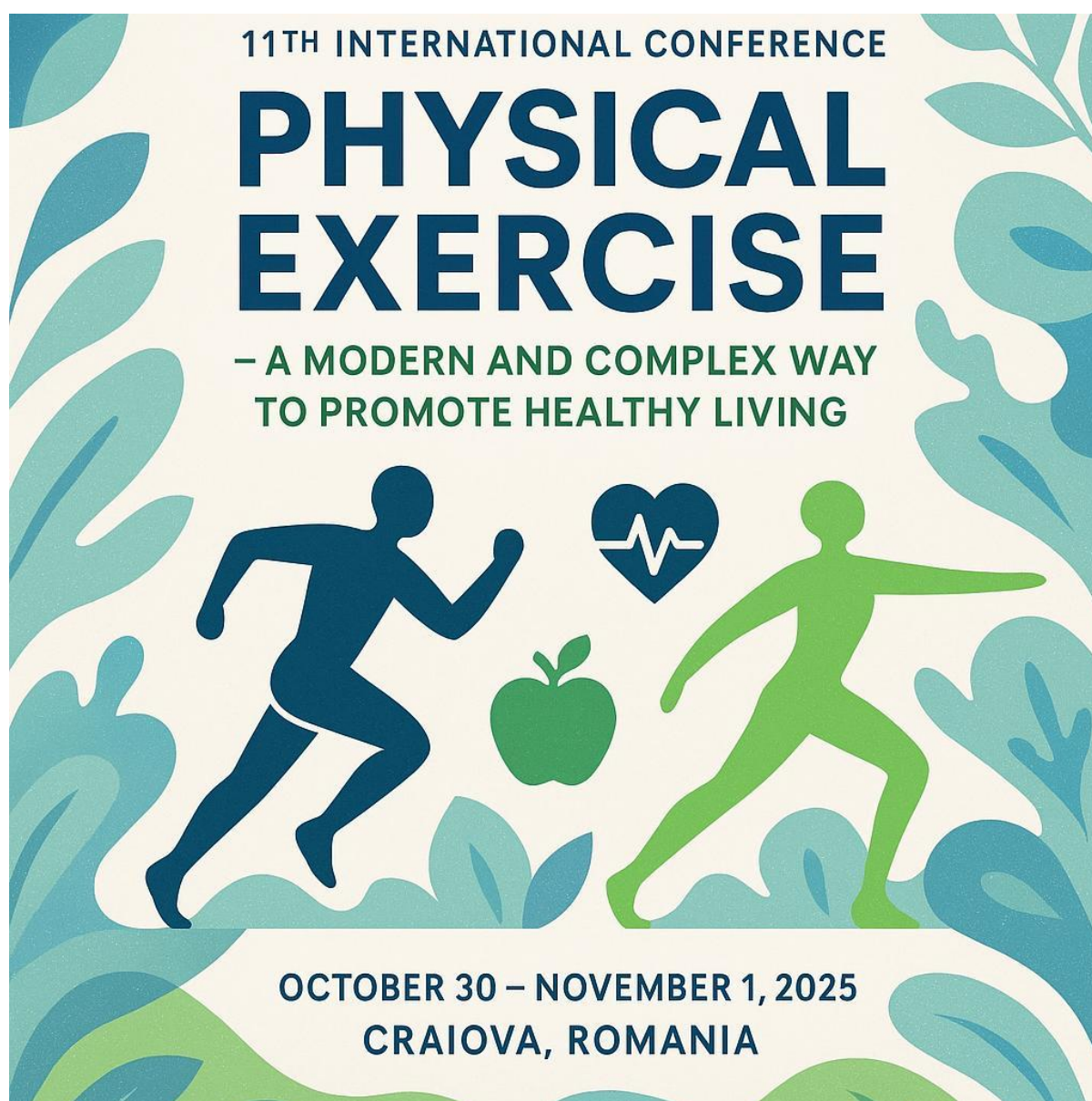




11th International Conference

"Physical Exercise – A Modern and Complex Way to Promote Healthy Living,"
Craiova, Romania, from October 30th to November 1st, 2025



-ABSTRACTS BOOK-



SPORT SCIENCES (SS)



ABSTRACT

The effects of implementing spinning as a complementary discipline on the psychomotor development of 11th-grade students

Adelina SCHEULEACA*

a Doctoral School, State University of Physical Education and Sport (USEFS), Chişinău, Republic of Moldova

* Corresponding Author: adelinanegrileasa@gmail.com

The aim of this study was to evaluate whether a spinning (indoor cycling) program produces significant improvements in psychomotor indicators—specifically static balance, coordination, and exercise capacity—in high-school students.

Methods. The study, conducted over 12 weeks at Wonder Gym Suceava, included 40 participants allocated to two equal groups (experimental and control; 10 girls and 10 boys per group), with 2 sessions per week lasting 45 minutes each. The assessment comprised five psychomotor tests (Flamingo, Simple Reaction, Eye-hand Coordination, Spatial Orientation, Applied Course), two spinning-specific tests (Pedaling at 75% HRmax—minutes; 1-minute RPM), and two general strength/endurance tests (30-second Sit-ups; 12-minute Cooper). **Analysis of the results** showed significant pre-post improvements in the experimental group and superiority over the control: reductions in Simple Reaction time (by approximately 40 ms), shorter times for Spatial Orientation and Applied Course (by approximately 7 s each), and increases in Eye-hand Coordination, 30-second Sit-ups (by approximately 6–7 repetitions), 1-minute RPM (by approximately 14 rpm), Pedaling at 75% HRmax (by approximately 2 minutes), and the 12-minute Cooper test (by approximately 280 m).

Conclusions. The findings confirm the effectiveness of spinning in supporting coordination, balance, and endurance, and justify its curricular integration (modular or elective) in the high-school setting.

Keywords: psychomotor development, physical education, high school, spinning (indoor cycling), coordination, endurance



ABSTRACT

Study on the development of motod skills in high school students through the use of handball-specific training methods

Adrian GEORGESCU^{a*}, Emilia-Andreea DAN-ZAMFIR^b, Cristian POPA^a, Ionel MELENCO^a

^a Ovidius University of Constanta, Faculty of Physical Education and Sport, Constanta, Romania

^b Graduated of Physiotherapy and Special Motricity, Faculty of Physical Education and Sport, Ovidius University of Constanta, Romania;

* Corresponding author: email: adrian_georgesci_78@yahoo.com

Aim. The study aims to highlight the effectiveness of using handball-specific means in developing motor skills among high school students. The research stems from the need to identify attractive and applicable methods within physical education lessons, capable of stimulating students' interest in motor activity and contributing to the improvement of their overall physical fitness.

Methods. The experiment was conducted over a period of 5 weeks during physical education, involving a sample of 8 students (4 girls and 4 boys) from grades IX-XII, aged between 13 and 18. The applied program included handball-specific exercises integrated into play forms and motor circuit. Progress was monitored through standardized motor test assessing speed, strength, endurance, flexibility and coordinative abilities, administered at the beginning and at the end of the program.

Results. The comparative analysis of the initial and final revealed significant improvements in all evaluated motor qualities, particularly in speed and strength. The students demonstrated increased levels of engagement and motivation and the obtained results confirm the effectiveness of handball-specific means in enhancing overall motor development.

Conclusions. The implementation of a program based on handball elements within physical education for stimulating fundamental motor qualities in high school students. Through its dynamic and attractive nature, handball can serve as a valuable toll in promoting an active and healthy lifestyle.

Keywords: motor skills, handball, physical education, high school, physical development



ABSTRACT

The role of aquatic exercise in maintaining health and morpho-functional performance in young adults

Adriana SLUSARa

a "Ștefan cel Mare" University of Suceava, Romania

e-mail: slusaradriana87@gmail.com

Introduction/Background: Physical activity performed in an aquatic environment holds special value for general health and morpho-functional performance due to the resistance provided by water and the reduced joint impact. Swimming stimulates cardiovascular and respiratory functions, contributes to muscle toning, and supports psychophysical balance. The aim of this study was to evaluate the role of aquatic exercise in maintaining and improving morpho-functional capacity in young adults aged between 25 and 30 years.

Material and Methods: The research was conducted on a sample of 40 active young adults (20 men and 20 women) who participated in a structured swimming program for 12 weeks, with a frequency of three sessions per week, each lasting 60 minutes. Morphological parameters (weight, body mass index, body fat percentage) and functional parameters (vital capacity, resting heart rate, muscular endurance) were evaluated before and after the training period. Statistical analysis was performed using the paired t-test ($p < 0.05$).

Results: The results showed significant improvements in body mass index (average decrease of 4.2%), an increase in vital capacity by 6.8%, and an increase in muscular endurance by 12.5%. The resting heart rate decreased on average by 7 beats per minute, indicating favorable cardiovascular adaptation. Participants also reported increased energy levels and an overall improvement in well-being.

