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BOOK OF ABSTRACTS

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People with Disabilities in Sport – Theory and Practice

*„From Inclusion in Physical Education to Professionalization in Sport for
People with Disabilities”*

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Keynote Speakers

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She is the initiator and co-organizer of the cyclical international conference "Sport for People with Disabilities — Theory and Practice," which is a forum for the exchange of experiences between scientific, coaching, and medical communities. She is a head of the Scientific Team for Research on Physical Activity for Health at the Institute of Sports Sciences at the Academy of Physical Education in Katowice. Author of over 230 scientific publications and 8 monographs, actively cited in Google Scholar, Web of Science, and Scopus databases. Participant and speaker at numerous congresses, national and international conferences. Since 2015, she has been cooperating with the Polish Paralympic Committee, where she serves as vice-chair of the Scientific Council of the Polish Paralympic Committee. She is an Honorary Member of the Polish Society of Audiophonology, a member of the Polish Society of Adapted Physical Activity, the Polish Society of Sports Medicine, and the European College of Sport Science (Cologne, Germany).

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Katarzyna Rogowiec

Two-time Paralympic champion from Turin (2006) in cross-country skiing in the 15 km classic technique and the 5 km free technique.



She is a multi-medalist at the World Championships in cross-country skiing and biathlon (Baiersbronn, 2003; Fort Kent, 2005; Khanty-Mansiysk, 2011). From March 2006 to 2014, she served as a member of the Athletes' Council at the International Paralympic Committee, and from January 2009 to 2015, as a member of the Athletes' Committee at the World Anti-Doping Agency. She is a member of the Athletes' Council at the Polish Anti-Doping Agency. She has observed the world's largest sporting events several times, gaining organizational experience at the Olympic Games in Beijing, London, Rio, and Pyeongchang, as well as the 2010 Commonwealth Games in New Delhi. In 2010, she founded the Katarzyna

Rogowiec Avanti Foundation, whose main goal is to support the comprehensive development of Polish society, especially people with disabilities. She lost both arms in 1980 (at the age of three) in a harvesting accident. She and her husband are raising Olimpia, 11, and Jaś, 9.



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Physical education – an important subject in school education. Current issues in physical education

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Physical education is a form of participation in physical culture, the aim of which is to prepare young generations for lifelong physical activity for health and physical fitness, as well as for participation in sport, which is the domain of people with above-average somatic and physical abilities. Therefore, comprehensive physical stimulation of children, taking into account their physical, mental, motor, and social development, is the basis for undertaking sports and recreational activities in subsequent stages of education. This preparation largely depends on conscious parents and teachers. Deficiencies in the area of comprehensive physical preparation have been evident for many years. Recent research in the field of Physical Literacy shows that primary school pupils have insufficient mastery of basic motor skills, which is compounded by lower levels of fitness in subsequent stages of education. This is particularly evident among pupils with lower motor potential, overweight pupils, and those who lack self-confidence. Focusing on less physically active pupils is a challenge. Today's schools offer more to pupils with higher sporting aptitudes than to those whose motor development is slower, and they themselves need reinforcement to believe in themselves, especially in an era of widespread hate constantly observed among teenagers. Therefore, taking into account the relationship between fitness and physical activity levels and well-being in research is another challenge for today's education. Schools cannot contribute to the deterioration of the mental health of children and young people. This is all the more important given that a particularly negative trend in physical activity and well-being was observed during and after the pandemic, which, unfortunately, continues to be evident in further research observations. In addition, by taking into account students' sports and recreational preferences, we increase the chances of participation in moderate to high-intensity activities, which is beneficial to health. Research confirms that consistency between preferred and actual physical activity promotes the implementation of daily PA recommendations, including high-intensity exercise.

The school recommendations for physical activity allow for the search for time reserves (time before school, during school, after school) that take into account the introduction of additional activity, considering health, educational and socio-economic factors.

From diagnosis to support – inclusive physical education in the "PE with AWF" project

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Introduction: Inclusive education emphasizes the acceptance of diversity by a conscious society and the pursuit of overcoming barriers to participation in the mainstream education system for students with special educational needs (SEN), including physical education (PE). In Poland, students with SEN constitute 5.3% (165,600) of all students in primary schools. The issue of inclusive PE indirectly affects all students and teachers in mainstream primary schools, while directly affects approximately 113,800 students with SEN in mainstream primary schools, representing 68.7% of all SEN students in primary education (GUS, 2024). The main goal of the new task in the "PE with AWF" project is to analyze inclusive physical education - the inclusion/participation and physical literacy of students with SEN in mainstream primary schools in order to implement effective strategies to increase the participation of these students in physical activity.

Material and methods: In the years 2025-2027, plans are underway across Poland to: (1) assess participation in inclusive PE for students with SEN, (2) assess the needs of PE and EWS teachers in the area of inclusive PE, (3) assess the physical literacy of students with SEN, (4) pilot the "Move Your Head and Legs" intervention for students with SEN. The project will validate tools assessing inclusion by parents, students, and teachers at school, home, and in the social environment - PEM-CY (Participation and Environment Measure – Children and Youth) and in PE classes - PIQ-PE (Perception of Inclusion in Physical Education), and adapt tools assessing the level of physical literacy of students with SEN - CAPL-2 (Canadian Assessment of Physical Literacy).

Conclusions: The plan is to analyze 3,000 students with SEN, 1,500 parents of SEN students, and 500 teachers from across Poland. The project will deliver, in addition to diagnosis of the inclusion process in PE classes, validated tools for monitoring the inclusion process by teachers, and recommendations along with best practices for supporting SEN students and teachers in PE.



“Invisible Students”: physical education teachers’ perceptions of students with impairments

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Introduction: The aim of this research is to report the findings of a sociological study on the attitudes of physical education (PE) teachers towards students with disabilities (SWD) in Polish schools.

Material and methods: The research was conducted in 2023 by the Institute of Sport – National Research Institute and included 5,330 respondents, among whom 2,294 were PE teachers and 3,036 students.

Results: The analyses revealed the phenomenon of the “invisibility” of SWD: as many as 85% of teachers reported having no contact with these students during physical education classes, while only 15% declared any experience in this field. Although 66% of the surveyed teachers expressed a willingness to cooperate in inclusive education, this readiness was conditional upon adequate infrastructure, staff support, and didactic preparation. The results indicate significant barriers to inclusion: a lack of professional preparation for working in heterogeneous classes, a deficit in adapted equipment and instructional methods, as well as the presence of implicit ableism leading to the marginalisation of SWD. Cluster analysis further demonstrated that teachers who derived satisfaction from their work and perceived it as a vocation were more open to inclusion.

Conclusions: The conclusions emphasise the need for systemic measures, such as interdisciplinary teacher education, continuous professional development, and the support of coach developers and mentors. Equally important is raising awareness among the entire school community. The findings highlight a persistent gap between legal and declarative commitments to inclusion and the actual practices in schools. The proposed solutions call for a transition from the formal presence of SWD in schools to their genuine inclusion in physical culture and school sport.

