of exclusion. Different sports modalities are used in the initiation phase, which make up a ten-week teaching unit and in which the game takes the leading role. The application of this program focuses specifically on students in compulsory secondary education, a stage in which significant changes are experienced in many aspects and levels. However, it is completely adaptable to other developmental stages. In this way, the main objective of this work is to create an intervention proposal that aims to promote, following a set of intervention units of sessions, the development of the three main values in which this work is based: respect, equality and inclusion.

Murfay, K., et al. (2022). "Examining high school student perceptions of physical education." European Physical Education Review.

ABSTRACT:

The current case study was designed to seek out incoming high school students' perceptions of physical education (PE) and how students felt former PE teachers influenced their perceptions. The study was conducted at a high school in the United States and included semi-structured focus group interviews of 25 students. The results

indicated that students have a mix of positive and negative perceptions of PE and reported that the purpose of PE was to participate in physical activity (PA) and learn how to live a healthy lifestyle through fun and meaningful experiences (theme 1). A fun and meaningful PE experience included learning how to live a healthy lifestyle, experiencing success in a variety of physical activities, and engaging socially with other peers (theme 2). The majority of students stated that their teachers controlled the factors that influenced their level of enjoyment in PE (theme 3). Students recognized that these activities and their teachers' actions influenced their interpretations of their PA experiences in PE. Students reported that these perceptions could influence their future participation in PA. Based on the results of the study, PE has the potential to provide students with positive experiences with PA that encourage individual competence over social comparison. This, combined with meaningful content that is based on PE standards and students' personal interests, can help to develop positive student perceptions of PE and increase students' participation in PA.

Navarro-Paton, R., et al. (2022). "Disruptive Behaviors in Physical Education: A Matched Study of Social Skills and Sport Practice in a Region of Spain." *International Journal of Environmental Research and Public Health* 19(3).

ABSTRACT:

Disruptive behaviors in physical education cause conflicts among students and, consequently, an abnormal development of classes. Therefore, finding the variables that can solve them is an urgent aspect to achieve an adequate learning environment in the 21st century school. The aim of this study was to analyze what happens to disruptive behaviors in relation to systematic and regulated sports and social practice in a sample of Spanish primary school students. Five hundred and forty-eight schoolchildren (276 were girls (50.4%)) participated with a mean age of 10.98 (SD = 0.71). The results show a significant main effect in terms of social skills in relatedness ($p < 0.001$), irresponsibility ($p < 0.001$), failure to follow directions ($p < 0.001$), distracting or disturbing others ($p <$

0.001), and in poor self-management ($p < 0.001$) with higher scores in disruptive behaviors in students with lower social skills. Regarding sports practice, only a significant main effect was found in relatedness ($p < 0.001$) and in poor self-management ($p < 0.001$), with the highest scores the schoolchildren who do not practice sports. Schoolchildren with high social skills obtain lower scores in disruptive behaviors. Likewise, schoolchildren who play sports have lower scores in relatedness and poor self-management.

Newman, T. J., et al. (2022). "Scholars' perspectives of positive youth development in coach education for high school sports." *Physical Education and Sport Pedagogy*.

ABSTRACT:

Background Despite the fact that research supports the positive impact coach education has on increasing the quality of athletes' developmental experiences in sport, there remains resistance regarding the use of positive youth development (PYD) content within coach education. The purpose of the current study is to explore what scholars, who are often viewed as 'experts,' believe is important to include in PYD-focused coach education for high school sport coaches. **Methods** A set of criteria, which were aligned with the study's aims, were established to identify potential participants: (a) scholars who studied PYD-focused coach education, sport-based PYD, and/or coach education; (b) scholars who published their work in peer-reviewed journals; and (c) scholars who were aware of the nature of high school sport and/or conducted research focused on this sport context. In total, of 162 scholars from around the world who were recruited, 30 completed the entire questionnaire. Specifically, data were collected using a 20-question online survey as a qualitative research tool to understand scholars' perceptions of the integration of PYD content in coach education, as well as how coaches may best learn about PYD content. **Findings** Findings highlight that scholars believe PYD-focused coach education is relevant for high school coaches and should focus on a variety of

components, including life skills, social justice, and mental health literacy. Scholars also purport that holistic athlete development may be an effective overarching framework for coach education. Further, scholars believe that coach learning should be maximized through a combination of formal, non-formal, and informal learning situations and should focus on learner-centered pedagogical strategies. Implications PYD-focused coach education should help coaches consider technical, tactical, physical, and life skill development as equally important pursuits.

Pasek, M., et al. (2022). "Environmental Knowledge of Participants' Outdoor and Indoor Physical Education Lessons as an Example of Implementing Sustainable Development Strategies." *Sustainability* 14(1).

ABSTRACT:

(1) Background: The purpose of the study was to assess the impact of physical activity outdoors in nature as part of physical education in schools on the level of knowledge and ecological attitudes. (2) Material and methods: A total of 220 students took part in the study, with 103 of them in the treatment group, which usually practiced outdoor physical education classes, and 117 in the control group, which practiced mainly indoor. The project lasted 21 months, covering the last two years of primary school. The authors used the Children's Environmental Attitude and Knowledge Scale CHEAKS in this study. The authors sought for an answer to the question of whether bringing a young person closer to nature by participating in a greater number of outdoor physical education lessons results in in-depth environmental knowledge. (3) Results: The appearance of seven statistically significant differences in ecological knowledge in the final study in favor of the group having outdoor physical education lessons proves the cognitively and visually stimulating role of a natural environment for physically active people. The location of physical education lessons turned out to be a much stronger condition for in-depth knowledge than gender, place of residence, parents' education level, and subjective assessment of the financial satisfaction level. (4) Conclusion: These results

are an incentive to further developing the young generation's contact with nature through outdoor physical education lessons.

Rojo-Ramos, J., et al. (2022). "Spanish Physical Education Teachers' Perceptions about Their Preparation for Inclusive Education." *Children-Basel* 9(1).

ABSTRACT:

The prevailing rights and quality of life approaches call for the inclusion of people with diversity and/or disabilities in society, including their participation in the educational system. Therefore, different institutions are urging countries to take action to ensure that students with disabilities receive the accommodations and supports they need within the framework of inclusive education. The idiosyncrasies of physical education (PE) classes can be an opportunity to encourage the participation and inclusion of these students. Thus, this study aims to evaluate the PE teachers' perception about their preparation to address inclusive education. The study involved 260 Spanish primary and secondary PE teachers who answered a sociodemographic questionnaire, three dichotomic questions about their initial and ongoing preparation and the Evaluation of Teacher Training for Inclusion Questionnaire (CEFI-R). PE teachers believe that they have not received the necessary initial preparation and they consider it important to assist in ongoing courses to address their students' diverse needs. PE teachers are aware of the importance of inclusive education and perceive greater difficulties in secondary education. PE teachers also showed a good predisposition to teach students with special educational support needs, especially found in primary school teachers through the CEFI-R Dimension 1, with statistically significant differences.

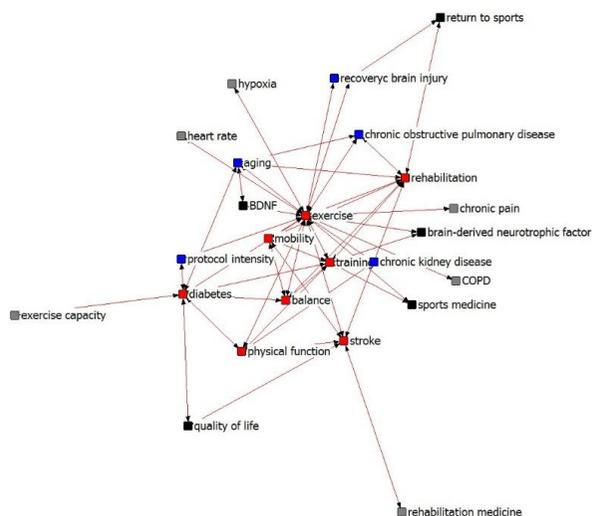
Varea, V. and M. Ohman (2022). "'Break the rules or quit the job': physical education teachers' experiences of physical contact in their teaching practice." *Sport Education and Society*.

ABSTRACT:

Physical contact between teachers and students in physical education (PE) has been a troubling, complex and unsolved issue. Research has shown that PE teachers struggle with high levels of fear, insecurity and anxiety when it comes to physical contact with students. However, most of the research conducted so far has focused on a few countries and in regard to the dominant no-touch societal discourse related to sexual connotations. Research from other countries on PE-related touch and other non-sexual physical contact topics is still missing from the literature. This paper aims to explore touch within the PE arena in Argentina and France. Data were generated with a group of eight PE teachers, four from France and four from Argentina. Results suggest that even though teachers were well aware of the widely spread discourse regarding sexual harassment, they discussed the concerns of touch in PE in different ways. Touch was considered necessary for both emotional support and the avoidance and treatment of injuries. In some cases, teachers were concerned about the admissibility of touch involving students with religious beliefs, and some acts of violence. The conclusions of this study reveal a shift in the 'risks' surrounding teacher-student physical contact, and the less-discussed presence of risks other than those related to sexual implications when considering other countries. The conclusions also revolved around the changes of PE teachers' professional subjectivities over the last few decades.

体医融合

本期体医融合学术研究共检索到英文相关文献331篇，研究热点主要集中在锻炼对糖尿病、脑卒中以及心血管相关疾病的影响；运动对身体成分以及身心健康的影响等方面。就检索导出的数据采用书目共现分析系统（Bicomb V202007）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。检索结果如下：1）关键词共词分析。提取关键词1027个，经过数据清洗后关键词有744个，词频为3及以上的关键词有28个，累计百分比为25.61%，高频关键词有锻炼、中风、康复、糖尿病、脑震荡等，生成可视化知识图谱（见下图）。2）来源期刊分析。涉及期刊159种，其中载文5篇及以上的期刊有13种，累计百分比为32%，刊载体医融合前三位的期刊分别为：Neurology（JCR学科分区Q1），International journal of environmental research and public health（JCR学科分区Q1、Q2），Brain Injury（JCR学科分区Q4、Q2）。3）交叉学科分析。引用文献总计11771篇，最多的频次为21次，其次是10次，这两篇文献分别是：*Consensus statement on concussion in sport-the 5th international conference on concussion in sport held in Berlin, October 2016*、*Guidelines for adult stroke rehabilitation and recovery a guideline for healthcare professionals from the American Heart Association/American Stroke Association*。



Abe, K., et al. (2022). "Effects of teriparatide and low-intensity aerobic exercise on osteopenia in type 2 diabetes mellitus rats." Journal of Bone and Mineral Metabolism.