Conclusions: Aquatic exercise proved to be an effective and safe method for maintaining and developing health and morpho-functional performance in young adults. Regular swimming practice can significantly contribute to preventing chronic diseases, enhancing functional capacity, and promoting psychophysical balance in the young adult population. It is recommended that swimming be included in health promotion and regular physical activity programs.

Keywords: swimming, aquatic exercise, morphofunctional capacity, health, young adults



ABSTRACT

The impact of speed on lower limb control asymmetry in triple extension movement during psycho-neuro-motor training

Alexandra Reta IACOBIN^a, b*, Pierre Joseph DE HILLERIN^a

^a Doctoral School of Sports Science and Physical Education, National University of Science and Technology Politehnica Bucharest, Pitești University Center, 110040 Romania

^b Faculty of Physical Education and Sport, Spiru Haret University, 030045 Romania

* Corresponding author: alexandra.iacobini@spiruharet.ro

Background. This study investigates the outcomes of psycho-neuro-motor control training sessions conducted with junior basketball athletes, employing a Conditions Simulator for Water Sports (C.S.N. Simulator). The primary aim of the program was to enhance movement control during the vertical jump and to optimize execution quality. Although symmetry analysis was not a predefined objective, observations revealed modifications in lower-limb symmetry as a result of the psycho-neuro-motor control interventions. Building on our previous findings that control asymmetry in ankle joint extension varies with execution speed, this study further explores the dynamics of symmetry and asymmetry under different motor demands.

Methods. A case study was conducted on a junior basketball athlete, focusing on the emergence of movement symmetries and asymmetries following training with the C.S.N. Simulator. Collected data enabled the assessment of the dynamics of symmetry and asymmetry in the triple extension movement, offering insights into the coordination of both lower limbs under varying performance demands.

Results. Findings indicated that lower-limb control during the triple extension is influenced by execution speed, with evidence of differential adaptations in response to increased velocity demands.

Conclusions. The study highlights new research avenues regarding the dynamics of symmetry and asymmetry in motor control, both in additional movement patterns and across diverse athletic populations. Future investigations extending to upper-limb movements and athletes from other sports disciplines may contribute to the development of training strategies aimed at optimizing asymmetries and, ultimately, enhancing athletic performance.

Keywords: interlimb asymmetry, psycho-neuro-motor control, execution speed, basketball performance



ABSTRACT

The interaction of energy systems in the specific effort of the applied swimming and drowning rescue events in the naval pentathlon

Alexandru ABRAMIUCa*

a The Department of Physical Education, Sports and Physical Therapy, Faculty of Physical Education and Sport, Ovidius University of Constanta, 900470 Constanta, Romania

* Corresponding author: alexandru_abramiuc@yahoo.com

Introduction: The aim of this research is to bring new information, in the sense of a deep understanding of the role of the interaction of energy systems in the specific effort of the applied swimming and drowning rescue events, components of the naval pentathlon.

Methods: In the naval pentathlon events, referring to the classification of endurance efforts in cyclic sports, the effort made by swimmers both in training and in competitions is an endurance effort in a strength regime. Thus, organic aerobic endurance is the result of cardiac hypertrophy that allows a higher systolic volume, an increase in cardiac tone with an effect on the opening of capillaries, an increase in the number of functional pulmonary alveoli that absorb oxygen, an improvement in gas exchange at the alveoli level and blood modification that allows a more abundant transport of oxygen to the tissues.

Results: The two tests correspond to the anaerobic organic effort - the body's ability to take over the products of wear, to work in toxic conditions of oxygen debt: the specific effect is the anaerobic speed-endurance effort, specific to the 50-100m tests. In our case the distance is 75m for drowning rescue and 125 m for the applied swimming (equipped with swimming fins).

Conclusions: The applied swimming and drowning rescue tests in the naval pentathlon simultaneously require anaerobic and aerobic energy mechanisms, depending on the intensity and duration of the effort. Performance depends on the development of anaerobic speed-endurance, but also on the optimization of cardio-respiratory functions specific to aerobic endurance, which requires an integrated training adapted to the requirements of these tests.

Keywords: swimming, energy system, pentathlon



ABSTRACT

Integrating sustainability and digitalization principles into sports management practices

Alexandru SIMION^a, Andreea-Adriana SIMION^b, Andreea-Ioana VĂCUȚ^c

a University of Craiova, Str. A.I.Cuza, no. 13, Craiova, Romania

b University of Craiova, Str. A.I.Cuza, no. 13, Craiova, Romania

c University of Craiova, Str. A.I.Cuza, no. 13, Craiova, Romania

* Corresponding author: email: alexandru.simion@edu.ucv.ro

This article analyzes how sustainability and digitalization are becoming fundamental pillars of contemporary sports management. Sustainability is viewed both from the perspective of social and environmental responsibility, and as an opportunity to increase the efficiency and attractiveness of sports organizations' activities. Digitalization, through the use of smart technologies, online platforms and data analysis tools, supports decision-making processes, optimizes resources and improves the experience of athletes and spectators. The integration of the two directions allows sports organizations to strengthen their public image and adapt more quickly to the continuous changes in the global sports environment. In this article, we aim to emphasize that the sports management of the future must be innovative, ethical and oriented both towards performance and towards responsibility towards the community and the environment.

Intoduction: In the context of profound transformations generated by globalization, sports management is faced with complex challenges that require the integration of new strategic paradigms. Sustainability pressures, together with the accelerated progress of digitalization, determine a reassessment of organizational practices and structures in the field. Thus, the integration of ecological, social and technological dimensions becomes essential for the development of an innovative, ethical and sustainable performance-oriented sports management model. Sustainability is a global theme that has come to influence numerous sectors of the economy and industry (Bunget, O. C., Dumitrescu, A. C., Burcă, V., & Bogdan, O., 2023). In the sports field, the aim is to integrate the principles of sustainable development in the organization and conduct of sports activities. This includes reducing the impact on the environment (renewable energy, waste management, sustainable transport), social responsibility (inclusion, accessibility, community involvement) and ensuring long-term economic viability. Sport thus becomes an instrument of change, educating and mobilizing the public towards environmental protection and social equity. Digitalization in sport is the process of integrating digital technologies into the structures and processes of



organization, training, competition and communication, leading to significant transformations in the way sports activities are practiced, managed and consumed. The sports industry is undergoing a profound transformation, driven by the rapid evolution of digital technologies (Geissler D, Beiderbeck D, Schmidt SL, Schreyer D. , 2024), (Pashaie S, Mohammadi S, Golmohammadi H., 2024). From fan engagement to athlete performance, data analysis and immersive experiences, virtual and augmented reality, innovations such as artificial intelligence (Glebova et al.), blockchain and the metaverse are redefining the way sports are practiced, consumed and marketed. (Pizzo AD, Fornaciari CJ, Coyle P, Varzgani N, Pierce M., 2024).

Material and Methods:Sustainability in sport is the integration of ecological, social and economic principles in the planning, organisation and implementation of sporting activities and events. The main objective is to ensure that the development of the sports sector generates benefits for both individuals and the environment, while maintaining long-term economic viability. Sport can have a significant impact — from its environmental footprint (energy consumption, waste, transport) to its social effects (community involvement, inclusion) and economic influence (local development, sponsorships). Sustainability ensures that these effects are positive and balanced. more academic. The environmental dimension aims to improve and adopt environmentally friendly behaviour, through a high level of protection of natural resources and reducing the negative impact of human activity on the environment. It promotes sustainable practices, such as reducing waste, conserving energy and reducing the carbon footprint. Thus, this dimension includes individuals and organisations involved in activities that are beneficial to the environment. (Klaperski-Van Der Wal, S., 2023) .The social dimension is often defined in the literature as the area of sustainability that aims to promote social inclusion and cooperation between people, helping to overcome certain social barriers. It also aims at unity between people by achieving common goals. (Taylor, P., Davies, L., Wells, P., Gilbertson, J., & Tayleur, W. 2015., 2024).The economic dimension focuses on the financing and sustainable use of resources in sport, as well as balancing economic growth in sport with social and environmental responsibility and ensuring the long-term viability of sports organizations and infrastructure. The economic dimension aims to encourage sustainable consumption and production by reducing waste and promoting resource efficiency. It is about bridging the gap between economic growth and environmental protection. Thus, long-term economic stability is promoted through investments in sustainable infrastructure and practices that benefit both the economy and the environment (Murga-Menoyo, M. Á., 2014). Digitalization is one of the most influential trends of the contemporary era, radically transforming the way sports are practiced, managed and perceived. Digital technologies have penetrated all aspects of the sports field — from training and competitions, to club management, communication and fan engagement. They provide advanced tools for collecting, analyzing and using data, facilitating strategic decision-making, improving performance and



optimizing the spectator experience. Digitalization covers all areas of society, especially sports. This paper presents the results of a research and analysis on digital media, with a special focus on the diversity of their implementation (analysis, broadcasting of sports events, promotion, etc.). (Dugalić, 2018). Knowledge of new business skills is essential for the survival of the sports management profession in the contemporary market (Dugalić S. &, 2016). Therefore, there are multiple benefits in researching the digitalization of media in sports, and one of the common characteristics of sports and digital media that requires study is the concept of "massivity" from a sociological perspective. Sports unite people through common ideas, places, organizations and values. These bonds become extremely strong, which imposes the need for communication and synchronization of all activities within and outside the sports system. Thus, the spectrum of communication acquires modern mechanisms for information transfer, and communication itself undergoes significant transformations. (Dugalić S. , 2018). Professional sports, globalization and the challenges generated by international competitiveness in sports impose the need for long-term strategic planning from the stage of technical-tactical, psychological and other types of training of athletes. Given that they offer excellent performance in rendering video content for strategic analysis (image clarity, fast transition of sequences following the trajectory of objects, slowing down athletic actions, etc.), digital radio transmission systems have been rapidly adopted by sports professionals. (Dugalić S. , 2018)