Physical education teachers' perception of their knowledge and possibilities of inclusive education

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One of the most important conditions for conducting inclusive PE in an effective, therefore purposeful and planned way, is the proper understanding of the notion of “inclusive education (IE)” by the teaching staff, parents and pupils (Schwab 2018, Lenicki 2018, Skotnicka 2020, Luiza et al. 2022). Inclusive education is not only the attendance of special educational needs (SEN) pupils at mainstream schools. It is first and foremost the skilful adaptation of the curriculum to the individual needs of each of them (Florian and Black-Hawkins 2011, UNESCO 2015, Hassani et al. 2022). Inclusive education is not only the attendance of special educational needs (SEN) pupils at mainstream schools. It is first and foremost the skilful adaptation of the curriculum to the individual needs of each of Boer and Minnaert (2011) aptly observe that it is not enough to admit children with SEN to a mainstream class, expecting that they will be positively perceived by their peers, but it is necessary to create conditions for individual development, as 'every child wants to achieve their own success, not as part of a team or a group' (Wieczorek and Sadziak (2017, p. 235). These aspects make the school employees' attitudes very important, and the current knowledge in the field of integration of pupils with diversities should become the basic and obligatory practice of every 21st-century teacher (Scottish Government 2010, OECD 2013, Skills Development Scotland 2018, Yan et al. 2022). From the data provided by Triviño-Amigo et al. (2022), it appears that even if teachers have good intentions and want to implement inclusive education in their classes, they often feel insufficiently prepared for the difficult tasks that they face when teaching SEN pupils in a Polish school. The aim of this research was to analyse the level of knowledge of PE teachers and the correlation between the knowledge of inclusive PE and independent variables: gender, seniority, place of work (village-city) and the type of school in which a teacher works. PE teachers (n = 1064) from primary (68.2%) and secondary (31.8%) schools took part in the study conducted online with the help of an original survey questionnaire (AQ). As a result of the conducted research process it can be concluded that the vast majority of the surveyed physical education teachers have a medium level of knowledge about inclusive education. The surveyed teachers' level of knowledge is not differentiated depending on gender. However, physical education teachers with less seniority tend to have more knowledge about inclusive education. Teachers who work in large cities and teachers who work in secondary schools are also marked by a high level of knowledge. Conducting research on inclusive education in physical education classes is necessary due to the increasing number of children diagnosed with special educational needs. Physical education teacher's professional knowledge is essential to meet individual educational needs and facilitate the achievement of the individual educational needs of their pupils. Proper learning of the factors which induce teachers to deepen their knowledge of inclusive PE is important from the point of view of the rapidly changing social situation. Thus, a properly conducted and planned process of inclusion in physical education classes may bear fruit in the form of the pupil's educational success and avoidance of exclusion.



"Deficits are not a limitation - adapted physical activity is an opportunity for every student" - preliminary report on the project implementation

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Introduction: In recent years, there has been an increasingly pronounced diversification in students' mental health and physical fitness, which directly impacts their educational and social functioning. There is a need for systematic monitoring of the physical and mental health of children and adolescents in the school environment, which allows for early detection of disturbing trends and the planning of effective supportive interventions. One example of such initiatives is the Science for Society project entitled "Deficits are not a limitation - adapted physical activity is an opportunity for every student."

Material and methods: As part of the project, physical education teachers were trained to conduct holistic assessments of students' potential (ages 7-17) in schools, including morphofunctional status (body build, posture and physical fitness, knee function), well-being, perception of inclusion in school education, and auditory processing.

Results: 523 students (238 girls and 285 boys) were examined. 68% had abnormal kyphosis, and 58% had abnormal lumbar lordosis. Auditory processing disorders were noted in 15%. Twenty-seven percent of the sample indicated a need for diagnostic testing for depression (particularly among 15-, 16-, and 17-year-olds). The level of perception of inclusion in school education decreased with age, being highest in the social dimension and lowest in the academic self-concept.

Conclusions: The results clearly indicate the need for both remedial and supportive measures. At the same time, they confirm the need for a holistic diagnosis.



The role of the governing body in supporting inclusive education - regional experiences

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Introduction: The aim of my presentation is to present inclusive education in its broad understanding, from the perspective of a regional governing body. In the first part, I describe the role of the regional government in shaping the educational policy of the region. I point to regional strategies and documents that define the directions of action for inclusive education. I emphasize the need for a broad approach to inclusion, resulting from dynamic social, demographic, and economic changes, as well as the evolving needs of future-oriented education. Special attention is given to the integration of students with special educational needs, including those with officially recognized disabilities, within educational processes. Supporting their participation in extracurricular activities fosters not only physical development, but also the formation of social competences, a sense of belonging, and social inclusion. I demonstrate that physical activity can become a natural medium of inclusive education – a tool for integration, motivation, and self-development. In the following part, I discuss the role of schools and teachers in meeting the challenges faced by students, with particular emphasis on support for students with special educational needs and gifted students. I highlight the actions undertaken by the Silesian Voivodeship to create conditions conducive to full educational and social inclusion – both in terms of teaching and physical activity.

Conclusions: In conclusion, I present the conditions necessary for the effective implementation of inclusive education, including the importance of cooperation between the governing authority, schools, teachers, parents, and local support institutions. I emphasize that the inclusion of students with special educational needs and disabilities in sports and educational activities is not only an obligation, but also an opportunity to build a school community based on equality, respect, and shared growth.



Contemporary challenges of functional social communication – CAPD

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Central Auditory Processing Disorder (CAPD) poses a significant challenge in everyday life and education. Difficulties with speech understanding, especially in noisy environments, foreign language learning, reading, writing, and maintaining attention to spoken words are observed. It is estimated that 2-5% of school-age children may have APD, which often goes undiagnosed, leading to communication difficulties. Despite normal hearing sensitivity, students with APD have difficulty receiving and processing auditory stimuli. This results in problems distinguishing similar sounds, recalling sound sequences, and producing correct intonation, which directly affects speech comprehension. In physical education classes or during sports training, this may manifest as failure to follow teacher instructions or, secondarily, a reluctance to exercise due to auditory discomfort in the gym.

This presentation will discuss auditory processing disorders – their symptoms, causes, and epidemiology in the context of difficulties with communication, physical fitness, and social functioning, based on an analysis of existing research.



Assessment of the body posture of primary school children in the city of Olsztyn using new technologies - a pilot study

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Introduction: Postural disorders such as scoliosis, round back, genu valgum, and flat feet are highly prevalent among children and may lead to permanent disabilities. The application of modern, non-invasive diagnostic methods enables rapid and safe detection of abnormalities, thereby improving opportunities for screening and prevention. Aim: To assess body posture in primary school children in Olsztyn using innovative diagnostic technologies.

Material and methods: In the first half of 2025, the study included 116 children (59 boys, 57 girls) aged 8–14 years (mean age 10.08 ± 1.40), attending grades III, V, and VII. Anthropometric parameters (height, body weight, BMI, waist circumference) and body posture were assessed using a plumb line, a digital inclinometer, a Bunnell scoliometer, and a computerized podoscope (Podo4Foot®). In 24 children with identified abnormalities, a three-dimensional analysis was performed using the BodyMapper® system.