ABSTRACT:

Introduction In patients with type 2 diabetes mellitus (T2DM), bone fragility increases fracture risk. Teriparatide (TPTD) improves bone strength, and exercise therapy suppresses blood glucose levels in T2DM. In this study, the combined effects of TPTD and exercise therapy on trabecular and cortical bone were examined in advanced T2DM model rats. **Materials and methods** Thirty-week-old Otsuka Long-Evans Tokushima Fatty rats were divided into four groups (n = 9-10 in each group at two time points): Cont group (vehicle-treated control), TPTD group (TPTD 30 μ g/kg injected subcutaneously, 3 times/week), Exe group (treadmill exercise, 10 m/min, 60 min/day, 5 times/week), and Comb group (TPTD-treated and treadmill exercise combined). Five and 10 weeks after treatment, bone mineral density (BMD), bone strength, and bone micro-architecture were measured. **Results** TPTD and combined treatment significantly increased BMDs of the lumbar spine and femur compared to the Cont group ($p < 0.05$ to $p < 0.01$). In the three-point bending test of the femur, only combined treatment increased the maximum load at 5 weeks compared with the Cont and Exe groups ($p < 0.01$). In the compression test of the distal femoral metaphysis, both TPTD and combined treatment increased the trabecular bone strength compared with the Cont and Exe groups ($p < 0.05$ to $p < 0.01$). Although TPTD and combined treatment improved the micro-architecture of trabecular bone ($p < 0.05$ to $p < 0.01$), only combined treatment improved the micro-structures of cortical bone from 5 weeks of treatment ($p < 0.05$ to $p < 0.01$). **Conclusion** The combination of TPTD and treadmill exercise increased BMD and trabecular and cortical bone strength of the femur with improved micro-architecture in T2DM model rats.

Casatori, L., et al. (2022). "Differential Influence of Physical Activity on Cardiopulmonary Performance and Stroke Volume Assessed at Cardiopulmonary Exercise Test in Pectus Excavatum: A Pilot Study." *Frontiers in Physiology* 13.

ABSTRACT:

Background Exercise training increases muscle VO_2 by increasing O_2 transport and O_2 uptake while cardiac output increase might be limited by the conformation of the chest in subjects with pectus excavatum (PE). **Aims** The aim of the present study was to investigate the influence of physical activity (PA) on functional parameters of cardiopulmonary performance and stroke volume obtained at Cardiopulmonary Exercise Test (CPET) in PE. **Methods and Procedures** A cohort of adolescents (15 with PE and 15 age- and sex-matched healthy controls, HC) underwent Cardiopulmonary Exercise Test (CPET) and administration of the International Physical Activity Questionnaire - Short Form (IPAQ-SF) with estimation of weekly PA ($\text{METs h}^{-1} \cdot \text{week}^{-1}$). Determinants of CPET parameters were investigated with multivariable linear regression analysis. **Results** As expected, when compared to HC, PE had lower $\text{VO}_2 \text{ max}$ (37.2 ± 6.6 vs. $45.4 \pm 6.4 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$, $p < 0.05$), and $\text{VO}_2/\text{HR max}$ (O_2 pulse, 12.1 ± 2.4 vs. $16.2 \pm 3.6 \text{ mL} \cdot \text{min}^{-1} \cdot \text{bpm}^{-1}$, $p < 0.05$). Importantly, physical activity level was a predictor of $\text{VO}_2 \text{ max}$ (adjusted for sex, body mass index, $\text{FEV}_1\%$, and presence of PE, $\beta = 0.085$; 95% CI 0.010 to 0.160, $p = 0.029$) whereas O_2 pulse was independent from PA level ($\beta = 0.035$; 95% CI -0.004 to 0.074). **Conclusion** Physical activity is a determinant of $\text{VO}_2 \text{ max}$ (cardiopulmonary performance), whereas it appears not to affect O_2 pulse (a measure of stroke volume at peak exercise) related to constrained diastolic filling in PE.

Cvetko, E. D., et al. (2022). "Effects of 8-week increment aerobic exercise program on bone metabolism and body composition in young non-athletes." *European Journal of Applied Physiology*.

ABSTRACT:

Purpose The effects of aerobic exercise on bone metabolism are still unclear. Thus, the main goal of this study was to explore if there was an effect of the short-term aerobic exercise program on the bone remodeling process and if there were sex differences in the effect of the training program on bone metabolism. **Methods** Twenty-one participants (men and women) aged 20-23 performed an 8-week aerobic exercise program three times per week in 1-h sessions with increases in the exercise load every 2 weeks. Bone density, bone mineral content and concentration of markers of bone metabolism: osteocalcin, C-terminal procollagen type I peptide, pyridinoline, parathyroid hormone, osteoprotegerin, and the receptor activator of nuclear kappa B ligand by ELISA were measured at the start and at the end of the study, while changes in body composition were assessed by a bioelectric impedance analysis method 6 times during the study. **Results** The aerobic exercise program increased the concentration of osteocalcin (11.34 vs 14.24 ng/ml), pyridinoline (67.51 vs 73.99 nmol/l), and the receptor activator of nuclear kappa B ligand (95.122 vs 158.15 pg/ml). A statistically significant increase in bone density at neck mean (1.122 vs 1.176 g/cm³) and in bone mineral content at dual femur (33.485 vs 33.700 g) was found in women, while there was no statistically significant change at any site in men. **Conclusion** 8 weeks of the aerobic exercise program with increment in intensity increased some of bone remodeling biomarkers and showed different effects for men and women.

English, M., et al. (2022). "The impact of sport and physical activity programs on the mental health and social and emotional wellbeing of young Aboriginal and Torres Strait Islander Australians: A systematic review." Preventive Medicine Reports 25.

ABSTRACT:

This review aimed to identify and assess existing evidence of the impact of sport and physical activity programs on mental health and social and emotional wellbeing outcomes within young Aboriginal and Torres Strait Islander people. The review also aimed to highlight limitations of current practice within the research area. A systematic search of literature was undertaken on three peer-reviewed databases (PsycINFO, MEDLINE and SPORTSDiscus) and grey literature from January to March 2021. Studies were included if they described a sport and physical activity program for young (10-24 years) Aboriginal and Torres Strait Islander people and reported mental health or social and emotional wellbeing outcomes. Seventeen studies were selected for this review. Within these studies, the most commonly reported outcomes were related to psychosocial development (N = 12) and a sense of connectedness (N = 12). Mental illness related outcomes (N = 1) were rarely reported, as were substance use (N = 2) and social and emotional literacy (N = 1). Promising outcomes included increased connection to culture, self-esteem and confidence. Nonetheless, due to indirectness and suboptimal study design the precise impact on these outcomes could not be determined. A relevant evidence base is emerging on the impact sport and physical activity programs have on the mental health and social and emotional wellbeing of young Aboriginal and Torres Strait Islander people. However, further research that utilises robust, culturally appropriate methodologies and tools needs to be undertaken before the effects of sport and physical activity programs can reliably be discerned.

Ferreira, A. J., et al. (2022). "Stroke survivors with the same levels of exercise as healthy individuals have lower levels of physical activity." *Neurological Sciences*.

ABSTRACT:

Background Physical activity and exercise are different constructs. However, professionals usually employ heterogeneous definitions for these distinct constructs, resulting in nonspecific and inaccurate assessments, which compromise clinical decision making. **Purpose** The aim of this study was to verify if the levels of physical activity behave similarly between individuals with stroke and healthy-control individuals with the same levels of exercise. **Methods** Seventy-five stroke survivors and 75 healthy-control individuals matched by levels of exercise, age, and sex were evaluated. The level of exercise was classified as inactive, insufficient, and moderate/vigorous according to the Centers for Disease Control and Prevention criteria. The level of physical activity was assessed with the Human Activity Profile (HAP) and classified as "inactive," "moderately active," and "active." The physical activity level was compared between groups of subjects (stroke versus healthy-control) and subgroups of the level of exercise ("inactive," "insufficient," and "moderate/vigorous" level of exercise) ($\alpha = 5\%$). **Results** Stroke survivors had a significantly lower level of physical activity (HAP: 51 +/- 22 and 71 +/- 19 points, respectively). Only for individuals with stroke, a statistically significant difference was found in the levels of physical activity between subgroups of level of exercise, specifically between "inactive" and "moderate/vigorous" subgroups (HAP:47 +/- 22 and 70 +/- 8 points, respectively). **Conclusions** Physical activity behaved differently between individuals with stroke and healthy-control individuals with the same levels of exercise. Individuals with stroke had worse physical activity levels than matched controls. Furthermore, different from individuals with stroke, in healthy-control individuals with different levels of exercise, the level of physical activity was similar.

Ferreira, S. A., et al. (2022). "Different types of physical exercise in brain activity of older adults: A systematic review." *Experimental Gerontology* 159.

ABSTRACT:

Background: To verify the effects of different modalities of physical exercise on brain activity of older adults. Methods: Systematic searches were conducted according to the PICOS strategy and the following databases were searched: PubMed, Web of Science, PsycInfo and Scielo. Two independent evaluators performed the initial selection from reading the title and abstract based on the stipulated eligibility criteria. Results: The searches resulted in 1935 titles, of which 97 were duplicated and 1793 were excluded based on reading the titles and abstracts. This phase resulted in 45 articles for detailed analysis. At this stage, 35 articles were excluded because they did not meet the eligibility criteria. The information for qualitative analysis was extracted from 10 articles that met the criteria. Conclusion: There was improvement in the brain activity of older adults regardless of the type of physical exercise performed (aerobic, neuromuscular, flexibility or neuromotor), but with a discrete advantage for balance and coordination exercises (neuromotor).

Gagnon, M.-A., et al. (2022). "Feasibility of a remotely supervised home-based group eHealth Fitness and Mobility Exercise program for stroke: French-Canadian version preliminary study." *Topics in Stroke Rehabilitation*.