Digital cameras also play an important role in sports for multiple reasons, including performance correction, thus contributing to the improvement of sports results through interactivity and personalization of digital sports recordings, as explained by (Owens, N., Harris, C., & Stennett, C, 2003) This sophisticated technology uses various methods to classify video sequences into technical-tactical and strategic models in sports, which are the subject of experiments. Specified parameters, such as the (lack of) structure in certain sports and tasks (e.g., classifying game sequences based on the identification of athlete movements and object trajectories), help to analyze past performances and simulate strategically designed future performances. (Dugalić S. , 2018). Effective analysis of movement and activity during the game, essential for achieving a sporting result based on a solid strategic foundation, requires sophisticated technologies for detecting and monitoring the movement of players and objects, as well as analyzing their behavior and the course of the game. The methodology used by sports professionals for this purpose consists of evaluating video footage obtained from interconnected cameras covering the entire playing surface. (Dugalić S. , 2018). Digitalization as a tool for sustainability in sports, it is one of the most important transformative factors in contemporary sports management, providing innovative tools and technologies that can support sustainability objectives. In the context of increasing concerns about environmental impact, resource efficiency and social responsibility, the integration of digital technologies becomes essential for optimizing processes, reducing costs and minimizing the environmental footprint of sports activities.



Sport is one of the most popular social activities worldwide. It is also one of the most dynamic industries from an economic point of view, recording an annual growth of over 7% between 2014 and 2019 [4]. The field of sports is at the intersection of economic, political and social issues. For this reason, sports organizations must consider sustainability as an essential dimension of their development and management as a major concern.

Digitalization and sustainability in sport are closely interconnected, creating a relationship of interdependence in which digital technologies become catalysts for sustainable practices. This relationship can be analyzed on three main levels:

1. Optimizing resources and reducing environmental impact

Digital technologies allow monitoring the consumption of energy, water and other resources, optimizing their use and reducing waste. Examples include intelligent systems for lighting and air conditioning of sports facilities or applications for managing the transport of event participants.

2. Increasing efficiency and transparency

Digitalization facilitates the collection and analysis of data, providing sports organizations with relevant information for sustainable decision-making. Thus, digitalization supports the creation of green strategies based on real data and improves environmental responsibility.

3. Boosting social and economic inclusion

Digital platforms can increase the accessibility of sport through online broadcasts, interactive applications and educational campaigns, thus reducing the need for physical travel and the associated impact. At the same time, digitalization can open new economic opportunities through the development of innovative and sustainable sports services.

More generally, sports organizations have a rare opportunity to influence the lifestyles of millions of people around the world by setting standards and presenting strategies for environmental sustainability. Sport can act as a catalyst for the generation of sports facilities that can be used by local communities for decades. Sport can also change the image and reputation of destinations and places. (Christopher H., Michel D., 2023)

Providing a general perspective on sustainability in sport may seem like an impossible mission. In reality, this approach must involve different stakeholders and organizations, addressing a wide variety of issues, as described below. Providing a general perspective on sustainability in sport may seem like an impossible mission. In reality, this approach must involve different stakeholders and organizations, addressing a wide variety of issues. (Christopher H., Michel D., 2023)

Conclusions: In conclusion, integrating sustainability and digitalization into sports management is a key strategic factor: it allows organizations to be more efficient, reduce environmental impact, create economic and social value, and provide better experiences for athletes, fans, and the community. This approach combines ecological and social responsibility with technological innovation, strengthening the reputation of federations, clubs, and sports arenas, and attracting sponsors and long-term partners.



Potential future directions for this research could include conducting a quantitative study on how sports clubs in Romania communicate about sustainability, approaching new target audience segments (athletes, people involved in sports, sports fans, business representatives who have contact with the sports field), but also studying aspects related to the cultural values of Romanian sports fans that influence openness to sustainability.

Keywords: sports management, sports organizations, sustainable development, digitalization, innovation



ABSTRACT

Modernizing youth football training through technology-assisted global coaching

A. VLĂESCU^{a*}, I. MELENCO^a

^a Universitatea Ovidius Din Constanta, Școala Doctorală de Știința a Sportului și Educației Fizice, Aleea Universității, Constanța, România

*Autor Corespondent: vlaescualexandru@yahoo.com

Introduction. Recent developments in sports science have led to a significant shift in the preparation of young athletes, gradually moving from analytical methods—focused on the isolated development of specific components—to global and integrated approaches that more accurately reflect the complexity of the real game. In this context, the present research aims to examine the effectiveness of a modern youth football training model based on the integration of cutting-edge digital technologies within a global training framework.

Material and Methods. The main objective is to assess the impact of combining technical, tactical, physical, and cognitive development within a unified, interactive, and personalized environment, supported by technological tools such as video analysis systems, wearable sensors, interactive digital devices, and real-time feedback technologies. Continuous monitoring of physiological parameters and technical–tactical performance is expected to enable the individualized optimization of training loads, enhance motivation, and improve motor learning processes.

Results. It is anticipated that this innovative approach will lead to significant improvements in physical qualities (strength, speed, endurance) and technical–tactical abilities (ball control, execution accuracy, decision-making capacity), as well as to greater active engagement of young athletes in the training process. The results obtained may provide a solid scientific foundation for redefining methodological strategies used in youth football development, in accordance with international trends in the modernization of youth sports training.

Conclusions. The implementation of this model may contribute to shaping a generation of young footballers better adapted to the demands of modern football—characterized by speed of thought, adaptability, and technology-supported performance.

Keywords: global training; youth football; sports technology; wearable sensors; real-time feedback; technical–tactical development



ABSTRACT

From stability to performance: integrating proprioceptive assessments into the training of junior II handball athletes

**Alex-Paul SECIUa*, Roxana-Nicoleta POPAa, Virgil ENE-VOICULESCUb,
Carmen ENE-VOICULESCUc**

a University of Craiova, Doctoral School of Social Sciences and Humanities, Alexandru Ioan Cuza Street, no. 13, 200585 Craiova, Romania c

b Naval Tactics and Armament Department, Faculty of Marine Engineering, Mircea cel Batran Naval Academy, 900218 Constanta, Romania

c Physical Education, Sports and Physical Therapy Department, Faculty of Physical Education and Sports, Ovidius University of Constanta, Cpt. Av. Al. Serbanescu Street, no. 1, 900470 Constanta, Romania

* Corresponding author: email: secialex95@gmail.com

Introduction: Handball requires rapid multidirectional movements, explosive accelerations, and frequent physical contact, which place considerable strain on the musculoskeletal system and elevate injury risk in the absence of sufficient joint stability and neuromuscular control. While traditional training has focused on physical and technical skills, increasing attention is directed toward proprioception as a key factor in both performance and injury prevention.

Proprioception—the body's ability to sense and regulate joint and muscle position without visual input—underpins coordination, balance, and motor control, enabling athletes to perform complex movements safely and effectively. For adolescent players, particularly those in the Junior II category, proprioceptive training is crucial due to ongoing physiological changes that heighten vulnerability to injury. Its systematic inclusion in handball programs enhances motor control, strengthens joint stability, and reduces the incidence of sprains, dislocations, and ligament damage, while also laying the foundation for long-term athletic development.

Material and Methods: This study investigates the role of proprioceptive structures in the training of Junior II male handball players, emphasizing their impact on coordination, balance, agility, and injury prevention during adolescence—a critical stage of physical and neuromuscular development. Conducted on teams representing the Junior II category, the research aimed to evaluate performance speed, dynamism, and motor control through scientifically validated proprioceptive assessment tools. Methods included documentation, systematic observation, experimental testing, statistical and mathematical analysis, and graphical data representation.