Results: In all age groups, a reduction in the mean lumbar lordosis angle was observed, while in grades V and VII an increase in thoracic kyphosis was noted. Girls presented greater spinal rotation in the thoracic region. Significant relationships were found between spinal curvature angles and rotation, as well as between thoracic and upper lumbar rotation and plumb line deviation from the spinal axis ($p < 0.05$). BodyMapper® analysis revealed significant correlations between thoracic rotation and pelvic rotation ($p < 0.05$), as well as between thoracic and pelvic rotation and foot loading ($p < 0.05$).

Conclusions: The study confirmed the presence of postural disorders among school-aged children. The BodyMapper® technology enables identification of complex biomechanical relationships, making it a valuable tool in prevention and rehabilitation planning. Quality of life and prevention of disability: a psychosocial intergenerational perspective.



Motor and psychosocial development of children with and without Autism Spectrum Disorder (ASD)

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Introduction: Children with Autism Spectrum Disorder (ASD) demonstrate limitations in key aspects of psychosocial development, leading to delays in processing social and emotional stimuli (Hilton et al., 2012; MacDonald et al., 2014). They also frequently experience restrictions in motor development, particularly in gross motor coordination and balance (Sherrill, 2004; Whyatt & Craig, 2012). Early interventions targeting these areas are essential to promote functional growth and social participation (MacDonald et al., 2014; Vivanti et al., 2014). The present study aimed to holistically evaluate motor development, psychosocial functioning, and behavior in children and adolescents with and without ASD.

Material and methods: The sample consisted of 48 participants (15 with ASD and 33 typically developing peers) recruited from schools in the wider Attica region (Athens). Assessments included the Bruininks-Oseretsky Test of Motor Proficiency, Second Edition (BOT-2), as well as teacher and caregivers' reports on strengths and difficulties, and behavior.

Results: Findings indicated that children and adolescents with ASD scored significantly lower in motor development, psychosocial functioning, and behavior compared to their peers (Kashi et al., 2021; Nordin et al., 2021).

Conclusions: These findings highlighted the importance of integrated assessment and intervention strategies that address both motor and psychosocial domains in ASD populations (Bruininks & Bruininks, 2005; Kruger et al., 2019).

Quality of life and prevention of disability: a psychosocial intergenerational perspective

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Introduction: The quality of life of school-aged children and adolescents is a key determinant of both psychosocial and physical health. Early identification of risk areas forms the basis for effective disability prevention. A generational perspective highlights the role of both family and the school environment in shaping health-promoting behaviors. Aim: To determine the quality-of-life profile of school-aged children and adolescents in the context of psychosocial functioning and to indicate its importance for disability prevention from an intergenerational perspective.

Material and methods: In the first half of 2025, the study included 116 children (59 boys, 57 girls) aged 8–14 years (mean age 10.08 ± 1.40), attending grades III, V, and VII in primary schools in Olsztyn, Poland. A diagnostic survey was conducted using the KIDSCREEN-27 questionnaire, which assesses five dimensions of quality of life: physical activity and health, general mood and self-perception, family and free time, peers, and school and learning. Statistical analyses were performed with a significance level set at $p < 0.05$.

Results: In the school and learning dimension, a significant decline in quality of life with age was observed – adolescents aged 12–14 scored lower (63.53 ± 18.53) compared with children aged 8–11 (73.17 ± 17.91). Boys, both in the total sample and within younger and older groups, reported higher quality of life in physical activity and health ($p < 0.001$) and general mood and self-perception ($p < 0.03$). In the remaining dimensions, differences between genders were not statistically significant, although mean values were consistently higher among boys.

Conclusions: The findings confirm the importance of psychosocial and physical factors in shaping the quality of life of school-aged children and adolescents and highlight the need for measures aimed at disability prevention. Recommended strategies include strengthening mental health, enhancing peer and family support, and particularly promoting physical activity and sport as effective preventive tools. Regular physical activity not only fosters physical development but also improves emotional well-being, builds stress resilience, and reduces the risk of disability in adulthood. Keywords: quality of life, psychosocial health, prevention, disability, physical activity

The phenomenon of infrachumanization of disabled athletes practicing swimming among primary school students

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Introduction: According to J.P. Leyens' theory, being human is perceived as an essential characteristic of the ingroup, but not of the outgroup. The implicit process of attributing fewer human-specific traits (e.g., secondary emotions or typically human words) to members of the outgroup is defined as infrachumanization, reflecting the tendency to dehumanize groups other than one's own. Potential infrachumanization of disabled athletes by primary school students may provide valuable insights regarding efforts to foster an inclusive environment. Aim of the study. The identification of the effect of infrachumanization among primary school students toward disabled athletes practicing swimming.

Material and methods: The study involved 60 eighth-grade primary school students. The diagnostic survey method was applied, with a questionnaire consisting of a list of eight words (four typically human and four typically animal-related), selected by T. Baran (2011) from a list developed by T. Viki et al. (2006). The participants' task was to select four out of the eight nouns that best described: (1) their own group, (2) able-bodied swimmers, (3) blind swimmers, and (4) physically disabled swimmers. Prior to completing the questionnaire, the students watched short films presenting all categories of swimmers under investigation. The number of typically human versus animal-related words selected constituted the dependent variable. A two-way repeated measures ANOVA (4×2) was conducted. The first factor – group – was analyzed at four levels (primary school students vs. able-bodied swimmers vs. blind swimmers vs. physically disabled swimmers). The second factor – type of words – was analyzed at two levels (typical human words vs. typical animal words).

Results: The interaction GROUP × WORDS, which was of central importance to the study, was not statistically significant: $F(3, 177) = 2.0808$; $p = 0.11$. However, post hoc analysis suggested that primary school students assigned more typically human words to their own group ($M = 2.60$) than to blind swimmers ($M = 2.28$). This result should, however, be interpreted with caution and only as a statistical tendency.

Conclusions: Primary school students attribute more typically human words to their own group than to blind swimmers, which may indicate the risk of infrachumanization of this group of disabled athletes. The findings highlight the necessity of strengthening educational efforts in primary schools aimed at fostering an inclusive environment and promoting contact with athletes with disabilities—particularly blind swimmers—in order to prevent the emergence of the negative phenomenon of infrachumanization.



How to optimise interactions between athletes with and without disabilities – integrativ perspective

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The processes of inclusion and integration of people with disabilities may be analysed at an institutional, interpersonal and personal level. Direct contacts between persons classified to different social categories are of paramount importance for the success of integrative initiatives. Studies demonstrate that experiences gathered by partners in interaction (both with and without disabilities) may contribute either to further intensification of such contacts or, conversely, to their avoidance. The conducted analysis of conceptions of interactions and relevant empirical research findings allows us to determine conditions which are conducive to minimising negative effects of such contacts and maximising positive effects. In the final part of the paper several postulates aimed at coaches are proposed which may be helpful in increasing the integration of athletes with disabilities.