ABSTRACT:

Background The numerous barriers to community-based physical activity programs have been exacerbated by the COVID-19 pandemic, especially among individuals with disabilities. eHealth programs may provide an alternative approach to address the physical activity needs of stroke survivors, but little is known about their feasibility or acceptance. Objective The aims of this study were to 1) evaluate the feasibility of a remotely supervised home-based group eHealth program called Fitness and Mobility Exercise (FAME@home); 2) explore the influence of FAME@home on physical

condition, mobility, self-efficacy, depression and anxiety; and 3) describe participants' satisfaction and experiences. Methods A pre-post pilot study was used to recruit stroke survivors (>1 y post stroke) to complete a 12-week (2 days/week) eHealth program in small groups (n = 3). Feasibility indicators were assessed for process (e.g. inclusion criteria), resources (e.g. ability to use technology), management (e.g. major challenges), and treatment (e.g. influence on clinical outcomes and adverse events). Results Nine participants were recruited with a mean (SD) of 60 (13) years of age and 7 (4) years post-stroke; eight completed the program. FAME@home was feasible for indicators of process, management, and treatment. Minor considerations to improve resources were suggested (i.e. support for technology use). There were statistically significant improvements in mobility after completion of FAME@home and 100% of the participants reported satisfaction. No adverse events occurred. Conclusion FAME@home was feasible to deliver as a remotely supervised group exercise program to community-dwelling stroke survivors, with high levels of retention and adherence. FAME@home improved accessibility to exercise and facilitated engagement by having a class schedule and social interaction.

Gu, C., et al. (2022). "Regulation of Mitochondrial Dynamics by Aerobic Exercise in Cardiovascular Diseases." *Frontiers in Cardiovascular Medicine* 8.

ABSTRACT:

Mitochondrial dynamics, including continuous biogenesis, fusion, fission, and autophagy, are crucial to maintain mitochondrial integrity, distribution, size, and function, and play an important role in cardiovascular homeostasis. Cardiovascular health improves with aerobic exercise, a well-recognized non-pharmaceutical intervention for both healthy and ill individuals that reduces overall cardiovascular disease (CVD) mortality. Increasing evidence shows that aerobic exercise can effectively regulate the coordinated circulation of mitochondrial dynamics, thus inhibiting CVD development. This review aims to illustrate the benefits of aerobic exercise in prevention and treatment of cardiovascular disease by modulating mitochondrial function.

Iwai, K., et al. (2022). "Usefulness of Aerobic Exercise for Home Blood Pressure Control in Patients with Diabetes: Randomized Crossover Trial." *Journal of Clinical Medicine* 11(3).

ABSTRACT:

Hypertension usually coexists with diabetes mellitus and significantly increases the risk of macrovascular complications. Blood pressure measured at home, especially nocturnal blood pressure, is particularly important because it is more strongly associated with target organ damage than clinical blood pressure measurements. Regular moderate aerobic exercise has been shown to have anti-hypertensive effects. This study aimed to investigate the effects of aerobic exercise on home blood pressure in patients with diabetes. This randomized crossover trial was based on outpatient treatment at a university hospital. In this randomized crossover trial, 124 patients with type 2 diabetes were randomly assigned to two groups over 56 days: an exercise preceding group (exercise intervention for 28 days and then no exercise intervention for the following 28 days) and an exercise lagging group (no exercise intervention for 28 days and then exercise intervention for the following 28 days). The associations between the nocturnal blood pressure and exercise intervention were assessed accordingly. A decrease in blood pressure was observed in the morning and evening, at 2 a.m. and 3 a.m. after exercise intervention; however, there was no significant difference between groups. Moderate exercise was not effective in lowering nocturnal blood pressure in this study.

Kang, D.-W., et al. (2022). "Exercise Cardio-Oncology: Exercise as a Potential Therapeutic Modality in the Management of Anthracycline-Induced Cardiotoxicity." *Frontiers in Cardiovascular Medicine* 8.

ABSTRACT:

Anthracyclines are one of the most effective chemotherapy agents and have revolutionized cancer therapy. However, anthracyclines can induce cardiac injuries

through 'multiple-hits', a series of cardiovascular insults coupled with lifestyle risk factors, which increase the risk of developing short- and long-term cardiac dysfunction and cardiovascular disease that potentially lead to premature mortality following cancer remission. Therefore, the management of anthracycline-induced cardiotoxicity is a serious unmet clinical need. Exercise therapy, as a non-pharmacological intervention, stimulates numerous biochemical and physiologic adaptations, including cardioprotective effects, through the cardiovascular system and cardiac muscles, where exercise has been proposed to be an effective clinical approach that can protect or reverse the cardiotoxicity from anthracyclines. Many preclinical and clinical trials demonstrate the potential impacts of exercise on cardiotoxicity; however, the underlying mechanisms as well as how to implement exercise in clinical settings to improve or protect against long-term cardiovascular disease outcomes are not clearly defined. In this review, we summarize the current evidence in the field of "exercise cardio-oncology" and emphasize the utilization of exercise to prevent and manage anthracycline-induced cardiotoxicities across high-risk and vulnerable populations diagnosed with cancer.

Leoni De Sousa, R. A. and A. C. Improta-Caria (2022). "Regulation of microRNAs in Alzheimer ' s disease, type 2 diabetes, and aerobic exercise training." *Metabolic Brain Disease* 37(3): 559-580.

ABSTRACT:

Alzheimer's disease (AD) is the most common type of dementia. The evolution and aggregation of amyloid beta (beta) oligomers is linked to insulin resistance in AD, which is also the major characteristic of type 2 diabetes (T2D). Being physically inactive can contribute to the development of AD and/or T2D. Aerobic exercise training (AET), a type of physical exercise, can be useful in preventing or treating the negative outcomes of AD and T2D. AD, T2D and AET can regulate the expression of microRNAs (miRNAs). Here, we review some of the changes in miRNAs expression regulated by AET, AD and T2D. MiRNAs play an important role in the gene regulation of key

signaling pathways in both pathologies, AD and T2D. MiRNA dysregulation is evident in AD and has been associated with several neuropathological alterations, such as the development of a reactive gliosis. Expression of miRNAs are associated with many pathophysiological mechanisms involved in T2D like insulin synthesis, insulin resistance, glucose intolerance, hyperglycemia, intracellular signaling, and lipid profile. AET regulates miRNAs levels. We identified 5 miRNAs (miR-21, miR-29a/b, miR-103, miR-107, and miR-195) that regulate gene expression and are modulated by AET on AD and T2D. The identified miRNAs are potential targets to treat the symptoms of AD and T2D. Thus, AET is a non-pharmacological tool that can be used to prevent and fight the negative outcomes in AD and T2D.

Long, J., et al. (2022). "Effects of sling exercise therapy on post-stroke walking impairment: a systematic review and meta-analysis." *International Journal of Rehabilitation Research* 45(1): 12-23.

ABSTRACT:

Walking impairment is a common consequence of stroke, resulting in long-term disability. Trunk muscle strength has been proven to be associated with post-stroke walking performance. As a type of trunk training, sling exercise therapy (SET) has been widely used to improve the trunk function in stroke patients. The purpose of this systematic review was to investigate the efficacy of SET on post-stroke walking impairment. Seven databases were systematically searched for eligible studies from their inception to 1 August 2021. Review Manager 5.3 software was used for this meta-analysis. The overall quality of included studies was evaluated by the physiotherapy evidence database scale. Twenty-five randomized controlled trials involving 1504 patients were included (23 in China and two in South Korea). In summary, SET more effectively improved the walking ability of post-stroke patients than conventional physical therapy or trunk training. The pooled analysis demonstrated that SET had positive effects on the 10 m maximum walking speed, integrated

electromyography value of rectus femoris, biceps femoris and gastrocnemius, functional ambulation category, timed up and go test, and step length. At least in East Asia, our findings support SET to manage the post-stroke walking impairment.

Mahmood, A., et al. (2022). "Development of strategies to support home-based exercise adherence after stroke: a Delphi consensus." *Bmj Open* 12(1).

ABSTRACT:

Objective: To develop a set of strategies to enhance adherence to home-based exercises after stroke, and an overarching framework to classify these strategies. **Method** We conducted a four-round Delphi consensus (two online surveys, followed by a focus group then a consensus round). The Delphi panel consisted of 13 experts from physiotherapy, occupational therapy, clinical psychology, behaviour science and community medicine. The experts were from India, Australia and UK. **Results** In round 1, a 10-item survey using open-ended questions was emailed to panel members and 75 strategies were generated. Of these, 25 strategies were included in round 2 for further consideration. A total of 64 strategies were finally included in the subsequent rounds. In round 3, the strategies were categorised into nine domains-(1) patient education on stroke and recovery, (2) method of exercise prescription, (3) feedback and supervision, (4) cognitive remediation, (5) involvement of family members, (6) involvement of society, (7) promoting self-efficacy, (8) motivational strategies and (9) reminder strategies. The consensus from 12 experts (93%) led to the development of the framework in round 4. **Conclusion** We developed a framework of comprehensive strategies to assist clinicians in supporting exercise adherence among stroke survivors. It provides practical methods that can be deployed in both research and clinical practices. Future studies should explore stakeholders' experiences and the cost-effectiveness of implementing these strategies.

Miyawaki, Y., et al. (2022). "Model-Based Analyses for the Causal Relationship Between Post-stroke Impairments and Functional Brain Connectivity Regarding the Effects of Kinesthetic Illusion Therapy Combined With Conventional Exercise." *Frontiers in Systems Neuroscience* 15.

ABSTRACT:

Aims: Therapy with kinesthetic illusion of segmental body part induced by visual stimulation (KINVIS) may allow the treatment of severe upper limb motor deficits in post-stroke patients. Herein, we investigated: (1) whether the effects of KINVIS therapy with therapeutic exercise (TherEx) on motor functions were induced through improved spasticity, (2) the relationship between resting-state functional connectivity (rs-FC) and motor functions before therapy, and (3) the baseline characteristics of rs-FC in patients with the possibility of improving their motor functions. Methods: Using data from a previous clinical trial, three path analyses in structural equation modeling were performed: (1) a mediation model in which the indirect effects of the KINVIS therapy with TherEx on motor functions through spasticity were drawn, (2) a multiple regression model with pre-test data in which spurious correlations between rs-FC and motor functions were controlled, and (3) a multiple regression model with motor function score improvements between pre- and post-test in which the pre-test rs-FC associated with motor function improvements was explored. Results: The mediation model illustrated that although KINVIS therapy with TherEx did not directly improve motor function, it improved spasticity, which led to ameliorated motor functions. The multiple regression model with pre-test data suggested that rs-FC of bilateral parietal regions is associated with finger motor functions, and that rs-FC of unaffected parietal and premotor areas is involved in shoulder/elbow motor functions. Moreover, the multiple regression model with motor function score improvements suggested that the weaker the rs-FC of bilateral parietal regions or that of the supramarginal gyrus in an affected hemisphere and the cerebellar vermis, the greater the improvement in finger motor function. Conclusion: The effects of KINVIS therapy with TherEx on upper limb motor function may be

mediated by spasticity. The rs-FC, especially that of bilateral parietal regions, might reflect potentials to improve post-stroke impairments in using KINVIS therapy with TherEx.