The central hypothesis proposed that targeted proprioceptive testing can



effectively measure players' ability to regulate strength, speed, and dynamic balance, thereby offering insights into both motor efficiency and injury risk. To test this, the study employed a series of protocols: the digitalized Balance Error Scoring System (BESS) to detect postural control deficits; the Proprioceptive Reaction Wall (Smart Wall) to measure accuracy and reaction time; isometric strength testing with a portable dynamometer (MuscleBoard) static muscle force; a Specific Handball Endurance Circuit to replicate sport-specific demands; and a Target- Throwing Test following proprioceptive stimulation to evaluate precision under instability. Through these methods, the study provides evidence on proprioceptive-motor development in young handball players, with direct implications for optimizing training strategies and reducing injury incidence.

Results: Based on the proposed hypothesis and the application of the selected proprioceptive tests, several outcomes can be anticipated. It is expected that the *digitalized BESS test* will reveal a measurable improvement in postural stability and a reduction in balance errors, particularly under unstable conditions, thereby confirming the effectiveness of proprioceptive- oriented training in enhancing neuromuscular control. Similarly, the *Proprioceptive Reaction Wall* is likely to demonstrate shorter reaction times and increased precision in movement execution, reflecting improvements in coordination, agility, and cognitive-motor responsiveness. The use of the *MuscleBoard isometric dynamometer* is anticipated to highlight segmental strength gains and a reduction in muscular asymmetries, both of which contribute to overall functional stability and injury prevention. Through the *Specific Handball Endurance Circuit*, players are expected to show better tolerance to sport-specific workloads, maintaining efficiency in execution even under fatigue, which is a critical factor in high-intensity competitive matches. Finally, the *Target-Throwing Test under proprioceptive stimulation* is expected to evidence increased accuracy and adaptability, suggesting that proprioceptive training enhances not only motor control but also decision-making under conditions of instability and dynamic challenge. Overall, the anticipated results converge toward the idea that integrating proprioceptive assessments and exercises within the training process can provide young handball players with a more robust foundation of balance, coordination, and motor efficiency. This, in turn, is likely to reduce the incidence of sport-related injuries and to support long-term athletic development in the Junior II category.

Conclusions: Proprioceptive training enhances immediate performance indicators—such as reaction time, balance, and precision—while simultaneously reducing injury susceptibility, a benefit particularly relevant during adolescence. The integration of validated proprioceptive assessments with sport-specific exercises bridges laboratory evaluation and the practical demands of handball, fostering both motor efficiency and resilience under competitive pressure. Proprioceptive-focused methods represent an essential component of modern handball preparation, supporting safer athletic development and improved individual and team performance in Junior II players.

Keywords: performance, handball, proprioception, coordination, balance



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ABSTRACT

Pacing strategies and performance determinants in 200m freestyle: A cluster analysis of world championship finalists

Andreea Natalia JURESCHI (GHEORGHE)a*, Luciela Maria VASILEa

a National University of Physical Education and Sports, *Faculty of Physical Education and Sport*,
Bucharest, Romania

* Corresponding author: email: njureschi@gmail.com

Introduction/Background: World Swimming Championships bring together elite swimmers globally, yet factors differentiating 200m freestyle finalists remain understudied. The 200m freestyle demands an optimal pacing strategy due to speed and metabolic control requirements. Three consecutive World Championships (Budapest 2022, Fukuoka 2023, Doha 2024) provided an unprecedented opportunity to analyze elite performance patterns. Previous research suggests that the third 50m segment has a significant impact on outcomes.

Materials and Methods: Data from 24 finalists across three World Championships were collected from the World Aquatics website, including reaction times, intermediate times, and final times. Swimming velocities were calculated for each 50m section. Athletes were categorized into three pacing strategies: A (positive pacing with the fourth 50m equal/faster than the third), B (positive pacing progressively slower), and C (negative pacing with a fast finish). K-means cluster analysis was performed using SPSS, with final time and third 50m speed as clustering criteria.

Results: Cluster analysis revealed three performance groups. Cluster 1 (62.5%, n=15) showed superior performance with 104.9s final time and 1.85 m/s third 50m speed, occupying positions 1-5. Cluster 2 (33.33%, n=8) demonstrated slower performance (106.14s, 1.82 m/s), typically finishing 6th-8th. Cluster 3 contained only David Popovici with exceptional performance (103.21s, 1.90 m/s). Strategy A proved most effective for top-3 placements. ANOVA confirmed statistically significant differences between clusters ($p<0.001$). Reaction time showed no correlation with final performance.

Conclusions: The Third 50m segment speed emerges as the primary differentiating factor among 200m freestyle finalists. Positive pacing strategies, particularly maintaining speed in the final 50m, prove most successful for top-3 positions. The start reaction time does not impact race results. These findings provide coaches with evidence-based insights for targeted training programs, emphasizing the maintenance of third-segment speed in 200m freestyle optimization.

Keywords: swimming competitive performance, freestyle events



ABSTRACT

Effects of implementing a folk dance program on certain components of coordination abilities in children aged 9-11 Years

Andreea PARSEGHIAN (FERARU)^a, Dumitru BARBUB, Roxana DUMITRUB, Cătălin Ionuț FORTĂNB

^a University of Craiova, Doctoral School of Social Sciences and Humanities, Craiova, Romania

^b University of Craiova, Faculty of Physical Education and Sport, Craiova, Romania

*Corresponding author: costi_21nanu@yahoo.com

Introduction. Integrating folk dance into the educational process represents an innovative and effective pedagogical strategy. The specific teaching methods for dance ensure structured learning, adapted to age requirements and the children's motor characteristics, in order to maximize the development of their coordination abilities. **Material and Methods.** The main purpose of this research consists in identifying and evaluating the efficiency of specific folk dance means in developing certain components of coordination abilities in children aged between 9 and 11 years. The conducted research included a number of 27 subjects from rural areas, of which: 21 girls and 6 boys. A series of tests were used to evaluate static and dynamic balance, posture, and functional mobility. **Results.** The implemented folk dance program demonstrated efficiency in improving certain components of coordination abilities, in developing body expressiveness and school motivation, as well as in strengthening social and cultural values in children. **Conclusions.** Regular participation in choreographic folk dance activities has facilitated not only motor progress, but also free body expression, or an increase in children's engagement with motor education.

Keywords: folk dance, coordination abilities, balance



ABSTRACT

Integrating dance to optimize expressiveness in aerobic gymnastics

Andreea SPINU^a*, Carmen ENE-VOICULESCU^b, Gabriela TOMESCU^c

^a PhD Student, Institute of Doctoral Studies, Ovidius University of Constanta, 900470 Constanta, Romania

^b Professor PhD supervisor, Institute of Doctoral Studies, Ovidius University of Constanta, 900470 Constanta, Romania;

^c PhD Assist, Ovidius University of Constanta, 900470 Constanta, Romania

* Corresponding author: andreeaspinu16@yahoo.com

Introduction: Dance, as both an artistic and motor form of expression, constitutes a fundamental component in advancing the aesthetic and expressive dimensions of aerobic gymnastics. The most recent Code of Points mandates the systematic incorporation of dance elements into competitive routines, underscoring the critical significance of musicality, coordination, and fluidity of movement. The precision and refinement of dance execution exert a measurable influence on final scores, affirming its decisive role in performance assessment.

Methods: A theoretical analysis was conducted on the introduction of dance steps into aerobic gymnastics choreographies, emphasizing the mandatory inclusion of dance elements as required by the current Code of Points. Representative examples of dance integration and aesthetic evaluation criteria were reviewed to assess their contributions to enhancing expressiveness, musicality, and thematic coherence in competitive routines.

Results: Structured integration of diverse dance forms allows gymnasts to transform technical sequences into cohesive, thematically coherent performances that generate emotional resonance and aesthetic impact. Dance enriches the expressive repertoire available to athletes, facilitating the communication of emotion, the construction of visual narratives, and the demonstration of creative innovation.

Conclusions: The integration of dance into aerobic gymnastics represents a purposeful and innovative strategy for elevating the artistic dimension of competitive routines. Beyond enhancing strength and synchronization, this inclusion has significantly increased the artistic score value and advanced athletes' ability to convey narrative meaning. Through the fusion of dance movements, gymnastics elements, and strength components, athletes no longer perform only basic steps but transform their routines into expressive stories. This synergy between athletic precision and artistic expression adds a powerful visual dimension, increases the sport's dynamism and aesthetic sophistication, and attracts a broader audience of admirers and spectators while aligning with contemporary judging



standards that emphasize creativity and expressiveness. **Keywords:** aerobic gymnastics; dance integration; artistic performance; expressiveness; competitive routines



ABSTRACT

Comparative analysis of flywheel and conventional resistance training in the development of lower-limb strength in youth athletes

Andreea-Mihaela ALBINĂ*, Alina-Elena ALBINĂa, Andreea-Aurora-Maria BUGAa, Constantin ALBINĂa

a University of Craiova, 13 A. I. Cuza Street, Craiova, Romania

* Corresponding author: andreea.albina@edu.ucv.ro

Introduction: The development of strength and movement efficiency is critical in the athletic progression of youth athletes. Isoinertial flywheel training has emerged as an innovative alternative to traditional resistance training, offering unique eccentric overload stimuli that may enhance neuromuscular performance. The aim of this study was to compare the effects of flywheel isoinertial training and conventional resistance training on performance outcomes in junior athletes (U16), with particular emphasis on squat test performance.