From the Olympic Games to everyday life: the universal message of Olympism in building an inclusive society

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Olympism, revived in the vision of Pierre de Coubertin, has from the outset been understood more broadly than as a mere sporting competition. Its essence remains a universal message – community beyond differences – symbolized by the five Olympic rings, the flame, and the Olympic oath. Values such as equality, solidarity, fair play, and the pursuit of excellence may be treated not only as rules binding in the stadium but also as a model for integration in everyday social life. The paper demonstrates how Olympism can inspire the process of building an inclusive society. From the perspective of social psychology, Olympic values serve as a mechanism for expanding the category of “we” and reducing barriers between groups. In sociological terms, they function as shared rituals that strengthen bonds and collective identity. In the legal dimension, they correspond to the principles of equality before the law and the prohibition of discrimination enshrined in the Constitution of the Republic of Poland and international documents, while in a broader sense they support the implementation of the idea of sustainable development. Particular attention is given to the integration of persons with developmental disabilities, treated not in the narrow categories of Paralympic sport but as an inspiration for the entire community. The transfer of Olympic values into education, work, and social relations makes it possible to point out that the true Olympic Games take place every day – in the practices of collective life, where diversity may become a source of communal strength.



From idea to publication: procedures and best practices at Physical Activity Review

Jacek Wąsik

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The aim of this presentation is to outline the editorial procedures and publication requirements of the journal *Physical Activity Review*. The subject of analysis is the successive stages of the publishing process - from the submission of the manuscript, through scientific review, to the editorial decision and publication. Particular attention is paid to ethical standards, criteria for assessing the quality of research and editorial principles determining the acceptance of texts. The authors' good practices conducive to the preparation of publications of high scientific and editorial value are also an important element. These include, among others, precise formulation of the research problem, adequate choice of methodology, clear presentation of results and careful preparation of tables and figures. In the context of the conference on physical activity of people with disabilities, the role of sound scientific publications in disseminating research results, exchanging international experiences and in supporting sports practice in the spirit of inclusivity is emphasised. The presentation aims both to promote the journal *Physical Activity Review* and to disseminate good publication practices, which are an important part of the development of physical activity science.

Effectiveness of the Active Rehabilitation program for people with spinal cord injury

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Introduction: Persons with spinal cord injury (SCI) indicate that their top health priorities are the restoration of functional abilities including mobility, as well as bowel, bladder, and sexual function. For individuals with tetraplegia, regaining arm and hand function is a further key priority. The aim of this study was to assess to what extent participation in Active Rehabilitation Camps (ARC) in Poland assists individuals with SCI fulfill key health priorities. This study is part of the International Project for the Evaluation of Active Rehabilitation (Inter-PEER).

Material and methods: Participants (n=122) with traumatic or nontraumatic SCI older than 16 years were evaluated at the beginning (T1) and completion (T2) of 16 consecutive ARC in Poland, and at 3-month follow-up (T3). Key health priorities were matched with Inter-PEER measures (using total score, domain score, or specific individual item score): The Queensland Evaluation of Wheelchair Skills, Wheelchair Skills Test Questionnaire, Spinal Cord Independence Measure Self-report, Moorong Self-efficacy scale, Life Satisfaction Questionnaire.

Results: Regarding mobility function, the majority of participants achieved meaningful improvement in wheelchair skills practical test during ARC. These gains were supported by self-reported improvements in mobility indoors and outdoors on even surfaces and in wheelchair skills capacity and confidence. Individuals with tetraplegia improved their self-care abilities during ARC, with these gains maintained at the 3-month follow-up. Bladder function improved significantly by the end of ARC, but this improvement was not retained at follow-up. Confidence in having a satisfying sexual relationship improved during ARC and was retained at follow-up, with participants also reporting enhanced sexual function at follow-up.

Conclusions: The peer-led ARC program substantially meets the health priorities of persons with SCI. The mobility, bowel/bladder and sexuality functions improved around 10% as a result of participation in ARC, while hand/arm function improved around 23% among those with tetraplegia.



Possibilities for using virtual reality solutions in adapted physical activity

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Currently, there is a growing popularity of virtual reality in physiotherapy and sports for people with disabilities. Modern technologies offer an interesting and innovative alternative to traditional treatment protocols. The current state of knowledge based on the principles of Evidence-Based Medicine (EBM) was presented, and a review of the literature on the use of virtual reality in adapted physical activity was conducted. Practical examples of the use of virtual reality in selected clinical cases and our own observations were also presented. Virtual reality allows for an innovative supplement to existing treatment algorithms, although its exact usefulness in light of EBM must be critically verified based on randomized clinical trials with high reference value.



The role of nutrition in sleep regulation and recovery: applications for paralympic sport

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Sleep is a key determinant of recovery, cognitive function, and long-term health. Adequate duration and quality of sleep are necessary for optimal immune, endocrine, and metabolic regulation, while insufficient sleep impairs glucose metabolism, appetite control, protein synthesis, and energy balance. Practical nutritional strategies can therefore serve as accessible tools to enhance restorative sleep. For athletes, who face elevated sleep demands due to training and competition, such interventions may provide an effective means of supporting recovery and performance. Moreover, targeted dietary approaches may help mitigate circadian rhythm disturbances such as jet lag, which commonly affects athletes during long-distance travel. The aim of this review is to provide practical, evidence-based information for coaches and sport practitioners, including Paralympic athletes, to optimize sleep through nutritional strategies.



Blood flow restriction (BFR) training as a potential opportunity to develop the level of physical fitness of people with disabilities - potential considerations

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Blood flow restriction (BFR) training has emerged as a new exercise modality that allows individuals to achieve significant muscle adaptations with significantly intensity of effort. This is particularly relevant not only for athletes but especially for people who want to support long-term health. However the BFR training can be an interesting solution for people who often encounter barriers to traditional high-intensity exercise due to comorbidities or functional limitations. Physiological mechanisms of BFR, such as increased metabolic stress, muscle metabolism, glucose uptake, and muscle strength, offer promising opportunities to stimulate the adaptation process in a way that is often not possible for people with disabilities. Therefore, understanding the efficacy, safety, and practicality of BFR in this population may be a new direction not only for scientific research but above all for supporting the health and physical activity process.



Functional electrical stimulation driven cycling for the rehabilitation and competitive sport of paralyzed individuals

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Functional electrical stimulation (FES) is a technique in which electric current are applied to the muscular system to produce a functional movement. FES-assisted or FES-driven cycling is used in medical rehabilitation processes for people with spinal cord injury, whose lower limbs are paralyzed. Beside its role in rehabilitation programs, FES cycling was introduced as a competitive sport at the Cybathlon event in 2016. This event is organized in each Olympic year for people with disabilities who use advanced assistive technologies suitable for everyday use and for sport activities as well. Our team participated in the Cybathlon 2024 event and earlier, during the preparation at the Lyon Cyberdays 2023 event. Our pilot (athlete) is a 54-year-old man with a complete spinal cord injury, and for several years he participated in FES cycling training sessions weekly twice using a Berkelbike tricycle equipped with a multichannel electrical stimulator. FES assisted cycling training can be performed indoors using a cycle ergometer or stationary exercise bicycle and outdoors using a tricycle in a mobile manner. Research was performed on optimizing stimulation parameters to achieve better performance and higher power output. The timing of the stimulation of the paralyzed muscles is given as a function of the direction of the crank of the ergometer or tricycle (within the 360 degrees cycle of the crank rotation). Quadriceps, hamstrings and gluteus muscle groups were stimulated in both legs. The coordinated activation via electrical stimulation of these muscles requires research in the field of sport science, rehabilitation, engineering, and motor control. We present the application of this multidisciplinary approach in the rehabilitation and sport of individuals living with spinal cord injury.