Nucci, M. P., et al. (2022). "Effect of Cell Therapy and Exercise Training in a Stroke Model, Considering the Cell Track by Molecular Image and Behavioral Analysis." *Cells* 11(3).

ABSTRACT:

The goal of this study is to see how combining physical activity with cell treatment impacts functional recovery in a stroke model. Molecular imaging and multimodal nanoparticles assisted in cell tracking and longitudinal monitoring (MNP). The viability of mesenchymal stem cell (MSC) was determined using a 3-[4,5-dimethylthiazol-2-yl]-2,5 diphenyl tetrazolium bromide (MTT) assay and bioluminescent image (BLI) after lentiviral transduction and MNP labeling. At random, the animals were divided into 5 groups (control-G1, and experimental G2-G5). The photothrombotic stroke induction was confirmed by local blood perfusion reduction and Triphenyltetrazolium chloride (TTC), and MSC in the G3 and G5 groups were implanted after 24 h, with BLI and near-infrared fluorescence image (NIRF) tracking these cells at 28 h, 2, 7, 14, and 28 days. During a 28-day period, the G5 also conducted physical training, whereas the G4 simply did the training. At 0, 7, 14, and 28 days, the animals were functionally tested using a cylinder test and a spontaneous motor activity test. MNP internalization in MSC was confirmed using brightfield and fluorescence microscopy. In relation to G1 group, only 3% of cell viability reduced. The G2-G5 groups showed more than 69% of blood perfusion reduction. The G5 group performed better over time, with a progressive recovery of symmetry and an increase of fast vertical movements. Up to 7 days, BLI and NIRF followed MSC at the damaged site, demonstrating a signal rise that could be connected to cell proliferation at the injury site during the acute phase of stroke. Local MSC therapy mixed with physical activity

resulted in better results in alleviating motor dysfunction, particularly during the acute period. When it comes to neurorehabilitation, this alternative therapy could be a suitable fit.

Razi, O., et al. (2022). "Aerobic training improves blood-brain barrier and neuronal apoptosis in experimental autoimmune encephalomyelitis." *Iranian Journal of Basic Medical Sciences* 25(2): 245-253.

ABSTRACT:

Objective(s): Blood-brain barrier (BBB) permeability is central in multiple sclerosis (MS) pathophysiology, and exercise may improve BBB integrity. The current study investigated the prophylactic and/ or therapeutic role of aerobic exercise (EX) training on BBB integrity in experimental autoimmune encephalomyelitis (EAE). Materials and Methods: Forty female Lewis rats were randomly divided into four groups. The experimental groups included: no-EAE induction+ no-exercise (no-EAE+ no-EX), no-EAE induction+ exercise (no-EAE+EX), EAE induction+ no-exercise (EAE+ no-EX), and EAE induction+ exercise (EAE+EX). The no-EAE+EX and EAE+EX groups performed six weeks of progressive aerobic exercise training. GFAP, angiotensin 1 (Ang-1) expression, tight-junction (TJ) proteins of claudin-5 and occludin were measured as components of BBB integrity and the rate of neuronal apoptosis was evaluated in hippocampi. Results: A significant increase in GFAP and Ang-1 expression ($P<0.001$) and conversely a down regulation in TJ proteins ($P<0.05$) was found in the brains of the no-EAE+EX group compared with the no-EAE+ no-EX group. The expression of GFAP and Ang-1 proteins significantly increased in the hippocampi of the EAE+ no-EX group ($P<0.001$), whereas aerobic training (in the EAE+EX group) meaningfully reversed such increases ($P<0.001$). Besides, down-regulated TJ proteins and increased neuronal apoptosis induced by EAE induction (EAE+ no-EX group) were restored and reduced, respectively, by aerobic training in the CNS of the EAE+EX group ($P<0.001$). Conclusion: The provision of a six-week treadmill aerobic training buffered the detrimental effects of EAE on BBB integrity and consequently neuronal apoptosis.

Vidanage, D., et al. (2022). "Impact of aerobic exercises on taste perception for sucrose in patients with type 2 diabetes mellitus; A randomized controlled trial." *Bmc Endocrine Disorders* 22(1).

ABSTRACT:

Background: Regular exercise is a key element in the management of type 2 diabetes mellitus (T2DM). Although the importance of regular exercises on glycemic control in people with diabetes is studied extensively, evidence is lacking on its impact on sweet taste perception. Thus, the aim of this study was to determine the impact of aerobic exercises on taste perception for sucrose in people with diabetes. Methods: A sample of 225 people with diabetes aged 35-60 years was assigned randomly into 3 groups; aerobic exercise, combined exercise and a control group. The outcomes of the combined exercise group is not reported. The aerobic exercise group performed brisk walking 30min/day, 4-5days/week for 6 months. The primary outcome measures were supra-threshold intensity ratings and preference for sucrose assessed at baseline, at 3 and 6 months using 'general Labeled Magnitude Scale' and 'Monell 2-series-forced choice method' respectively. Glycated haemoglobin (HbA1c) level was assessed at baseline and at 6 months to determine glycemic control. Results: Aerobic exercise group showed significantly increased ratings (mm) for higher sucrose concentrations at 3 months (mean difference for 2.02M; +6.63 +/- 2.50, p=0.048 and for 0.64M; +7.26 +/- 2.76, p=0.026) and at 6 months (mean difference for 0.64M; +7.79 +/- 4.49, p= 0.044) compared to baseline and also when compared to controls (mean difference for 2.02M between baseline and 3 months; intervention: +6.63 +/- 2.50, control: -4.01 +/- 1.79, p=0.02 and between baseline and 6 months for 2.02M; intervention: +3.15 +/- 0.57, control: -7.96 +/- 0.40, p=0.022 and for 0.64M; intervention: +7.79 +/- 4.49, control: -8.98 +/- 0.99, p=0.003). A significantly reduced preference (mol/L) was seen both at 3 (mean difference; -0.03 +/- 0.02, p= 0.037) and at 6 months (mean difference; -0.05 +/- 0.12, p=0.011) compared to baseline within the intervention group. Also, a significant reduction was seen in the intervention group compared to controls at 6 months (mean difference; intervention: -0.05 +/- 0.12, control: 0.01 +/- 0.03, p=0.044). HbA1c was significantly reduced in the intervention group compared to controls at 6 months (mean

difference; intervention $-0.43 \pm 1.6\%$, control $+0.33 \pm 1.8\%$, $p=0.018$). Conclusion: Regular aerobic exercises increase the sweet taste sensitivity, especially for higher concentrations of sucrose and decrease sweet taste preference in people with diabetes. These alterations in sweet taste perception, are likely to contribute to a better glycemic control in people with diabetes.

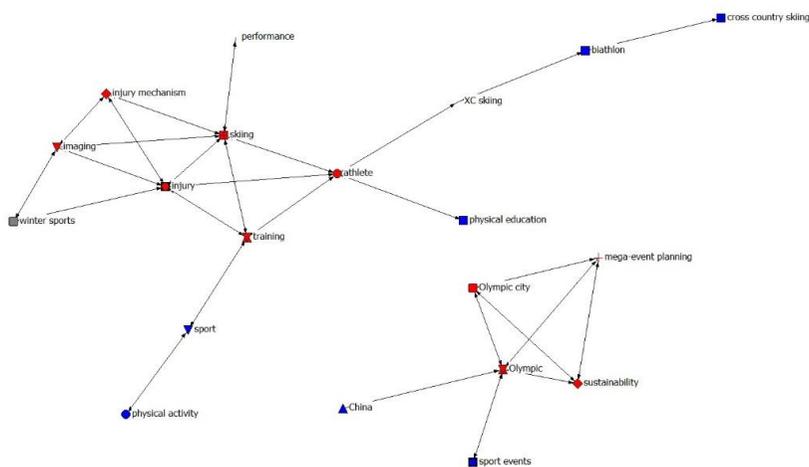
Xu, T.-Y. and L.-M. Liu (2022). "The mediating effect of self-efficacy on the relationship between hope level and rehabilitation exercise adherence among stroke patients with hemiplegia." *Acta Medica Mediterranea* 38(1): 759-765.

ABSTRACT:

Introduction: This study aimed to explore the mediating role of self-efficacy between the level of hope and rehabilitation exercise compliance in stroke patients with hemiplegia. Materials and methods: The general information questionnaire, Questionnaire of Exercise Adherence, Herth Hope Index, and Stroke Self-Efficacy Questionnaire were administered to 172 patients with hemiplegia who were admitted to the neurology and rehabilitation departments of an affiliated hospital in Zhengzhou. Results: Stroke hemiplegic patients had a total self-efficacy score of (60.10 ± 34.82) , a level of hope score of (28.65 ± 8.05) , and a functional exercise compliance score of (34.71 ± 8.45) . The total scores of self-efficacy, hope level, and rehabilitation exercise compliance and each dimension were positively correlated ($p < 0.01$). The model-fitting results showed that self-efficacy partially mediated the effect between hope level and rehabilitation exercise compliance in patients with stroke hemiplegia, with a practical value of 0.471. Conclusion: The level of hope of stroke patients with hemiplegia is a direct predictor of rehabilitation exercise compliance, but is moderated by the mediating effect of self-efficacy, which can be strengthened to increase rehabilitation exercise compliance and promote disease recovery.

冰雪运动

本期冰雪运动学术研究共检索到英文相关文献79篇，研究热点主要集中在滑雪运动器材与用品、冰雪运动损伤、运动员身体训练等方面。就检索导出的数据采用书目共现分析系统（Bicomb V202007）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。检索结果如下：1）关键词共词分析。提取关键词341个，经过数据清洗后关键词有283个，词频为2及以上的关键词有22个，累计百分比为23.46%，高频关键词有奥林匹克、滑雪、越野滑雪、损伤、体育赛事等，生成可视化知识图谱（见下图）。2）来源期刊分析。涉及期刊58种，其中载文2篇及以上的期刊有8种，累计百分比为36.7%，刊载冰雪运动前三位的期刊分别为：International journal of sports physiology and performance（JCR学科分区Q2、Q1），Journal of sport and health science（JCR学科分区Q1），Sustainability（JCR学科分区Q2、Q3）。3）交叉学科分析。引用文献总计3867篇，最多的频次为5次，频次排名前三的文献分别为Application of dGNSS in alpine ski racing: Basis for evaluating physical demands and safety、Physiological capacity and training routines of elite cross-country skiers: Approaching the upper limits of human endurance、Analysis of sprint cross-country skiing using a differential global navigation satellite system。



Bosich, D., et al. (2022). "Evolution of an Alpine Ski-Resort Distribution System Toward Microgrid." *Ieee Transactions on Industry Applications* 58(1): 152-162.