Materials and Methods: The study included 25 participants divided into an experimental group (n = 13; 8 males, 5 females) and a control group (n = 12; 8 males, 4 females). The experimental group performed isoinertial training using the Exxentric kBox 4 Pro device, with systematic monitoring via the kMeter application to ensure precise measurement of performance indicators. The control group followed a traditional resistance training protocol. Key outcome measures were average force production and execution time during the squat exercise. Independent samples t-tests were applied to compare pre- and post-intervention values between groups. Additionally, upon completion of the training program, the participants underwent a standing long jump test, followed by a comparative analysis of the results.

Results: At baseline, no significant differences were observed between groups in average force (Control: M = 150.92, SD = 64.8; Experimental: M = 155.75, SD = 49.89; ns) or execution time (Control: M = 4.39 s, SD = 1.40; Experimental: M = 4.11 s, SD = 0.92; ns), confirming the initial homogeneity of samples. After the intervention, significant between-group differences were observed. The experimental group demonstrated higher average force values ($t(14.57) = 4.87, p < .001$) and reduced execution times ($t(23) = -4.29, p < .001$), indicating enhanced performance efficiency. Regarding the standing long jump, no initial differences were detected ($t(22) = 0.09, p = .952$); however, post-intervention results showed a significant improvement for the experimental group ($t(22) = 2.13, p = .045$), reflecting greater lower-limb power. The large effect size ($d = 0.87$) further supported the substantial impact of the flywheel training program.

Conclusions

Isoinertial flywheel training using the Exxentric kBox 4 Pro significantly enhanced average



strength and reduced execution time in junior athletes compared with traditional resistance training. These results support the application of flywheel-based protocols in youth athletic development programs, highlighting their effectiveness in improving both force production and movement efficiency.

Keywords: isoinertial training, flywheel, Exxentric Kbox4, athletes



ABSTRACT

God protecting me during the match? The religion as part of Romanian Elite football referees' life

Andrei ANTONIEa*, Arto NEVALAb

a University of Eastern Finland, Address, Joensuu, Finland

b University of Eastern Finland, Address, Joensuu, Finland

* Corresponding author: email: andreia@uef.fi

Introduction: Football has been considered a religion in many countries. The footballers as Maradona or Pele has been seen and treated as God not only in their countries but also worldwide. Although football and religion are part of daily life in most of the societies, there is little research about the possible links between religious faith and elite athletes.

Romania is a traditional orthodox society from the religious perspective. At the same time, the Romanian football referees are recognised for their performances on the international football stage. The aim of this study is to find if there is any link between the religious faith and Romanian elite football referees.

Method: Taking into consideration that there is little research on the subject, the chosen method was the on-line questionnaire. It consisted in a total of 12 questions including three open ones. The total population of Romanian Elite football referees consists in 33 referees and 30 replied (28 men and 2 women). Participants identified their religion as Orthodox (n=27), Catholic (n=1) and Other (n=2). I am a Romanian top league referee, therefore I excluded myself from the present study.

Results: The Religion and Sport Performance (RSP) model was the starting point of the analyze. At its base, RSP model has fundamental and contributing factors, and some of them were identified also in this study. The fundamental factors identified were religious practices, degree of religious belief and religious culture, whereas the contributing factors were coping strategy, religious support, psychological effects, performance outcomes and mental health. In conclusion, there is strong link between the religious faith and refereeing performances. The further research should focuss on a better understanding between religious faith and referees' performances.

Keywords: football, refereeing, religion



ABSTRACT

The effect of swimming on sleep quality in university combat sport athletes following intense training

Cătălin PĂUNESCU^{a*}, Teodor PĂUNESCU^b

^a University of Medicine and Pharmacy "Carol Davila", 37 Dionisie Lupu Street, Bucharest, Romania

^b National Physical Education and Sport University, 140 Constantin Noica Street, Bucharest, Romania

* Corresponding author: e-mail: catalinpaunescu@umfcd.ro

Background: Adequate sleep is fundamental for recovery and performance in combat sport athletes, yet high-intensity training often disrupts sleep architecture. Active recovery strategies such as swimming may counteract these effects, though evidence is limited.

Methods: Twenty-four medical students (19–24 years), members of the university combat sport team, were randomly assigned to an intervention group (n = 12) or a control group (n = 12). Following training at 85% VO₂max, the intervention group completed 20 minutes of low-intensity swimming, while the control group followed passive recovery routines. Sleep was assessed objectively using Garmin Fenix 5 smartwatches. Parameters included total sleep time (TST), sleep efficiency (SE), deep sleep, REM sleep, and resting heart rate (RHR). Data were analysed using paired and independent t-tests, with significance set at p < .05.

Results: Baseline comparisons showed no significant group differences. After the intervention, the swimming group demonstrated significant improvements: TST increased by 11% versus an 18% decline in controls; SE rose by 1% compared with a 5% reduction; deep sleep and REM sleep increased by 8% and 16%, while controls declined by 46% and 40%, respectively. RHR decreased by 4% in swimmers but increased by 5% in controls.

Conclusion: Post-exercise swimming significantly improved sleep duration, efficiency, and restorative stages in combat sport athletes compared with passive recovery. These findings suggest swimming facilitates both physiological and cognitive-emotional recovery, supporting its integration into recovery protocols for athletes following intense training.

Keywords: swimming, sleep quality, combat sports, recovery, Garmin Fenix 5, athletes



ABSTRACT

Combined and complex motor qualities – their role in practicing collective sports at junior age (Nota I)

Constantin PEHOIU^a, Cristian Florian SAVU^a, Dumitru Nicolae CRISTEA^a

^a "Valahia" University of Targoviste, Faculty of Humanities, Romania

* Corresponding author: cpehoiu@yahoo.com/ constantin.pehoiu@valahia.ro

Introduction: A motor ability is analyzed independently only for pedagogical reasons, since in reality, motor qualities are interdependent and mutually influence each other, ultimately determining the degree of their manifestation. Theoretical and practical findings in the field show that, within the training programs of junior athletes, especially in team sports, the objectives are mainly oriented toward developing basic motor abilities, without clearly defining those aimed at the development of their combined forms of expression.

Premises: The methodology of the study was based on the premise that the development and education of motor abilities and their combinations throughout a competitive and training year — especially during the pre-competitive and competitive stages — lead to the improvement of physical and technical components specific to team sports, which is directly reflected in the increase of competitive potential.

Purpose of the study: The purpose was to highlight the opinions of specialists regarding physical training and its objectives, the motor abilities and their combined forms of manifestation specific to team sports, as well as the influence of their development on the technical-tactical efficiency during official matches. At the same time, the study aimed to identify the verification methods of competitive potential, the role of developing combined motor abilities within a macrocycle, the number of training sessions dedicated to this goal during the competitive period, and the specific methods and means used in such programs.

Working hypothesis: It was assumed that the share and content of physical training focused on developing combined motor abilities in junior athletes practicing team sports can be determined through a sociological opinion survey applied to specialists (teachers and coaches) working with this age category.

Research subjects: The questionnaire-based survey was conducted between September 1 and December 30, 2024, involving 135 specialists (teachers and coaches) active in the field of team sports. They answered a set of 10 questions formulated in accordance with the purpose and hypothesis of the study, addressing the organization of physical



training, the structure and role of motor abilities, and their impact on competitive performance.

Research methods used: The following research methods were applied: scientific documentation (for theoretical grounding), interview (for obtaining qualitative information), questionnaire survey (for collecting expert opinions), and statistical and mathematical calculation (for data processing and validation), using the KY-PLOT software.

Results: Specialists acknowledge that a higher level of manifestation of combined motor abilities determines the optimization of the technical potential required by the practiced sport. The distribution of opinions was as follows: 25% considered that performance increases due to the improvement of off-ball play; 48% appreciated that accuracy, speed, and efficiency of actions are ensured; 30% noticed an increase in the variety and effectiveness of executions; and 45% expressed other opinions.

Conclusion: The results confirm the importance of developing combined forms of motor abilities in the training of junior athletes, as these significantly contribute to enhancing technical-tactical performance and to better adaptation to the complex demands of modern team sports.