Redesigning urban spaces for inclusive sports: enabling active participation of people with disabilities

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Introduction: urban environments play a crucial role in fostering inclusive sports for people with disabilities, promoting social integration and quality of life. While traditionally sideline, accessible sports infrastructure is now central to inclusive urban planning. This start the explores how cities can adapt to provide equal opportunities for people with disabilities in sports, from physical education to professional sports.

Material and methods: this research adopt a comparative analysis of cities that have integrated accessible sports facilities and policies. Case studies from various urban areas highlight initiatives such as wheelchair sports, accessible sports complexes, and inclusive school programs. Methods include literature review, policy analysis, and interviews with urban planners, disability advocates, and city officials.

Results: findings suggest that cities investing in universal design and inclusive sports policies improve both the physical environment and social integration for people with disabilities. cities with accessible public spaces and sports facilities report higher participation in adaptive sports local policies supporting disability inclusive sports education have also fostered great social cohesion and reduced stigma.

Conclusions: incorporating people with disabilities into sports activities is essential for building inclusive urban communities cities must prioritize accessible infrastructure and inclusive programs to ensure full participation in city life. A collaborative approach between local authorities, educational institutions, and community organisations is needed to eliminate barriers and promote equal opportunities in sports.



Data-driven injury prevention in elite team sports: lessons for inclusive and adaptive training models

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Introduction: Injury prevention in elite team sports such as football is critical for optimizing performance and maintaining player availability. Advances in wearable technologies, machine learning, and performance monitoring have provided novel insights into athlete health and workload management. This presentation explores how data-driven approaches in elite environments can inform inclusive and adaptive training strategies for broader athletic populations, including youth and athletes with disabilities.

Material and methods: This work draws from longitudinal studies conducted on elite football players across multiple seasons, incorporating GPS-based load monitoring, heart rate variability, neuromuscular fatigue assessments, and injury surveillance. Predictive models were developed using machine learning algorithms (e.g., decision trees, random forests) to identify injury risk based on training load patterns, recovery markers, and physiological indicators.

Results: The models demonstrated high sensitivity and specificity in predicting non-contact soft-tissue injuries. Key predictors included acute: chronic workload ratio (ACWR), sleep quality, perceived fatigue, and sRPE. The findings also revealed individual variability in load tolerance, emphasizing the importance of personalized training plans. Moreover, the framework shows strong potential for adaptation in diverse settings, including youth development programs and inclusive sports models.

Conclusions: Data-driven injury prevention offers scalable solutions for improving training safety and performance. Insights from elite sports environments can guide inclusive practices by promoting individualized monitoring, early risk detection, and adaptive workload management. Integrating such models in various populations, including athletes with disabilities, could enhance participation, reduce injury rates, and support long-term athlete development.



Standardisation of the use of diagnostic imaging and radiology in sports for people with disabilities

Dominik Sieroń

Group Affidea Kft

Diagnostic imaging, especially computed tomography (CT) and magnetic resonance imaging (MRI), is the foundation of modern medicine and sports medicine. In healthy patients, the examination is in many cases a problem related to the psychosomatic aspect of the patient. In patients with disabilities, this problem is further complicated by deficiencies in the standards for conducting and interpreting these examinations. This presentation analyses the current state of knowledge on the use of CT and MR in disabled people and disabled athletes and proposes directions for the standardisation of diagnostic procedures. Studies indicate that anatomical and functional differences in people with disabilities require specific imaging protocols, which are not currently widely used due to, among other things, the time required for the examination, involuntary movements and the aspect of forced positioning. A review of the literature and the authors' own research prove that the lack of standards leads to ambiguous diagnoses, delays in treatment and an increased risk of secondary injuries. The proposed standardisation model includes the adjustment of image acquisition parameters, specific patient positioning protocols, and interpretation guidelines that take into account the anatomical and functional diversity of persons with disabilities. The implementation of these standards can significantly improve the quality of medical care for disabled athletes, enabling more accurate diagnosis, more effective rehabilitation and more effective injury prevention. It is also crucial to educate medical staff on the specifics of imaging examinations in people with various types of disabilities and to ensure interdisciplinary cooperation between specialists in the fields of diagnostic imaging, electrocardiology, sports medicine and rehabilitation.



Differences in trunk rotation velocity on the dominant and non-dominant side in para table tennis players

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This study compares velocity in the acceleration phase of trunk rotations on the dominant and non-dominant side in para table tennis players. A group of 13 wheelchair table tennis players (age 24.5 ± 4.8 years, height 178.3 ± 7.4 cm, body mass 80.4 ± 6.9 kg) performed 5 rotations of the trunk to each side, in a seated position, with a barbell of 1 kg placed on their shoulders behind the neck. Peak and mean velocity produced during trunk rotational movement was registered using the FiTRO Torso Dynamometer (FiTRONiC, Bratislava, Slovakia). Results showed significantly higher peak angular velocity during trunk rotations on the dominant than non-dominant side (275.1 ± 44.7 °/s and 220.6 ± 33.4 °/s, $p = 0.020$). Mean angular velocity in the acceleration phase of trunk rotations was also significantly higher on the dominant than non-dominant side (172.2 ± 29.7 °/s and 138.5 ± 26.6 °/s, $p = 0.038$). These side-to-side differences (19.8% for peak velocity and 19.6% for mean velocity) can be attributed to asymmetric loading during trunk rotations in para table tennis. Practitioners should therefore pay more attention to incorporating exercises into their training that can reduce these imbalances and thus prevent potential back problems in the future.

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Yoga exercises for wheelchair sportsmen

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Introduction: The lecture is based on the author's research studies and contemporary knowledge in adapted physical activities and rehabilitation. It explores the possibilities of yoga and breathing exercises for individuals using wheelchairs and presents fundamental principles of their practices as part of rehabilitative and inclusive strategies. Objective The goal is to provide a theoretically grounded and practically applicable framework for adapting yoga exercises according to the health status and individual abilities of wheelchair users, without requiring complex equipment.

Material and methods: The interventions consisted of structured yoga sessions specifically adapted for wheelchair users, including guided breathing, and relaxation exercises. Monitoring methods included: •Muscle tone and tension assessed through electromyography (sEMG) •Upper body flexibility measured via goniometry and functional reach tests •Postural stability evaluated using observational assessments •Psychosomatic and autonomic responses monitored through heart rate variability, blood pressure measurements, and standardized well-being and stress questionnaires

Results: Results from adult and senior participants of both genders indicate that the interventions led to reduced muscular tension, improved flexibility of the upper body, and enhanced postural stability. Additionally, participants reported psychosomatic benefits, including stress reduction and improved mental well-being, while objective measures showed positive effects on autonomic nervous system regulation.