ABSTRACT:

The Alpine ski-resorts are conventionally powered by the electrical distribution network to perform the snow-making operations throughout the ski slopes. On one hand, these grids can present a low capacity, and on the other, the line lengths are not negligible due to natural obstacles and altitude changes. As a consequence, the voltage drops are remarkable when several power loads are fed by the low voltage section. Based on this aspect, a novel evolution of ski-resorts power grids toward microgrids is pursued to improve the power system quality of service and to foster the implementation of distributed energy resources (DERs). The article examines the ac electrical distribution system installed in the ski-resort of San Vito di Cadore, Italy. A preliminary power flow analysis identifies bottlenecks on voltage profiles and weights effective solutions to evolve the power grid. Four system configurations are contrasted in terms of voltage drop in order to establish the most convenient redesign. A proper voltage profile along the entire ski-resort is ensured by the last solution, which redistributes the loads powering among the five resort's substations. Finally, a techno-economical-environmental analysis explores the possibility of installing DER and storage to feed the resort loads. The study demonstrates the capability of hydropower plant in enhancing microgrid sustainability and environmental friendliness.

Dann, R. A. and V. G. Kelly (2022). "Considerations for the Physical Preparation of Freestyle Snowboarding Athletes." *Strength and Conditioning Journal* 44(1): 84-94.

ABSTRACT:

The rapid growth in trick progression for competitive snowboarding over the past 20 years has resulted in increased physical demands required from snowboarding athletes.

Despite a wealth of knowledge surrounding strength and conditioning principles for other sports, researchers are yet to address the novel strength and conditioning challenges faced by the freestyle nature of competitive snowboarding. This article, therefore, offers practitioners strategies to address the unique considerations surrounding cultural qualities, injury prevention, unstable surface training, skill acquisition, and recovery strategies for the effective implementation of strength and conditioning interventions for snowboarding athletes.

Flores, D. V., et al. (2022). "Imaging Review of Alpine Ski Injuries." *Seminars in Musculoskeletal Radiology* 26(01): 41-53.

ABSTRACT:

Skiing is a continuously evolving winter sport, responsible for a considerable number of musculoskeletal injuries. Specific injury patterns and mechanisms in the upper and lower extremities, head, and spine are influenced by skier expertise and skill, position during injury, and environmental conditions. Predilection for certain joints and injury patterns have changed over time, largely due to technological advancements in equipment, increased awareness campaigns, and preventive protocols. Knowledge and understanding of these trends and developments can aid the radiologist to reach a timely and accurate diagnosis, thereby guiding clinical management and potentially reducing the overall incidence of debilitation and death.

Jolstad, P. A. H., et al. (2022). "Validity of the AdMos, Advanced Sport Instruments, GNSS Sensor for Use in Alpine Skiing." *Remote Sensing* 14(1).

ABSTRACT:

The AdMos receiver from Advanced Sport Instruments is a global navigation satellite system (GNSS) frequently used in alpine ski racing, with users from national and professional teams. Therefore, a validation was conducted for use of the AdMos in

alpine skiing, using data from both recreational and competitive skiers. Athletes skied a total of 60 km in different measurement and skiing conditions, while carrying both an AdMos and a differential GNSS, which was used as the gold standard. From the GNSS position data, speed, acceleration, turn radius, trajectory incline and impulse were calculated as instantaneous and turn average measures for both GNSS systems and errors between the systems were calculated. The median and interquartile range (IQR) for the instantaneous errors were below 3.5 (3.5) m for horizontal plane position and below 7.0 (4.3) m for the 3D position. The median and IQR for instantaneous errors and turn average errors, respectively, were below 0.04 (0.24)/0.04 (0.16) m/s for speed, below 0.23 (1.06)/0.35 (0.63) m/s² for acceleration, below 0.47 (5.65)/0.73 (5.3) m for turn radius, and below 0.043 (1.96)/0.42 (1.42) degrees for trajectory incline. The median and IQR for turn average impulse were 0.025 (0.099) BWs. The position error changed gradually and randomly over time, with low noise levels causing smooth trajectories of similar shape but spatially shifted from the true trajectory that allowed the position-time derivation of the performance parameters, and detection of turns with 3% median and 5% IQR error. The accuracy assessment revealed that (1) the error levels were comparable to other consumer-grade standalone GNSS units designed for sport; (2) the trajectories closely resembled the true trajectories but with a random shift that changed over time and had a low noise level; (3) there was a very low instantaneous speed error that may allow the detection of many performance aspects of skiing and other sports; and (4) there were larger instantaneous errors for the remaining performance parameters, which decreased substantially when averaged over a turn.

Jones, T. W., et al. (2022). "An Analysis of Warm-Up Strategies at a Cross-Country Skiing National Championship." *International Journal of Sports Physiology and Performance* 17(1): 50-57.

ABSTRACT:

Purpose: To provide a descriptive analysis of the warm-up (WU) strategies employed by

cross-country skiers prior to distance and sprint competitions at a national championship and to compare the skiers' planned and executed WUs prior to the respective competitions. Methods: Twenty-one national- and international-level skiers (11 women and 10 men) submitted WU plans prior to the distance and sprint competitions, and after the competitions, reported any deviations from the plans. Skiers used personal monitors to record heart rate (HR) during WU, races, and cooldown. Quantitative statistical analyses were conducted on WU durations, durations in HR-derived intensity zones, and WU loads. Qualitative analyses were conducted on skiers' WU plans and their reasons for deviating from the plans. Results: Skiers' planned WUs were similar in content and planned time in HR-derived intensity zones for both the distance and sprint competitions. However, 45% of the women and 20% of the men reported that their WU was not carried out as planned, with reasons detailed as being due to incorrect intensities and running out of time. WU activities including skiing across variable terrain, muscle-potentiating exercises, and heat-maintenance strategies were missing from the skiers' planned routines. Conclusions: Skiers favored a long, traditional WU approach for both the sprint and distance events, performing less high-intensity and more moderate-intensity exercise during their WUs than planned. In addition, elements likely relevant to successful performance in cross-country skiing were missing from WU plans.

Lemos, D. F., et al. (2022). "Musculoskeletal Injuries in Cross-Country Skiing." *Seminars in Musculoskeletal Radiology* 26(01): 69-81.

ABSTRACT:

Cross-country skiing, one of the oldest forms of skiing, is enjoyed widely as a recreational activity and as a competitive sport. It is practiced in regions with snow-covered landscapes, particularly in the Nordic countries and with increasing popularity in non-Nordic countries of Europe as well as in the United States, Canada, Australia, and New Zealand, among others. Cross-country skiing is a fairly safe activity, and historically the risk of injury has been relatively low. However, advances in

equipment development, together with increasing speeds, more demanding trails, and growing numbers of participants, have all contributed to a larger report of injuries, although still comparatively low versus other skiing modalities. Injuries in cross-country skiing can occur either after a single traumatic event or in the setting of chronic repetitive microtrauma (i.e., overuse injuries).

Rizk, B., et al. (2022). "Injuries in Skating and Sledding Winter Sports: Patterns and Imaging Findings." *Seminars in Musculoskeletal Radiology* 26(01): 82-90.

ABSTRACT:

While skiing and snowboarding are amongst the most common winter sports, skating and sledding activities are also popular for competition or recreation. Related injuries following an acute trauma mainly involve head, spine, upper and lower limbs. For elite athletes, overuse injuries represent a significant burden. In skating, lesions can be related to boot structure and design. This article reviews epidemiology, patterns, and imaging findings of common injuries in ice skating, short track speed skating, curling, luge, bobsleigh, and skeleton.

Zimmermann, P., et al. (2022). "Athlete's Heart in Elite Biathlon, Nordic Cross-Country and Ski-Mountaineering Athletes: Cardiac Adaptions Determined Using Echocardiographic Data." *Journal of Cardiovascular Development and Disease* 9(1).

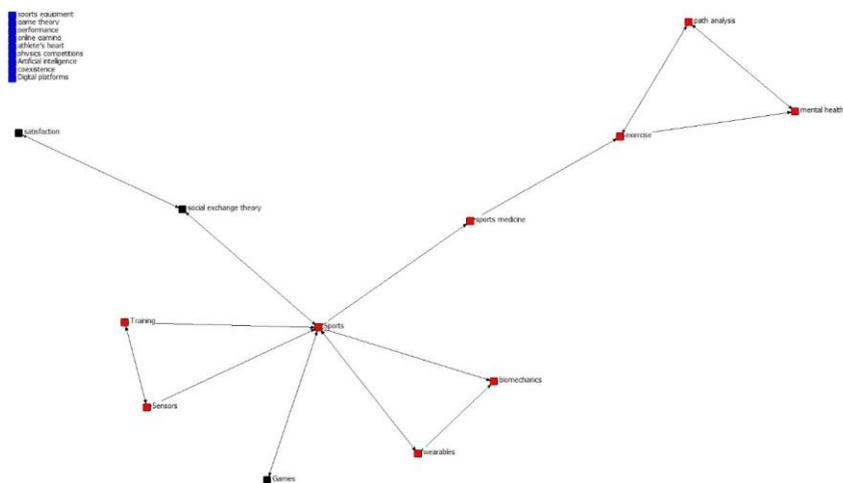
ABSTRACT:

Twelve world elite Biathlon (Bia), ten Nordic Cross Country (NCC) and ten ski-mountaineering (Ski-Mo) athletes were evaluated for pronounced echocardiographic physiological cardiac remodeling as a primary aim of our descriptive preliminary report. In this context, sports-related cardiac remodeling was analyzed by performing two-dimensional echocardiography including speckle tracking analysis as left

ventricular global longitudinal strain (LV-GLS). A multicenter retrospective analysis of echocardiographic data was performed in 32 elite world winter sports athletes, which were obtained between 2020 and 2021 during the annual medical examination. The matched data of the elite world winter sports athletes (14 women, 18 male athletes, age: 18-35 years) were compared for different echocardiographic parameters. Significant differences could be revealed for left ventricular systolic function (LV-EF, $p = 0.0001$), left ventricular mass index (LV Mass index, $p = 0.0078$), left atrial remodeling by left atrial volume index (LAVI, $p = 0.0052$), and LV-GLS ($p = 0.0003$) between the three professional winter sports disciplines. This report provides new evidence that resting measures of cardiac structure and function in elite winter sport professionals can identify sport specific remodeling of the left heart, against the background of training schedule and training frequency.