Keywords: motor abilities; physical training; junior athletes; team sports; technical-tactical performance



ABSTRACT

Integrated programs of physical exercise assisted by artificial intelligence: effects on physical and mental health in amateur athletes

Constantin-Marian IONIȚĂ*, **Monica STĂNESCU**^a

a National University of Physical Education and Sport, Constantin Noica Street no. 140, Sector 6, postal code 060057, Bucharest

*Corresponding author: ionita_constantin88@yahoo.com

Introduction: Physical exercise, balanced nutrition, and mindfulness techniques are recognized as essential factors for improving health and quality of life. However, their integrated application among amateur athletes is little explored in the scientific literature. At the same time, the high dropout rates (50–70% within the first 6 months) from fitness programs highlight the need for innovative solutions to increase long-term motivation and adherence. Artificial intelligence (AI)-based technologies are playing an increasingly important role in sports and health, offering personalized tools for monitoring and adjusting training, thus becoming a potential support for specialists in sports and health sciences.

Material and Methods: This paper proposes a systematic review of the scientific literature on integrated interventions that include physical exercise, nutritional education, and mindfulness techniques, assisted by AI-based applications or algorithms. Major databases (PubMed, Scopus, Web of Science, etc.) are explored using relevant keywords, and study selection follows predefined inclusion and exclusion criteria. The analysis synthesizes existing results regarding the effects of these interventions on physical health (physical, motor, and functional indicators), on mental health (stress, anxiety, quality of life, motivation), and on adherence to training programs.

Results: The review highlights current trends and the level of evidence reported in the literature, identifying both the potential benefits of using AI in personalizing and monitoring integrated programs and the methodological limitations of existing studies. Furthermore, it emphasizes future research directions necessary to validate these interventions among amateur athletes.

Conclusions: Through a critical analysis of published studies, this paper contributes to understanding the role of AI in supporting physical and mental health, providing a theoretical basis for designing innovative integrated programs for amateur athletes. The integration of AI in recreational training interventions has the potential to increase their



efficiency and attractiveness, supporting specialists in promoting an active and sustainable lifestyle.

Keywords: artificial intelligence; physical exercise; nutrition; mindfulness; amateur athlete



ABSTRACT

Impact of specific physical training program on physical performance in a U15 girls' basketball team

Costina PÎSĂ (PIPEREA)^{a*}, Marian DRAGOMIR ^b

^a University of Craiova, Doctoral School of Social Science and Humanities

^b University of Craiova, Faculty of Physical Education and Sport, Craiova, Romania

* Corresponding author: email: pisa.costina.j6b@student.ucv.ro

Introduction/Background: Physical performance in basketball is determined by a combination of speed, jumping ability, agility, and endurance. In adolescent athletes, these attributes are essential for both competitive success and long-term athletic development.

Material and Methods: The present study involved a group of twelve U15 female basketball players, vice-champions at the national level. All athletes were assessed using a standardized battery of physical tests evaluating speed (20 m sprint), vertical jump (countermovement jump), agility (T-test), and endurance (Beep Test). A six-month sport-specific physical training program was implemented, integrated into regular basketball practice sessions (three times per week, 90 minutes per session). The exercises focused on speed drills, plyometric work, agility routines, and aerobic conditioning.

Results: Post-intervention assessments indicated significant improvements across all tested parameters. Average sprint times decreased from 3.85 ± 0.12 s to 3.62 ± 0.10 s; vertical jump height improved from 34.2 ± 2.5 cm to 38.7 ± 2.8 cm; agility test times decreased from 10.45 ± 0.33 s to 9.92 ± 0.28 s; and Beep Test performance improved from Level 7.3 ± 0.4 to Level 9.1 ± 0.5 .

Conclusions: The six-month specific physical training program significantly enhanced the physical capacities of U15 female basketball players, contributing to superior team performance and culminating in their victory as national U16 champions. The results highlight the importance of tailored, structured physical conditioning programs for optimizing performance in youth basketball.

Keywords: basketball, speed, agility, endurance, adolescent athletes



ABSTRACT

Development of strength in basketball using specific means and methods

Costina PÎSĂ (PIPEREA)^{a*}, Marian DRAGOMIR^b

^a University of Craiova, Doctoral School of Social Science and Humanities

^b University of Craiova, Faculty of Physical Education and Sport, Craiova, Romania

* Corresponding author: email: pisa.costina.j6b@student.ucv.ro

Background: Strength development is crucial for basketball performance, especially in junior female players. Small-sided games combined with targeted strength exercises can enhance physical capabilities.

Aim: To evaluate the effects of a 5-month training program using small-sided games and specific strength exercises on speed, agility, and explosive lower limb strength in U15 female basketball players.

Methods: Twelve female players (aged 14–16) participated in a 5-month intervention program integrated into regular training sessions. Pre- and post-intervention tests measured 20 m sprint speed, agility (T-test), and explosive strength (long jump). Statistical analyses used paired t-tests with significance at $p < 0.05$.

Results: Significant improvements were observed: 20 m sprint time decreased from 3.87 ± 0.10 s to 3.82 ± 0.06 s ($p = 0.03$); agility improved from 16.15 ± 0.60 s to 15.85 ± 0.52 s ($p = 0.01$); long jump increased from 1.77 ± 0.17 m to 1.86 ± 0.14 m ($p < 0.01$).

Conclusion: Combining small-sided games with specific strength exercises effectively enhances speed, agility, and explosive strength in junior female basketball players, supporting tactical and physical performance.

Keywords: basketball; strength training; small-sided games; explosive strength; youth athletes



ABSTRACT

The effects of plyometric training on explosive strength and start length in junior swimmers

Cristian ȚĂRȚĂLEANU^a, Marian Costin NANU^b, Gabriel MANGRA^b, Laurențiu LICĂ^b

^a University of Craiova, Doctoral School of Social Sciences and Humanities, Craiova, Romania

^b University of Craiova, Faculty of Physical Education and Sport, Craiova, Romania

*Corresponding author: cristian_tartaleanu@yahoo.com

Introduction: Considered a fundamental component of sports training, physical preparation plays a decisive role in achieving high-level results. The development of motor skills directly contributes to optimizing the training process and increasing athletic efficiency. This study analyzes the effects of a plyometric physical training program on swimming performance, with an emphasis on starts and turns, in athletes during puberty.

Material and Method: The group of participants, consisting of competitive-level swimmers, followed a 12-week training program including two weekly sessions focused on plyometric exercises aimed at developing explosive strength—essential in the dynamic phases of swimming. Explosive strength was assessed both at the beginning and at the end of the program using the Optojump system, which provided objective biomechanical data. In addition, the start length was measured through video analysis using the Kinovea application to evaluate efficiency.

Results: The results showed significant improvements in the analyzed parameters, confirming the effectiveness of plyometric training in optimizing start and turn performance.

Conclusions: The study highlights the importance of developing explosive strength among junior athletes, as well as the value of modern technology in monitoring athletic progress.

Keywords: swimming, plyometrics, explosive strength, performance



ABSTRACT

Integration of sport technology in physical education and athletic performance: A Modern Perspective

Daniel CHIVUa*, Monica Delia BÎCĂa

a University "Constantin Brâncuși" of Târgu-Jiu, Târgu-Jiu, Romania

*Corresponding author: daniel.chivu@utgjiu.ro

Introduction. The integration of digital technologies in sport and physical education has transformed the way athletes train, monitor performance, and optimize recovery. This study explores the role of Sport Technology in enhancing training efficiency and motivation among university students and amateur athletes. The research aimed to assess the impact of wearable devices, performance-tracking applications, and video analysis tools on physical performance, engagement, and learning outcomes. **Material and methods.** A total of 60 participants (aged 18–25) were monitored over an 8-week training period using smartwatches and motion-analysis software. Quantitative data were collected through physical fitness tests (Cooper test, push-ups, and flexibility) and qualitative feedback from structured questionnaires. Results demonstrated significant improvements in endurance (+9.5%), strength (+12.8%), and training adherence (+15%) compared to the control group without technological support. Participants reported higher motivation and self-awareness regarding performance metrics. **Conclusions.** The study concludes that Sport Technology represents a powerful educational and performance-enhancement tool in the modern training process. These findings support the systematic integration of technology into physical education curricula to foster innovation, engagement, and measurable progress in sports practice.

Keywords: sport technology, digital performance, wearable devices, physical education, motivation.