Conclusion: Yoga, as a multidimensional system of physical, breathing, and relaxation practices, provides a valuable tool for supporting physical, psychological, and social health. Its systematic integration into daily routines can enhance quality of life, promote psychological balance, and increase overall enjoyment of life for wheelchair users. This lecture encourages professional discussion on incorporating yoga into comprehensive supportive strategies for wheelchair users, aiming to strengthen health, mental balance, and life satisfaction.



Design and evaluation of a two-week reconditioning wellness program for athletes with intellectual disabilities within the Czech Special Olympics

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Introduction: The study aimed to design and evaluate a two-week reconditioning wellness program for athletes with intellectual disabilities within the Czech Special Olympics. The program targeted improvements in functional mobility, balance, lower-limb strength, and overall physical fitness. Its primary principle was simplicity and accessibility, with exercises requiring no specialized equipment, expert supervision, or costly facilities. The program promotes a healthy lifestyle, vitality, and regular physical activity among participants.

Material and methods: The program consisted of 19 structured activities performed by participants with intellectual disabilities. Pre- and post-program assessments included the Timed Up and Go (TUG) test, handgrip strength measured by dynamometer, and anthropometric measurements of the lower limbs. The program was designed for easy implementation at home or outdoors, suitable for coaches, caregivers, or community practitioners with minimal training.

Results: Following completion, the mean TUG test time decreased from 8.72 s to 8.52 s, indicating improved functional mobility and dynamic balance. Anthropometric measurements of lower limbs showed thigh circumference increases: right leg 53.71 cm → 56.38 cm; left leg 55.20 cm → 56.67 cm. Handgrip strength did not show significant improvement (23.52 kg → 23.10 kg). The program effectively enhanced mobility and lower-limb development, with less impact on upper-limb strength.

Conclusions: The two-week reconditioning wellness program within the Czech Special Olympics proved effective in enhancing physical health, mobility, and fitness of athletes with intellectual disabilities. It's simple, low-resource design allows broad applicability and supports healthy lifestyle adoption, social integration, and rehabilitation in this population.



Postural control in neurodevelopmental disabilities

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Postural control and balance control play an important role in our daily activities. In neurodevelopmental disorders, balance control can be affected by a number of factors ranging from musculoskeletal factors to altered perception and sensorimotor processing to motor learning difficulties. In this presentation, we will illustrate the factors affecting postural control through the example of children born with Down syndrome, a more common condition, and Williams syndrome, a rare disorder. Furthermore, we report on a study investigating the effects of balance training in a virtual environment in young adults born with Down syndrome ($n=31$) and with typical development ($n=28$). The four-week-long training resulted in improvement in both the virtual game performance as well as its successful transfer to skill improvement underlying balance performance. Our results clearly showed that virtual environment can be effectively applied to postural control training in individuals with intellectual disability.

The structure of movement patterns of wheelchair fencers depending on the category of disability

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Introduction: The aim of the study was to determine differences in the muscle activity and muscle activation time in wheelchair fencers representing disability categories A and B.

Material and methods: 16 male and female wheelchair fencers from the Polish National Paralympic Team took part in the study: 10 fencers in disability category A (mean age 27.14 ± 6.12 years), and 6 fencers in disability category B (mean age 31.26 ± 9.54 years). Two time-synchronized measurement techniques were used: surface electromyography (sEMG) and accelerometers. EMG signals and activation times were obtained for five muscles of the sword arm and, laterally, for two back and abdominal muscles.

Results: Results were presented as percentage of maximal voluntary contraction (%MVC). Each fencer performed three thrusts on the coach's torso on visual cue. Intergroup differences in reaction time (RT) and %MVC were found ($p = 0.041$): category A fencers achieved significantly lower reaction times and higher muscle bioelectric tension values than category B fencers. In particular, significant differences were found in the activity of the back muscles and the deltoid muscle of the fencers.

Conclusions: The study results indicate the importance of the back and abdominal muscles as postural muscles in wheelchair fencers in both disability categories (A and B). The identification of neuromuscular and speed determinants of technical actions in wheelchair fencers can be used to more accurately classify para-athletes into specific disability categories.



Psychological and physical challenges faced by Polish Paralympians during the COVID-19 Pandemic

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Introduction: Psychological and Physical Challenges Faced by Polish Paralympians During the COVID-19 Pandemic Introduction This study synthesizes findings from research conducted in 2020–2021 on the multifaceted impact of COVID-19 on elite athletes with disabilities, primarily Polish Paralympians. The objective was to characterize training disruption and key mental-health outcomes across distinct phases of the pandemic.

Material and methods: The investigations comprised an initial cross-sectional survey in June 2020 and longitudinal/retrospective assessments at three time points in 2021: the third wave in Poland with about 15,681 average daily cases, a low-incidence period with minimal restrictions, and the fourth wave with about 22,591 average daily cases. Across studies, sample sizes ranged from 75 to 166 participants. Data were collected via standardized online questionnaires assessing training conditions, mental-health indicators such as anxiety, depression, perceived stress, loneliness, sleep quality, and coping strategies.

Results: Severe training disruptions were reported: most athletes trained at home or outdoors, a subset temporarily ceased training, and only a very small number had access to sports facilities. Weekly training volume nearly halved. Athletes also reported difficulties maintaining contact with coaches and caregivers. Mental-health indicators fluctuated with pandemic phases, with higher anxiety, depression, loneliness, and sleep disturbances during infection waves and stricter policies. Coping strategies varied; however, prevailing coping styles were insufficient to fully mitigate pandemic-related stress.

Conclusions: Elite athletes with disabilities experienced substantial mental and physical challenges during COVID-19. Findings underscore the need for flexible psychological and organizational support tailored to this population, ensuring training continuity, rehabilitation access, and social connection during crises. The results also argue for expanded research and specialized interventions to strengthen preparedness and resilience among Paralympic athletes in future global disruptions.



AI-based advisory and analytical system supporting the development of sports for people with disabilities

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The main objective of the project is to develop a database system based on artificial intelligence algorithms that will enable the optimization of the training process for people with disabilities. The operational goal of the task, which is dedicated to athletes with disabilities and has been prepared in close cooperation with the Polish Paralympic Committee, is to monitor the training process as well as the post-training period in several important aspects, such as: nutrition, sleep, physical activity (post-training), along with the diagnosis of changes occurring in the athletes' bodies. This will allow for the identification of both adaptive (post-training) and compensatory (internal and external) changes, thus enabling effective determination of predictors. The application goal of the research is to design the structure and develop a database system supporting the coaching staff (trainers, physiotherapists, classifiers, and other management personnel) in optimizing the planning and implementation of the training process for athletes with disabilities. The system will allow for the organization and classification of parameters collected for each athlete participating in the project. The task will be carried out from September 2025 to December 2027. As part of the project, a methodology for collecting and processing measurement data will be developed so that the data can serve as input for machine learning systems. Additionally, a database system will be created to enable the storage of this data for later use. Several assessments of the well-being of the participating athletes with disabilities will also be conducted. The activities planned as part of the project will form the foundation for further research and implementation work on the full utilization of machine learning systems in supporting the training process across all sports and disciplines for athletes with disabilities.

Validity of repeated sprint ability (RSA) test in wheelchair fencing athletes

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Introduction: The aim of this study was to evaluate whether a new repeated sprint ability (RSA) test provides a valid measure of anaerobic performance in wheelchair fencing.