体育工程

本期体育工程学术研究共检索到英文相关文献121篇，研究热点主要集中在大数据应用、智能系统开发、计算机智能算法等方面。就检索导出的数据采用书目共现分析系统（Bicomb V202007）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。检索结果如下：1）关键词共词分析。提取关键词528个，经过数据清洗后关键词有492个，词频为2及以上的关键词有21个，累计百分比为10.8%，高频关键词有体育、体育装备、游戏理论、生物力学、人工智能等，生成可视化知识图谱（见下图）。2）来源期刊分析。涉及期刊90种，其中载文3篇及以上的期刊有8种，累计百分比为21.49%，刊载体育工程前三位的期刊分别为：Sustainability（JCR学科分区Q2、Q3），International journal of environmental research and public health（JCR学科分区Q1、Q2），Applied science-basel（JCR学科分区Q3、Q2）。3）交叉学科分析。引用文献总计5725篇，最多的频次为4次，频次排名前三位的文献分别为*A new criterion for assessing discriminant validity in variance-based structural equation modeling*、*Effect of virtual reality exercises on the cognitive status and dual motor task performance of the aging population*、*Human memory update strategy: A multi-layer template update mechanism for remote visual monitoring*。



Budig, M., et al. (2022). "Heart Rate and Distance Measurement of Two Multisport Activity Trackers and a Cellphone App in Different Sports: A Cross-Sectional Validation and Comparison Field Study." *Sensors* 22(1).

ABSTRACT:

Options for monitoring sports have been continuously developed by using activity trackers to determine almost all vital and movement parameters. The aim of this study was to validate heart rate and distance measurements of two activity trackers (Polar Ignite; Garmin Forerunner 945) and a cellphone app (Polar Beat app using iPhone 7 as a hardware platform) in a cross-sectional field study. Thirty-six moderate endurance-trained adults (20 males/16 females) completed a test battery consisting of walking and running 3 km, a 1.6 km interval run (standard 400 m outdoor stadium), 3 km forest run (outdoor), 500/1000 m swim and 4.3/31.5 km cycling tests. Heart rate was recorded via a Polar H10 chest strap and distance was controlled via a map, 400 m stadium or 50 m pool. For all tests except swimming, strong correlation values of $r > 0.90$ were calculated with moderate exercise intensity and a mean absolute percentage error of 2.85%. During the interval run, several significant deviations ($p < 0.049$) were observed. The swim disciplines showed significant differences ($p < 0.001$), with the 500 m test having a mean absolute percentage error of 8.61%, and the 1000 m test of 55.32%. In most tests, significant deviations ($p < 0.001$) were calculated for distance measurement. However, a maximum mean absolute percentage error of 4.74% and small mean absolute error based on the total route lengths were calculated. This study showed that the accuracy of heart rate measurements could be rated as good, except for rapid changing heart rate during interval training and swimming. Distance measurement differences were rated as non-relevant in practice for use in sports.

Cao, X.-z. and T. R. Gadekallu (2022). "Construction of Sports Safety Information Mining Platform Based on Multimedia Data Sharing Technology." *Mobile Networks & Applications*.

ABSTRACT:

In order to improve the effect of sports information mining effectively, a sports security information mining platform based on multimedia data sharing technology is designed. The hardware part of the platform includes teaching multimedia data sharing module, sharing server module, sharing client and Web server. In order to realize the information transmission with low time delay and low energy consumption, ZigBee technology is introduced into the software design to realize the communication function of information and complete the evaluation of mining quality. The experimental results show that the time of sports information mining is obviously shortened and the application effect of the platform is improved after the application of the mining platform designed in this study.

Duan, H., et al. (2022). "Computer Intelligent Algorithm in the Recovery of the Elbow Joint Sports Injury Model." *Journal of Healthcare Engineering* 2022.

ABSTRACT:

In this study, the inverse kinematics mathematics computer intelligent algorithm model is used to study the sports injuries of the elbow joint of adolescents. At the same time, we simulated the movement parameter changes during the rehabilitation training of the patient's wrist and proposed a joint angular velocity function based on cubic fitting. Research has found that when the training scene changes greatly or the target task is changed, the smoothness of the elbow joint movement will change. The research conclusions of this article provide a theoretical basis for the selection of man-machine action points and the formulation of rehabilitation training methods. This article establishes the degree-of-freedom simulation model of the operating arm, which is the

number of independent position variables in the operating arm, and these position variables determine the positions of all parts in the mechanism.

Hao, L. and H. M. Pandey (2022). "Research on the Positioning Technology of Sports 3D Teaching Action Based on Machine Vision." Mobile Networks & Applications.

ABSTRACT:

This paper presents a method of action location in three-dimensional motion teaching. The machine vision technology is used to solve the problems of low positioning accuracy and long positioning time in the traditional motion three-dimensional teaching method. The work of this method is as follows: (a) using machine vision method to determine the world coordinate system of the image; (b) using MRF algorithm to extract the features of 3D teaching action image; (c) determining the spatial correlation of 3D teaching action data. In the three-dimensional teaching action image, the smooth filtering technology is used to suppress and eliminate the noise. Then the convolution neural network (CNN) is used to reconstruct the three-dimensional teaching action image. The entropy of three-dimensional teaching behavior of physical education is determined by CNN. Through a large number of computer simulations, the effectiveness of the proposed system is confirmed. The results show that the system achieves 95% accuracy when the positioning time is 1.9 s.

Li, H., et al. (2022). "Automatic detection technology for sports players based on image recognition technology: the significance of big data technology in China's sports field." Annals of Operations Research.

ABSTRACT:

In this research, players are investigated physically for the actual analysis to improve the recognition of motion effects based on image recognition technology. In this paper, the

incorporation of the status of image recognition science has been tested on the athletes through image processing using artificial intelligence technology (IPAIT). Furthermore, the segmentation of gradient procedure has been validated using image segmentation techniques with big data assistance. In AIT, enhancing the traditional method of a grayscale image and obtaining the reconstructed image segmentation algorithm has been designed and developed. Furthermore, big data-assisted Gaussian background and IPAIT modeling are used to identify the target for the feature extraction of the human body and use morphological operators to deal with noise. The simulation findings demonstrate that the proposed IPAIT model enhances the recognition ratio of 98.8%, a performance ratio of 97.7%, and increases the accuracy ratio by 95.9% compared to other existing models.

Liang, S., et al. (2022). " A self-powered wearable body-detecting/brain-stimulating system for improving sports endurance performance." Nano Energy 93.

ABSTRACT:

A new self-powered wearable body-detecting/brain-stimulating system for improving sports endurance performance has been realized. This wearable system can real-time monitor body vital signs and transmit neuralstimulating signal into the brain. The whole system can work without any external electricity power and be powered by the body itself. The system on the flexible substrate is integrated from power generator, body monitoring unit, data processing module and brain stimulating electrodes. A piezoelectric power generator can harvest the motion energy of athletes through converting mechanical energy into electricity. The body monitoring unit that is fabricated from flexible piezoelectric polymer can actively detect respiration, carotid artery and heartbeat. The data processing module can process physiological information and the detected information can be used to trigger the neural stimulator module for neural stimulations. Demonstration of the system with stimulating electrodes implanted in the medial forebrain bundle in running mice reveals great enhancement of endurance

performance. This study provides a novel self-powered strategy for wearable brain-machine-interface system and extends its application in sports and health monitoring.

Liu, Y., et al. (2022). "Digitalization and Information Management Mechanism of Sports Events Based on Multisensor Node Cooperative Perception Model." *Journal of Sensors* 2022.

ABSTRACT:

In the process of developing major sports events, how to guide providers and users to provide and utilize the archives information resources of major sports events and realize the interaction between them is an important problem to be solved urgently in the development of major sports events and the archive service of major sports events. By analyzing the present situation of archive service of major sports events, especially the analysis of the opposite dependent subjects of service providers and users, we can see that the continuous development of archive services for major sports events will inevitably lead to constant changes in user groups and user needs, guided by the theory of information retrieval, knowledge management, and media effect. According to the service model of archive service of major sports events, the archive service model of specific sports events is constructed. In this paper, four kinds of event recommendation models are applied to the collected marathon event data for experiments. Through experimental comparison, the effectiveness of content-based recommendation algorithm technology in the event network data set is verified, and an algorithm model suitable for marathon event recommendation is obtained. Experiments show that the comprehensive event recommendation model based on term frequency-inverse document frequency (TF-IDF) text weight and Race2vec entry sequence has the best recommendation performance on marathon event data set. According to the recommendation target of the event and the characteristics of the event data type, we can choose a single or comprehensive recommendation algorithm to build a model to realize the event recommendation.

Men, Y. (2022). "Intelligent sports prediction analysis system based on improved Gaussian fuzzy algorithm." Alexandria Engineering Journal 61(7): 5351-5359.

ABSTRACT:

In order to improve the effect of intelligent sports prediction and analysis, this paper analyzes the traditional high-speed model and proposes a reliable sports action recognition algorithm on this basis. With this algorithm as the core algorithm, sports action recognition can be performed. The paper mainly constructs a standard database structure, inputs a reliable standardized movement model into the database structure, and compares the identified sports movement model with the standard movement model to judge the accuracy of the sports movement. Moreover, this paper uses statistical analysis to study sports training and sports competitions, and obtains prediction results through multi-factor analysis and comparison. In addition, this paper uses statistical methods to process experimental data to draw graphs and tables that can visually observe the results of sports predictive analysis. From the experimental analysis, it can be seen that the algorithm model constructed in this paper has a significant effect.

Mu, C. (2022). "Digitalization and Information Management Mechanism of Sports Events Based on Cooperative Sensing Model of Multisensor Nodes." Journal of Sensors 2022.