ABSTRACT

Use of artificial intelligence-based tracking systems to optimize tactical performance in professional football players

Daniel CHIVUa*, Paul Bogdan CHIRIACa

a "Constantin Brâncuși" University of Târgu-Jiu, Târgu-Jiu, Romania

* Corresponding author: email: daniel.chivu1984@gmail.com

Introduction/Background: The integration of Artificial Intelligence (AI)-based tracking systems in football has transformed performance analytics, offering real-time insights into players' tactical behavior. Despite technological progress, limited research has evaluated how AI-based data impacts tactical decision-making and overall team performance in professional football. This study aims to experimentally assess the influence of AI-driven tracking technology on optimizing tactical efficiency among elite players.

Material and Methods: Twenty-four professional male football players (age 25.3 ± 2.1 years) from a Romanian third league team participated in an eight-week experimental training program. Players were divided into two groups: an AI-assisted group (using the STATSports Apex Pro Series tracking system with an AI analytics platform) and a control group using conventional video-based feedback. Performance indicators—positional accuracy, pressing efficiency, and spatial occupation—were collected via GPS tracking and AI tactical modeling. Data were statistically analyzed using repeated-measures ANOVA with a significance threshold of $p < 0.05$.

Results: The AI-assisted group demonstrated a significant improvement in positional synchronization (+12.8%, $p = 0.021$) and collective pressing efficiency (+15.4%, $p = 0.018$) compared to the control group. Heat maps generated by the AI system indicated enhanced tactical compactness and reduced inter-player distance during defensive transitions. AI feedback sessions also reduced tactical decision latency by 9.7%.

Conclusions: AI-based tracking systems significantly improve tactical coordination, situational awareness, and efficiency in professional football. Integrating AI-driven analytics into daily training enhances data-informed decision-making and may serve as a foundation for intelligent tactical planning in elite sport.

Keywords: Artificial intelligence, performance analysis, football, tactical optimization, player tracking.



ABSTRACT

Comparison of accelerometric indicators in junior football players during training and competition matches

Daniel CIOCĂNESCU^{a*}, Camelia-Simona STĂNCESCU^b, Dragoș CIUVĂȚ^c, Cătălin FORȚANA

^a Faculty of Physical Education and Sports, University of Craiova, Romania

^b Faculty of Law, University of Craiova, Romania

^c University of Medicine and Pharmacy of Craiova, Romania

Corresponding author: daniel_ciocanescu@yahoo.com

Introduction: Modern technology has recently become increasingly present in sports training monitoring. As a result, many AI-based applications have been developed and more and more sensors are available on the market. The aim of the study is to use accelerometers to compare the values recorded by 14 junior soccer players (aged 10-11) during a training match and an official match.

Materials and Methods: The research was conducted during the competitive season at a junior soccer club. The indicators monitored were: distance covered during matches, maximum sprint, activity, number of sprints, and maximum shot. The recordings were made in the same week, with similar training levels and playing conditions.

Results; Analysis of the recorded data identified significant differences ($p < 0.05$) in most of the indicators monitored, with the results in the official game (in the championship) being weaker than in the friendly game (played with teammates from the same club).

Conclusions: Possible causes for these results may be that players experience stress and fear of making mistakes in official matches, which reduces their level of maximum involvement, especially in sprints and high-intensity actions.

Also, in friendly matches, the atmosphere is more relaxed, players are more at ease and tend to move more freely. At the same time, young players (juniors) may have physiological reactions to stress (muscle tension, poor coordination), which limit their accelerometric performance. Official matches involve a more balanced game, with slower phases and more tactical breaks.

Keywords: juniors, football, accelerometers, monitorizing, matches.



ABSTRACT

Modern research methodologies in arm biomechanics: Integrating digital wall in volleyball and handball

Diandra- Florentina ADAMa*, Cristian POPAa

a Ovidius University of Constanța, Doctoral School of Sports Science and Physical Education,
Aleea Universității, Constanța, Romania,

* Adam Diandra : esentialcudia@yahoo.com

Introduction. The paper explores the integration of Digital Wall technology as a modern research and training tool for assessing and developing explosive arm strength in volleyball and handball players. In the context of contemporary sports, the use of digital systems has become increasingly relevant for optimizing training strategies, monitoring performance indicators, and individualizing athlete development. Digital Wall is an interactive platform that allows real-time biomechanical analysis of throwing and passing actions, enabling precise quantification of speed, reaction time, coordination, and power output of the dominant upper limb. These measurements provide valuable insights for both coaches and athletes, facilitating evidence-based interventions that directly target performance improvement.

Material and methods. Unlike traditional assessment methods, which often rely on subjective observation or delayed feedback, Digital Wall enables immediate data visualization and correction during training sessions. This capability significantly enhances motor learning, supports the development of sport-specific neuromuscular adaptations, and helps prevent overuse injuries by detecting technical errors early. The technology's versatility allows its integration into various training drills, from basic throwing exercises to complex game-like scenarios, making it suitable for athletes of different ages and performance levels.

Results. The study emphasizes the essential role of explosive arm strength in achieving technical and tactical efficiency in both volleyball and handball. By combining interactive digital feedback with structured physical training, Digital Wall offers a comprehensive framework for improving explosive gestures under dynamic game conditions. **Conclusions.** The results support the adoption of Digital Wall as part of modern training methodologies, confirming its applicability for individualized assessment, performance optimization, and long-term athletic development in sports that involve intense upper limb demands.

Keywords: Explosive strength, upper limb, Digital Wall, biomechanics, performance optimization.



ABSTRACT

Strategies for improving game speed in small-sided football among children aged 12–13 years

Doru STOICA^a, Dumitru BARBU^{a*}, Paul Florinel VIȘAN^b

^a University of Craiova, Faculty of Physical Education and Sport, Craiova, Romania

^b National University of Science and Technology – Politehnica Bucharest – Pitești University Center, Faculty of Sciences, Physical Education and Informatics, Department of Physical Education and Sport

* Corresponding author: email: miticabarbu@yahoo.com

Introduction: The current paper investigates the influence of game speed and tactical efficiency in offensive actions on sports performance in modern football, focusing on junior players aged 12–13 years under specific small-sided game (SSG) conditions.

Material and methods: The research was conducted over 12 official matches played by a U13 team during the first half of the championship season (initial testing) and another 12 matches during the second half (final testing). During this period a specific training program was implemented in order to develop execution speed, to improve offensive transitions as well as to enhance players' ability to maintain possession, pass and finalization.

Results: Two performance indicators were defined and employed in this study: the Game Speed Index (GSI%) and the Tactical Efficiency Index (TEI%), which were both calculated on the basis of objective parameters extracted from video recordings of the matches. The results of the initial testing indicated an average level for both indices (GSI – 57.06%; TEI – 51.11%), whereas after the methodological intervention, the recorded values showed a significant increase (GSI – 77.28%; TEI – 75.86%), reflecting improvements in game tempo, the quality of transitions and the organization of tactical actions.

Conclusions: A comparative analysis of the data revealed a direct correlation between a higher game tempo and the players' efficiency in the finalization phase.

Keywords: football, sports performance, speed index, tactical efficiency index.



ABSTRACT

Training through tactical periodization, an important benchmark for developing the specific endurance of junior football players

Dumitru BARBU^a, Doru STOICA^{a*}, Bogdan-Tony BUDESCU^b

^a University of Craiova, Faculty of Physical Education and Sport, Craiova, Romania

^b University of Craiova, Doctoral School of Social and Human Sciences, Craiova, Romania

* Corresponding author: email: doru_stoica_2005@yahoo.com

The current paper presents aspects related to several programs used for developing specific endurance, taking as a reference the tactical periodization training model. This framework is considered a modern method in football which directly influences both individual and collective performance.

Material and methods The aim of this research is to develop specific endurance in order to increase 17–18-year-old football players' aerobic capacity and power, which leads to a high level of performance throughout the entire match. Among modern methods for developing specific endurance are themed games, intermittent exercises, integrated circuits, and "small-sided games" (SSG) training, which combine physical effort with technical and tactical elements. Monitoring intensity through parameters such as heart rate, distance covered, and movement speed allows the coach to adjust the training volume and intensity for each player. The development program aims to adapt players' bodies to the complex demands of the game, characterized by rapid alternations between high-intensity efforts and short recovery periods. In training, specific endurance is not limited to general aerobic capacity but also involves anaerobic components, motor coordination, and the ability to repeatedly perform sprints, changes of direction, and high-intensity duels. Moreover, recovery periods, nutrition, and sleep play a crucial role in optimizing physiological adaptations.

Results: The paper presents the players' results in the Yo-Yo endurance test, showing significant differences, as the result of using specially designed program, ($p < 0.05$).

Conclusion: through scientific and individualized planning, higher game efficiency and sustainable improvement in sports performance can be achieved, whereas the risk of fatigue and technical-tactical errors can be reduced.

Keywords: tactical periodization, football, endurance, juniors.