Material and methods: Thirteen Polish national team athletes (9 men, 4 women; mean age 34.5 ± 7.6 years) participated. Each performed two tests: the RSA (6 $\times$ 6-second sprints with 24-second recovery intervals) and the 30-second Wingate Anaerobic Test (WAnT), the recognized gold standard. Parameters analyzed included peak and mean power, total work, power decrement, and lactate concentration.

Results: Results showed strong correlations ($r = 0.67\text{--}0.95$, $p < 0.001$) between RSA and WAnT outcomes, particularly for power and work indicators. Bland-Altman plots confirmed agreement between tests, while intraclass correlation coefficients (ICC) indicated high reliability (ICC 0.92–0.95). Significant differences were noted in power decrement and total work; however, the core variables describing anaerobic capacity were consistent across both methods.

Conclusions: Importantly, the RSA test more closely reflected the specific physiological demands of wheelchair fencing, characterized by repeated short, explosive efforts interspersed with recovery. This sport-specific approach enhances its applicability for training and performance monitoring. Although the study was limited by the small sample size, findings demonstrate that the RSA protocol is both valid and reliable for assessing anaerobic performance in elite wheelchair fencers. The test offers a practical tool for coaches and athletes, supporting individualized training strategies and performance optimization.



Validation and adaptation of selected stroke precision and service tests for para table tennis players

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Introduction: Table tennis is both a competitive, Olympic sport and a recreational sport that can be practiced by anyone, regardless of age, gender, or body type. It is also a physical activity practiced by people with disabilities. Despite the increasing popularity of para table tennis, so far there have been no developed, adapted or parameterized tests of precision of strokes and service in this discipline, which would help to diversify the training process and reliably assess the level of performed attempts in relation to age, gender, training seniority or stage of training.

Material and methods: During the presentation, the results of the 2022 and 2023 studies, conducted during the training camps of the Polish national team in para table tennis, were presented. In both cases, the research group consisted of 23. selected players, playing at the international level. The main objective of the research was to validate (repeat each year at three dates) and adapt (using selected quantitative and qualitative methods) selected tests of special fitness of P. Purashwani and F. Gomes, taking into account the rules of the game and the specifics of table tennis for people with disabilities.

Results: The results of both studies were published in international scientific journals with IF - Adapted Physical Activity Quarterly and Acta Kinesiologica. The individual trials were adapted for a pair of table tennis players using the Delphi method, Aiken's formula and Cohen's Kappa index. For most of the tests, it was found that the results obtained at three consecutive time points were similar ($p < .05$ during the 2022 tests and $p < .05$ during the 2023 tests), and the strength of this concordance was close to the value of 0.6 in 2022 and 0.7 in 2023.

Conclusions: The proposed research is innovative and interdisciplinary in nature. There is an urgent need for the creation, adaptation and parameterization of stroke and serve precision tests in para table tennis.



Deaf communication in Regatta Sailing

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Polish Deaf Sports Association

Introduction: Deaf sailing in Poland has been developing in practice for many years. It is supported by the Polish Deaf Sports Association, which is responsible for training deaf sailors in sailing, organizing training camps and participating in national and international events. It has participated three times in the World Sailing Championships for the Deaf, where Polish deaf sailors achieved success. A key factor in the success of this election is effective communications: 1. Between the coach and the competitors. 2. Within the crew. 3. Between the crew. All kinds of assistive tools are used to provide deaf sailors with the necessary support during regattas.

Material and methods: Short film clips presenting sign language in sailing. Case study – Communications methods based on the example of a team of deaf sailors. Research questions: How do deaf/hard-of-hearing crews communicate during training camps and regattas? How do deaf sailors receive the starting announcement (other than audio) during competitions?

Results: To ensure the smooth running of sailing competitions, coaches organize briefings during training camps and before competitions. During briefings, the course plan is thoroughly communicated on the water, using both spoken and sign language (a sign language interpreter is used). Visual signals are presented, which will be used during the competition as starting and finishing signals. The room where the briefings are held are chosen deliberately. Attention is paid to proper lighting and the elimination of outside noise. Whiteboards are also useful, allowing coaches to visualize, for example, the regatta course. Additionally, coaches share important information via WhatsApp – in a group created for deaf sailors. Deaf competitors have varying degrees of hearing loss. Some use hearing aids, but during competitions, everyone removes them and leaves them on shore. Communication with deaf people on a yacht relies primarily on visual communications, such as sign language, facial expressions, and previously developed methods of collaboration. Deaf competitors read the body language of their crew members and competitors, which significantly translates into making the right decisions during regattas.

Conclusions: Communication between deaf sailors in regatta sailing is a constantly evolving process, and ways are constantly being sought to facilitate it during training camps and competitions. Knowledge of sign language, at least at a basic level, is essential. Crew collaboratively develop a communications system in advance, which is used during competitions. Deaf sailors demonstrate that silence is not a barrier. It is a strength. In regatta sailing, communications allow for effective achievement not only on the national stage but also internationally.



Frame running as a form of adapted physical activity and a new Paralympic discipline

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Introduction: Frame Running is a rapidly developing sport discipline designed for individuals with motor impairments, particularly those with cerebral palsy (CP). It has been officially included in the program of the Los Angeles 2028 Paralympic Games. Athletes use special three-wheeled running frames that enable independent mobility and “running” despite motor limitations. Frame Running combines competitive sport, rehabilitation, and recreation, aligning with the concept of Adapted Physical Activity (APA).

Material and methods: The study is based on the activities of the Frame Running Terenia Club Wrocław and observations from both coaches and athletes. The functional use of the equipment was analyzed in competitive training as well as in recreational activities such as mountain hikes, city walks, and adapted physical games. National organizational and training initiatives led by sports clubs, federations, and governmental institutions in Poland were also considered. In addition, available scientific research results on the impact of Frame Running on physical fitness, health, and psychosocial functioning of individuals with disabilities were reviewed.

Results: Frame Running has been observed to improve endurance, muscle strength, and coordination, while also enhancing social integration and overall well-being among people with disabilities. In Poland, the discipline is undergoing dynamic growth, with new clubs being established, coaching courses organized, and competitions held. At the same time, further research is needed to assess potential risks such as overuse injuries and the specific impact on the musculoskeletal system of individuals with CP.

Conclusions: Frame Running should be regarded as a multidimensional activity – a competitive sport, a tool for rehabilitation, and a form of recreation. Its developmental potential spans both elite-level preparation for the Paralympic Games and daily activation within APA. Effective cooperation between the sports community, researchers, and public institutions will be crucial for fully realizing the opportunities created by its inclusion in the Los Angeles 2028 Paralympic program.

Monitoring of physiological parameters as a foundation for personalized supplementation and nutrition in athletes with disabilities

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Introduction: Para-sport is rapidly developing, and the growing awareness of athletes' individual needs opens new perspectives for optimizing nutritional and supplementation strategies. While traditional sports nutrition guidelines remain an important reference point, the complexity of the physiology of athletes with disabilities requires precise, individualized tools. A key direction is the integration of continuous physiological monitoring technologies—particularly continuous glucose monitoring (CGM) and core body temperature (CBT) measurement using the CORE 2 sensor.