ABSTRACT:

This paper provides an in-depth study and analysis of the optimization of sports event management systems using wireless sensor networks. Aiming at the monitoring task of a directed wireless sensor network in a three-dimensional environment, the directed sensing nodes scattered inside the designated monitoring area in a random deployment manner usually have uneven distribution and other problems; we analyze the characteristics of the directed sensor nodes, probabilistic sensing model, and the cooperative sensing model of multiple sensor nodes for monitoring target points and

propose a sensing optimization strategy in polar coordinates to guide the three-dimensional plane directed orientation adjustment and sensing optimization of sensor nodes, thus enhancing the sensing capability of network nodes. The experimental results confirm that the algorithm can improve the coverage of the area to be monitored and the quality of sensing service, and it reduces the overall energy consumption of the network by using the distributed node synchronization scheduling mechanism to extend the life cycle of the network to maintain good monitoring capability under the premise of the limited total usage of the directed nodes in wireless sensor networks. The application of wireless sensor network technology in sports competition management mainly includes the application of smart wearable devices in sports competition training, the application of goal-line technology in sports competition, and the application of eagle eye technology in sports events, all three technologies have certain advantages in the application of sports competition, and all of their help to promote the improvement of sports event management and the development of sports industry; the second aspect is wireless sensor. The second aspect is the application of wireless sensor network technology in sports event information management, which is mainly used to collect information related to sports events and fully utilize it to make sports event management more informative and digital, which is helpful to improve the level of sports event management; the third aspect is the application of wireless sensor network technology in sports event stadium management, which is mainly based on intelligent stadiums to create a more spectator-friendly and good experience for the audience, a more ornamental and good experience viewing place, to promote the development and growth of sports industry.

Park, C., et al. (2022). "Carved Turn Control with Gate Vision Recognition of a Humanoid Robot for Giant Slalom Skiing on Ski Slopes." *Sensors* 22(3).

ABSTRACT:

The performance of humanoid robots is improving, owing in part to their participation in robot games such as the DARPA Robotics Challenge. Along with the 2018 Winter Olympics in Pyeongchang, a Skiing Robot Competition was held in which humanoid robots participated autonomously in a giant slalom alpine skiing competition. The robots were required to transit through many red or blue gates on the ski slope to reach the finish line. The course was relatively short at 100 m long and had an intermediate-level rating. A 1.23 m tall humanoid ski robot, 'DIANA', was developed for this skiing competition. As a humanoid robot that mimics humans, the goal was to descend the slope as fast as possible, so the robot was developed to perform a carved turn motion. The carved turn was difficult to balance compared to other turn methods. Therefore, ZMP control, which could secure the posture stability of the biped robot, was applied. Since skiing takes place outdoors, it was necessary to ensure recognition of the flags in various weather conditions. This was ensured using deep learning-based vision recognition. Thus, the performance of the humanoid robot DIANA was established using the carved turn in an experiment on an actual ski slope. The ultimate vision for humanoid robots is for them to naturally blend into human society and provide necessary services to people. Previously, there was no way for a full-sized humanoid robot to move on a snowy mountain. In this study, a humanoid robot that transcends this limitation was realized.

Sellami, M., et al. (2022). "Molecular Big Data in Sports Sciences: State-of-Art and Future Prospects of OMICS-Based Sports Sciences." *Frontiers in Molecular Biosciences* 8.

ABSTRACT:

Together with environment and experience (that is to say, diet and training), the biological and genetic make-up of an athlete plays a major role in exercise physiology. Sports genomics has shown, indeed, that some DNA single nucleotide polymorphisms (SNPs) can be associated with athlete performance and level (such as elite/world-class athletic status), having an impact on physical activity behavior, endurance, strength, power, speed, flexibility, energetic expenditure, neuromuscular coordination, metabolic and cardio-respiratory fitness, among others, as well as with psychological traits. Athletic phenotype is complex and depends on the combination of different traits and characteristics: as such, it requires a "complex science," like that of metadata and multi-OMICS profiles. Several projects and trials (like ELITE, GAMES, Gene SMART, GENESIS, and POWERGENE) are aimed at discovering genomics-based biomarkers with an adequate predictive power. Sports genomics could enable to optimize and maximize physical performance, as well as it could predict the risk of sports-related injuries. Exercise has a profound impact on proteome too. Proteomics can assess both from a qualitative and quantitative point of view the modifications induced by training. Recently, scholars have assessed the epigenetics changes in athletes. Summarizing, the different omics specialties seem to converge in a unique approach, termed sportomics or athlomics and defined as a "holistic and top-down," "non-hypothesis-driven research on an individual's metabolite changes during sports and exercise" (the Athlome Project Consortium and the Santorini Declaration) Not only sportomics includes metabonomics/metabolomics, but relying on the athlete's biological passport or profile, it would enable the systematic study of sports-induced changes and effects at any level (genome, transcriptome, proteome, etc.). However, the wealth of data is so huge and massive and heterogenous that new computational algorithms and protocols are needed,

more computational power is required as well as new strategies for properly and effectively combining and integrating data.

Torres-Ronda, L., et al. (2022). "Tracking Systems in Team Sports: A Narrative Review of Applications of the Data and Sport Specific Analysis." *Sports Medicine-Open* 8(1).

ABSTRACT:

Seeking to obtain a competitive advantage and manage the risk of injury, team sport organisations are investing in tracking systems that can quantify training and competition characteristics. It is expected that such information can support objective decision-making for the prescription and manipulation of training load. This narrative review aims to summarise, and critically evaluate, different tracking systems and their use within team sports. The selection of systems should be dependent upon the context of the sport and needs careful consideration by practitioners. The selection of metrics requires a critical process to be able to describe, plan, monitor and evaluate training and competition characteristics of each sport. An emerging consideration for tracking systems data is the selection of suitable time analysis, such as temporal durations, peak demands or time series segmentation, whose best use depends on the temporal characteristics of the sport. Finally, examples of characteristics and the application of tracking data across seven popular team sports are presented. Practitioners working in specific team sports are advised to follow a critical thinking process, with a healthy dose of scepticism and awareness of appropriate theoretical frameworks, where possible, when creating new or selecting an existing metric to profile team sport athletes.

Yang, Y., et al. (2022). "Human movement monitoring and behavior recognition for intelligent sports using customizable and flexible triboelectric nanogenerator." Science China-Technological Sciences.

ABSTRACT:

Effective collection, recognition, and analysis of sports information is the key to intelligent sports, which can help athletes to improve their skills and formulate scientific training plans and competition strategies. At present, wearable electronic devices used for movement monitoring still have some limitations, such as high cost and energy consumption, incompatibility of suitable flexibility and personalized spatial structure, dissatisfactory data analysis methods, etc. In this work, a novel three-dimensional-printed thermoplastic polyurethane is introduced as the elastic shell and friction layer, and it endows the proposed customizable and flexible triboelectric nanogenerator (CF-TENG) with personalized spatial structure and robust correlation to external pressure. In practical application, it exhibits highly sensitive responses to the joint-bending motion of the finger, wrist, or elbow. Furthermore, a pressure-sensing insole and smart ski pole based on CF-TENG are manufactured to build a comprehensive sports monitoring system to transmit the athletes' motion information from feet and hands through the plantar pressure distribution and ski pole action. To recognize the movement status, the self-developed automatic peak recognition algorithm (P-Find) and machine learning algorithm (subspace K-Nearest Neighbors) were introduced to accurately distinguish the four typical motion behaviors and three primary sub-techniques of cross-country skiing, with accuracy rates of 98.2% and 100%. This work provides a novel strategy to promote the personalized applications of TENGs in intelligent sports.

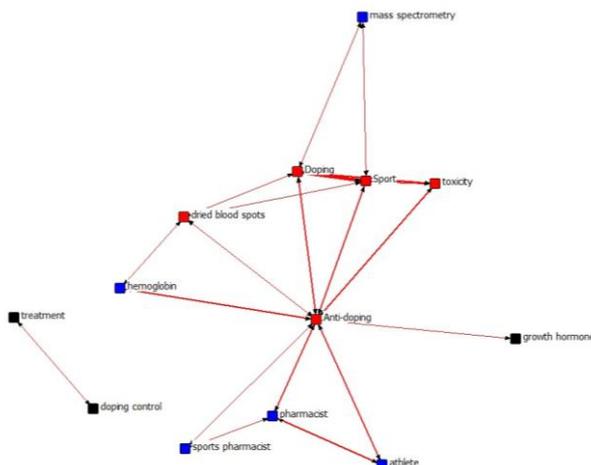
Zhao, Z., et al. (2022). "I-WKNN: Fast-speed and high-accuracy WIFI positioning for intelligent sports stadiums." *Computers & Electrical Engineering* 98.

ABSTRACT:

Based on various existing wireless fingerprint location algorithms in intelligent sports venues, a high-precision and fast indoor location algorithm improved weighted k-nearest neighbor (IWKNN) is proposed. In order to meet the complex environment of sports venues and the demand of high-speed sampling, this paper proposes an AP selection algorithm for offline and online stages. Based on the characteristics of the signal intensity distribution in intelligent venues, an asymmetric Gaussian filter algorithm is proposed. This paper introduces the application of the positioning algorithm in the intelligent stadium system, and completes the data acquisition and real-time positioning of the stadium. Compared with traditional WKNN and KNN algorithms, the I-WKNN algorithm has advantages in fingerprint positioning database processing, environmental noise adaptability, real-time positioning accuracy and positioning speed, etc. The experimental results show that the I-WKNN algorithm has obvious advantages in positioning accuracy and positioning time in a complex noise environment and has obvious application potential in a smart stadium.

反兴奋剂

本期反兴奋剂学术研究共检索到英文相关文献49篇，研究热点主要集中在兴奋剂的检测、兴奋剂检测标准、兴奋剂相关认知等方面。就检索导出的数据采用书目共现分析系统(Bicomb V202007)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。检索结果如下：1) 关键词共词分析。提取关键词314个，经过数据清洗后关键词有255个，词频为2及以上的关键词有14个，累计百分比为16.03%，高频关键词有反兴奋剂、干血点、体育药师、毒性等，生成可视化知识图谱(见下图)。2) 来源期刊分析。涉及期刊53种，其中载文2篇及以上的期刊有3种，所载文献累计百分比为23.08%，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Q2、Q3)，Yakugaku zasshi journal of the pharmaceutical society of Japan (JCR学科分区Q4)，Therapie (JCR学科分区Q4)。3) 学科交叉分析。引用文献总计2301篇，最多的频次为3次，排名前三位的文献分别为*Interlaboratory agreement of insulin-like growth factor 1 concentrations measured by mass spectrometry*、*Caffeine supplementation and physical performance, muscle damage and perception of fatigue in soccer players: A systematic review*、*Androgen bioassay for the detection of nonlabeled androgenic compounds in nutritional supplements*。



Equey, T., et al. (2022). "Application of the Athlete Biological Passport Approach to the Detection of Growth Hormone Doping." *Journal of Clinical Endocrinology & Metabolism* 107(3): 649-659.