Material and methods: CGM provides real-time data on interstitial glucose levels, enabling assessment of carbohydrate intake, glycemic responses, and recovery processes. The CORE 2 sensor offers non-invasive monitoring of core temperature and heat strain, supporting hydration, supplementation, and recovery strategies. Combined with training parameters such as power, heart rate, and GPS, these tools create a holistic athlete monitoring framework.

Results: CGM enables the personalization of carbohydrate strategies, detection of glycemic variability, prevention of nocturnal hypoglycemia, and indirect insights into energy availability and recovery. Concurrently, CORE 2 technology facilitates accurate monitoring of heat load and adaptation to hot environments, enhancing individualized hydration and nutritional protocols. Integration of both systems with training data provides comprehensive tools for managing load, safety, and performance. Despite limitations—such as CGM delays, the need for validation of CORE 2 in athletes with disabilities, and regulatory restrictions during competition—both technologies show significant potential to enhance performance, accelerate recovery, and increase athlete safety.

Conclusions: Continuous monitoring of glucose and core temperature represents the foundation of modern protocols for personalized nutrition and supplementation in athletes with disabilities. These technologies have the potential to redefine best practices in para-sport by addressing unique metabolic and thermoregulatory challenges. Future interdisciplinary research and standardized, evidence-based protocols are essential for fully exploiting their potential and setting new standards in the field.

Macro- and micromorphological properties of the rotator cuff structures in elite paralympic swimmers with tendinopathy

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Introduction: Rotator cuff tendinopathy represents one of the most common overuse injuries in elite swimmers, particularly in athletes with disability classifications where repetitive upper-limb propulsion is fundamental for performance. Ultrasound imaging allows simultaneous assessment of macromorphological parameters, such as tendon thickness, and micromorphological indices, including Peak Spatial Frequency Radius (PSFR), which reflects structural organization within the tendon. The aim of this study was to evaluate both macro- and micromorphological properties of the supraspinatus tendon in elite Paralympic swimmers with diagnosed tendinopathy.

Material and methods: The study included 20 elite Paralympic swimmers classified in functional classes S7–S10, all presenting clinical symptoms of supraspinatus tendinopathy. Each participant underwent standardized ultrasound examination. Tendon thickness (long axis) was measured at defined anatomical reference points, with particular attention to the middle segment. Micromorphological organization was quantified using the PSFR index derived from high-resolution ultrasound images. Measurements were performed with consistent positioning and probe alignment to ensure reproducibility.

Results: Athletes with supraspinatus tendinopathy demonstrated significantly greater tendon thickness compared to asymptomatic controls. The most pronounced differences were identified in the middle tendon segment, where altered structural remodeling was evident. In addition, PSFR values were higher in the tendinopathy group, indicating reduced homogeneity and increased irregularity of the fibrillar pattern. These findings suggest that tendon pathology in this athletic population is characterized by both macroscopic enlargement and microstructural disorganization.

Conclusions: Combined macromorphological and micromorphological ultrasound analysis provides valuable insights into tendon adaptation and pathology in elite Paralympic swimmers. The increased tendon thickness along with higher PSFR in individuals with tendinopathy may reflect maladaptive responses to repetitive loading inherent to swimming training. These features highlight the potential of quantitative ultrasound as a non-invasive diagnostic and monitoring tool for early detection and management of rotator cuff tendinopathy in Paralympic sport.



The chair makes the difference: ergonomic effects on trunk Kinematics assessment in wheelchair athletes

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Introduction: The International Paralympic Committee's 2025 classification code update emphasizes the importance of adaptive equipment in athlete assessment. This study aimed to investigate how ergonomic conditions affect trunk range of motion measurements (ROM), which are crucial for accurate wheelchair basketball classification.

Material and methods: Sixty-three active manual wheelchair users participated (54 males, 9 females), including 54 wheelchair basketball players and 9 athletes from other wheelchair sports. Clinical trunk and hip function assessments assigned participants to four functional classes, strongly correlating with official wheelchair basketball classification (Spearman's $r=0.94$). A repeated measures design examined trunk volume of action across four ergonomic conditions: (1) full support on an adapted platform-chair (inclination, straps, backrest), (2) partial support (straps, backrest), (3) no support, and (4) participant's sport wheelchair. Based on IMU sensor measurements, trunk angles were estimated for flexion, extension, lateral flexion, and rotation movements. Peak values were extracted from each trial, and the total volume of action was calculated by summing peak values across all movement directions for each condition.

Results: Mixed ANOVA revealed significant main effects and a critical interaction between ergonomic condition and functional group. Athletes with minimal trunk function (Groups 1-2) demonstrated severe movement restrictions without support, with most unable to perform movements. With full platform support, they achieved 86° and 188° respectively. Remarkably, these athletes reached optimal performance in their customized sport wheelchairs (152° and 199°), significantly exceeding standardized platform assessments. Higher-functioning athletes (Groups 3-4) maintained substantial ROM across conditions, with sport wheelchairs and partial support yielding optimal results. Paradoxically, full support restricted movement in the highest-functioning group.

Conclusions: Ergonomic configuration critically determines functional assessment outcomes in wheelchair athletes, with effects varying by impairment level. Athletes demonstrate optimal function in their individualized sport wheelchairs, validating the IPC's 2025 framework, recognizing adaptive equipment as integral to fair classification.

Inclusiveness in sports management – analysis of sports facility accessibility for people with disabilities based on the "Sport without Barriers" report

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Introduction: Sports facility management in the context of accessibility for people with disabilities is a key element of responsible sports development. Implementing universal design principles requires both appropriate infrastructural solutions and a high level of managerial awareness. The study aimed to analyse the degree of accessibility of Polish sports facilities and to identify managerial factors influencing the implementation of inclusive practices.

Material and methods: The research was conducted using document analysis (desk research) based on the “Sport without Barriers” report, which examined 12 major sports facilities in Poland. The analysis covered 20 accessibility criteria divided into three categories: physical infrastructure, organisation, and information. Both technical solutions (e.g., entrances, elevators, toilets) and systemic measures (e.g., staff training, communication, digital accessibility) were evaluated.

Results: The analysis revealed significant progress in physical infrastructure accessibility — most new arenas and stadiums follow universal design principles. The most frequently implemented improvements include adapted entrances, signage, and toilets. However, information and digital accessibility remain insufficient, with a lack of audio description, tactile maps, and accessible websites. The level of accessibility proved to depend mainly on the awareness and initiative of facility managers rather than on uniform legal regulations.

Conclusions: The findings indicate that the proactive attitude of sports facility managers plays a crucial role in improving accessibility. It is recommended to introduce nationwide accessibility standards, implement certification systems for facilities, conduct systematic training for managerial staff, and increase financial support for infrastructure modernisation and digital inclusion initiatives. Keywords: inclusiveness, sports management, accessibility, people with disabilities, sports infrastructure

We would like to inform you that this book of abstracts was created specifically for conference participants. The electronic book of abstracts, containing a conference summary, notes from the panel discussions, and abstracts of all the presentations, will be published on the conference website and sent to you by email within two weeks after the conference.

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