ABSTRACT:

Context Because of its anabolic and lipolytic properties, growth hormone (GH) use is prohibited in sport. Two methods based on population-derived decision limits are currently used to detect human GH (hGH) abuse: the hGH Biomarkers Test and the Isoforms Differential Immunoassay. **Objective** We tested the hypothesis that longitudinal profiling of hGH biomarkers through application of the Athlete Biological Passport (ABP) has the potential to flag hGH abuse. **Methods** Insulin-like growth factor 1 (IGF-1) and procollagen III peptide (P-III-NP) distributions were obtained from 7 years of anti-doping data in elite athletes (n = 11 455) and applied as priors to analyze individual profiles from an hGH administration study in recreational athletes (n = 35). An open-label, randomized, single-site, placebo-controlled administration study was carried out with individuals randomly assigned to 4 arms: placebo, or 3 different doses of recombinant hGH. Serum samples were analyzed for IGF-1, P-III-NP, and hGH isoforms and the performance of a longitudinal, ABP-based approach was evaluated. **Results** An ABP-based approach set at a 99% specificity level flagged 20/27 individuals receiving hGH treatment, including 17/27 individuals after cessation of the treatment. ABP sensitivity ranged from 12.5% to 71.4% across the hGH concentrations tested following 7 days of treatment, peaking at 57.1% to 100% after 21 days of treatment, and was maintained between 37.5% and 71.4% for the low and high dose groups 1 week after cessation of treatment. **Conclusion** These findings demonstrate that longitudinal profiling of hGH biomarkers can provide suitable performance characteristics for use in anti-doping programs.

Jing, J., et al. (2022). "Automated online dried blood spot sample preparation and detection of anabolic steroid esters for sports drug testing." Drug Testing and Analysis.

ABSTRACT:

Dried blood spots (DBSs) provide a valuable complementary sample matrix for routine doping analysis, and the full automation of analysis for DBS samples is achievable to avoid extensive and repetitive manual laboratory work. In the current study, a fully automated online DBS preparation and detection method for the screening and quantification analysis of 13 anabolic steroid esters by means of the DBSA-TLX-HRMS system was developed and validated, based on the purpose for the determination of the abuse of anabolic steroid esters in athletes. Validation of the method yielded linear ($R^2 > 0.99$), precise, and accurate ($RSD\%$ and $Re\% < 20\%$ at low, medium, and high concentration levels) results. The LOD of testosterone laurate was established at 0.5 ng/ml and at 0.2 ng/ml for other steroid esters. The extraction recovery of the target compounds from DBS ranged from 10.5% to 88.9%, and matrix effects were moderate. Furthermore, the developed and validated method was applied in the analysis of DBS samples collected after the oral administration of a single dose of 80 mg testosterone undecanoate demonstrating its applicability. Evaluation of analyte stability showed that testosterone undecanoate are more stable (8 weeks) in DBS samples of administration study when stored in frozen (-20 degrees C) condition compared with cold storage (4 degrees C). Collectively, these findings demonstrate the applicability of automated DBS analysis in doping control for detection of anabolic steroid esters.

Nan, P. (2022). "Detection of Diuretic Doping by Capillary Electrophoresis and Electro-chemical Technology: A Mini-Review." *Current Pharmaceutical Analysis* 18(1): 34-42.

ABSTRACT:

Athletes are not allowed to use performance-enhancing drugs. Despite many efforts, the use of performance-enhancing drugs still persists in sports. Doping testing in athletes is the main way to determine drug consumption. Taking biological samples from athletes can be used to detect doping. The least invasive method is urine, while hair and saliva can be sampled using a minimally invasive procedure. In contrast, blood sampling is the most invasive method. The development of sample analysis and detection technology is crucial for any kind of sampling method. This review details the progress of electrophoresis and electrochemical detection of diuretics in stimulants.

Sun, Y., et al. (2022). "Highly Sensitive Electrochemical Sensor Based on rGO/Fe₃O₄ Composite as Electrocatalyst for Clenbuterol Detection in Doping Analysis." *International Journal of Electrochemical Science* 17(1).

ABSTRACT:

Clenbuterol has anabolic effects as a doping agent and is banned by the World Anti-Doping Agency for use by athletes. If an athlete consumes pork with clenbuterol residues, it may cause a positive urine test result, which will seriously affect the athletic career. In this work, an electrochemical sensor for the detection of clenbuterol was proposed. Two reduced graphene oxide/Fe₃O₄ (rGO/Fe₃O₄) nanocomposites were prepared by solvent thermal and hydrothermal methods. Different rGO/Fe₃O₄ were characterized and compared with FT-IR, XRD, SEM, and Zeta potential meters. The results show that the rGO/Fe₃O₄ prepared by different methods vary in surface functional groups, Fe₃O₄ crystal structures and particle sizes, surface morphology and surface charge. The electrode was modified with rGO/Fe₃O₄ and the detection

performance of the sensor for clenbuterol was investigated. Under optimal conditions, the electrochemical sensor could linearly detect clenbuterol from 1 μ M - 128 μ M with a detection limit of 120 nM. In addition, this electrochemical sensor has been successfully used for the detection of clenbuterol in swine urine.

Nissen-Meyer, J., et al. (2022). "Are doping tests in sports trustworthy? Athletes suffer from insufficiently defined criteria for doping tests." Embo Reports.

ABSTRACT:

The World Anti-Doping Agency (WADA) uses analytic, science-based methods to detect doping, but it does not always adhere to scientific principles when it evaluates the results from their tests. The criteria for determining whether a sample is positive for an illegal substance often appear to be ambiguous with the risk of rendering evaluations subjective. Statements from WADA laboratories such as “you need to be an expert to clearly identify it” and “we know it when we see it” indicate such subjectivity. Subjective evaluations are troublesome because they erode the trust in WADA’s fight against doping, and have potentially dramatic consequences for athletes. The lack of clearly defined criteria for doping tests carries a great risk of punishing innocent athletes and undermines the fight against doping in international sports.

Velasco-Bejarano, B., et al. (2022). "Detection of clenbuterol residues in beef sausages and its enantiomeric analysis using UHPLC-MS/MS: A risk of unintentional doping in sport field." Drug Testing and Analysis.

ABSTRACT:

Clenbuterol (Clb) can be present in Mexico often but not all over the world in animal tissues and organs, therefore, potentially is derived from animal sources as well. The aims of this study were to develop and validate a method for detecting traces of clenbuterol in beef sausages. A calibration curve showed linearity in the range of 20-500

pg ml(-1). The limit of detection (LOD) and lower limit of quantification (LLOQ) were 5 and 10 pg g(-1), respectively. The analyte recovery was from 95.70% to 100.40% with an intraday relative standard deviation (RSD%) of 0.99%-2.10% and an interday RSD% of 0.54%-2.34%, R-2 = 0.9998. The methodology developed was applied successfully in 15 samples of beef sausage, and 73.3% of the samples tested contained racemic clenbuterol in concentrations between 30 and 471 pg g(-1). The UHPLC-MS/MS method developed combines high sensitivity with good selectivity and short chromatographic run time. Additionally, the enantiomeric analysis of clenbuterol performed in beef sausages showed a 59% for R-(-)-Clb and 41% for S-(+)-Clb. The presence of clenbuterol in beef sausages could represent a risk of unintentional doping in sport field, because the clenbuterol is a banned substance included in the World Anti-Doping Agency's (WADA) list of prohibited substances.

Weber, K., et al. (2022). "An exploration of doping-related perceptions and knowledge of disabled elite athletes in the UK and Austria." *Psychology of Sport and Exercise* 58.

ABSTRACT:

Introduction: Compared to anti-doping research in Olympic sport, the issue of doping is under-researched and poorly understood in Paralympic sport. However, with the growth of the Paralympic Games and the increased number of disabled elite athletes, the number of doping controls and doping cases has also increased. Therefore, there is a need to address the dearth of evidence in disabled sport contexts and develop an understanding of disabled elite athletes' perceptions, reasons and knowledge related to doping to ensure appropriate policy and programmes are implemented. Method: Sixteen disabled elite athletes from Austria (n = 9) and the UK (n = 7) participated in semi-structured interviews. Data were analysed using inductive reflexive thematic analysis (Braun & Clarke, 2019a). Findings: Four themes were generated during the analysis. The first showed that athletes perceive doping to be a well-known and wide-spread issue in

Paralympic sport. The second theme illustrated that disabled elite athletes are exposed to extreme pressure (e.g., to earn money), which they state poses a risk for using prohibited methods and/or substances. Thirdly, athletes suggested that there are several ways to cheat if someone would like to find 'loopholes' (e.g., misuse of Therapeutic Use Exemptions) in the current anti-doping system, which they reported only works partially. Lastly, although it is not officially named as an anti-doping rule violation, athletes proposed cheating on classification as a form of doping - and the greatest threat to the integrity of disabled sport. Conclusions: For the first time, the current study shows that doping in the context of disabled elite sport likely stems from only a few main factors; a perception of pressure and faults in the anti-doping system. To address these risks, prize money could be distributed more broadly, the TUE process and classification system should be more closely scrutinised, and targeted anti-doping education that addresses the main risk factors in disabled elite sport should be provided for all athletes and their support team worldwide.

Watson, C. J., et al. (2022). "Performance-enhancing drugs and the Olympics." *Journal of Internal Medicine* 291(2): 181-196.

ABSTRACT:

The rules of fair play in sport generally prohibit the use of performance-enhancing drugs (PEDs). The World Anti-Doping Agency (WADA) oversees global antidoping regulations and testing for elite athletes participating in Olympic sports. Efforts to enforce antidoping policies are complicated by the diverse and evolving compounds and strategies employed by athletes to gain a competitive edge. Now between the uniquely proximate 2021 Tokyo and 2022 Beijing Olympic Games, we discuss WADA's efforts to prevent PED use during the modern Olympic Games. Then, we review the major PED classes with a focus on pathophysiology, complexities of antidoping testing, and relevant toxicities. Providers from diverse practice environments are likely to care for patients using PEDs for a variety of reasons and levels of sport; these providers should be aware of common PED classes and their risks.