ABSTRACT

The professional skills model of the future tourism specialist obtained within the instructive-tourism practice

Ecaterina LUNGUa*, Mihail ONOIb, Gheorghe BRANIȘTEc

a "Ion Creangă" State Pedagogical University of Chisinau, Republic of Moldova & "Dunărea de Jos" University of Galati, Romania

b National Agency for Quality Assurance in Education and Research, Republic of Moldova & "Dunărea de Jos" University of Galati, Romania

c Institute of Physical Education and Sport of Moldova State University & "Dunărea de Jos" University of Galati, Romania

* Corresponding author: kathya.lng.1981@gmail.com

Introduction: In the dynamic global market, the tourism industry requires the future specialist to possess and demonstrate a diverse and complex range of competencies to ensure determining efficiency in the development of tourism enterprises. Achieving activities at a level of excellence is a *sine qua non* condition for success. This performance pressure highlights the necessity for the specialist to be adaptable, innovative, and solution-oriented in concrete, often unpredictable situations. The professional competencies acquired and validated during the instructive-touristic practice represent a crucial subject for analysis. The internship must be a process of professional immersion intended to offer added value, professional maturity, and performance.

Materials and Methods: The effort to identify the necessary competencies was based on a systematic analysis of specialized scientific-methodical literature. The methodology included exploring relevant academic resources: theoretical works, scientific articles, and methodical guides developed by regulatory bodies.

The objective was the identification of current trends and recognized international standards of excellence that define the ideal graduate profile. The focus was on discerning the practice-specific skills (field competencies) that differentiate a theoretician from an effective practitioner. The methodological focus aimed at understanding how practical experience consolidates knowledge, skills, and attitudes, serving as the cognitive basis for formulating the professional profile.

Results: The in-depth analysis led to the conclusion that the future specialist must have a balanced multicompetent profile, exhibiting strong competencies across three major pillars:

1. Organizational competencies: The capacity for planning and coordinating touristic operations (itineraries, logistics), efficient time management,



and optimal resource allocation. A competent specialist must be able to impeccably organize tourist packages.

2. Instructive-methodical competencies: The ability to convey clear information (storytelling), manage groups, resolve conflicts, and provide professional briefings. These are vital for guides and front-office personnel.

3. Practical and technical competencies: The capacity to utilize industry-specific tools and systems, negotiate, and apply standard safety procedures.

Additionally, the necessity for transversal soft competencies was highlighted, such as emotional intelligence, working in multinational teams, and advanced digital competencies, granting the specialist resilience in a changing market.

Conclusions: The main conclusion is that the future specialist must be an agent of performance and permanently maintain a high level of activity, pursuing operational excellence. It is imperative that they do not deviate from the minimum standards established in this complex sector. It is recommended that academic programs and internship stages be constantly recalibrated to emphasize the integrated development of competencies: inclusion of ethics and sustainability, simulation of crisis situations, and evaluation based on actual performance. Only through this holistic and performance-oriented approach will the practice process succeed in offering lasting professional value and the guarantee of excellence for the specialist.

Keywords: professional skills, tourism, model, instructive-tourism practice, structure.



ABSTRACT

Mobile applications and interactive games – Modern tools for developing motor competencies in rural physical education

Elena-Daniela BADEA^{a*}, Amalia-Georgeta BĂZĂVAN^a, Denisa NIȚU^a, Cristina ZAMFIR^a

^a University of Craiova, 13 A. I. Cuza Street, Craiova, Romania

* Corresponding author: daniela.badea@edu.ucv.ro

Introduction: In the current context of technological advancement, the development of digital skills has become essential for both teachers and students. In physical education, the integration of interactive technologies can enhance self-directed learning and motor skill development. This study aims to identify the effects of modern, technology-assisted physical education programs implemented in rural schools on the development of students' motor abilities.

Materials and Methods: The research was conducted in two rural schools — Lăcusteni Secondary School and Tina Secondary School — involving 68 students aged 11–14. The experimental group (37 students) participated in physical education lessons that included interactive games and modern technological tools, while the control group (31 students) followed traditional programs. The Eurofit test battery was used to evaluate balance, lower limb strength, abdominal strength, and endurance.

Results: The findings revealed significant improvements in the experimental group across all measured components. Students who participated in the technology-assisted program achieved higher scores in balance ($t=0.16$, $p<0.05$, $d=0.94$), lower limb strength ($t=1.17$, $p<0.05$, $d=0.60$), abdominal strength ($t=0.40$, $p<0.05$, $d=0.92$), and endurance (shuttle run) ($t=0.40$, $p<0.05$, $d=0.90$) compared to the control group.

Conclusions: The results demonstrate that the integration of interactive technologies into physical education lessons significantly contributes to the improvement of students' motor abilities in rural environments. The use of modern technological tools increases students' engagement, motivation, and performance, offering an effective direction for modernizing physical education and health promotion programs.

Keywords: physical education; interactive technology; motor skills; rural education; technology-assisted learning.



ABSTRACT

Selection and orientation of children towards football activity in primary school: motor, educational and parental analysis

Emil Costin SANDOI^a, Sorin IORDACHE^a, Mihai BRALOSTITIANU^a

^a University of Craiova, Craiova, Romania

Corresponding author: emi.sandoi@yahoo.com

Introduction: The early identification and selection of children for football programs represent a fundamental stage in shaping future athletes and promoting an active lifestyle. The present study investigates the process of selection and orientation of primary school pupils toward football activities, analyzing the interaction between motor performance, school infrastructure, and parental involvement. The main objective was to determine how the educational and social environment influences children's participation and consistent engagement in organized sports activities.

Material and Methods: The program was carried out in 11 primary schools in the municipality of Craiova, involving the assessment of 2,020 pupils aged between 6 and 10 years. The motor evaluation included three tests: a coordination and agility course using ladders, hurdles, and cones; a ball control exercise aimed at using both feet and spatial orientation; and a basic technical exercise focused on stopping and kicking the ball with different parts of the foot. In addition to the motor tests, two questionnaires — for pupils and parents — were administered to assess motivation, perception of physical education, and the degree of family support. Statistical analysis employed descriptive indicators, the Chi-square test for categorical variables, and the Pearson correlation coefficient to explore relationships between factors.

Results: The results showed that 65% of the pupils demonstrated good overall coordination, while 42% correctly performed all technical procedures. Only 38% of the children practiced sports outside school. A strong positive correlation ($r = 0.81$, $p < 0.01$) was identified between parental support and consistent participation in training sessions, confirming the essential role of the family. Infrastructural disparities between schools significantly influenced access to activities and the accuracy of the selection process, representing a limitation of the study. **Conclusions.** The results highlight that sports selection in the school environment should be understood as a continuous educational process rather than a singular stage. The sustainable development of youth football requires constant collaboration between schools, specialized coaches, and families. Improving infrastructure, conducting periodic motor evaluations, and strengthening parental involvement are key factors for ensuring equity and progress in the development of young athletes.

Keywords: students, football, selection, healthy lifestyle.



ABSTRACT

Competition anxiety in children training in football clubs vs. Those not practicing any sport after school using the SCAT Test

Eron HOXHAA*

a American School of Kosova, Prishtina, Kosova

Introduction: Competition anxiety is a common psychological factor affecting young athletes' performance and well-being. This study aims to compare competition anxiety levels between children who regularly train in football clubs and those who only participate in school physical education without engaging in any organized sports after school. Understanding these differences may help educators and coaches support children's mental health and athletic development.

Material and Methods: The study involved 60 children born in 2013 and 2014, divided into two groups of 30 each. The first group consists of children training regularly at football clubs, while the second group includes children attending school physical education classes only, with no additional sports activities. The Sport Competition Anxiety Test (SCAT) was used to measure competition anxiety levels in both groups.

Results: Preliminary analysis indicates observable differences in anxiety levels between the two groups. Children training in football clubs tend to exhibit distinct patterns of competition anxiety compared to their peers not involved in organized sports after school. Detailed statistical analysis is currently being finalized to better understand these differences.

Conclusions: These findings highlight the importance of recognizing competition anxiety variations among children with different sports engagement levels. This knowledge can guide teachers, coaches, and parents in creating supportive environments that enhance children's sports experiences and overall well-being. Further research is needed to develop effective anxiety management strategies tailored for young athletes.

Keywords: Competition anxiety, children, football clubs, physical education, SCAT test



ABSTRACT

Influence of a handball exercise program on the development of upper limb strength in high school students

Florin CAZANA*, **George Cosmin MUȘATA**, **Diana Victoria GIDUA**, **Mara Iulia DULCEAȚĂB**, **Florin VOINEAA**, **Adrian Dorin GEORGESCU**

a Ovidius University of Constanta, Faculty of Physical Education and Sport, Constanta, Romania

b "Neagoe Basarab" Theoretical High School Oltenita, Călărași Romania

* Corresponding author: email: cazan10florin@yahoo.com

Introduction. The strength of the upper limbs directly influences motor activities specific to handball, such as passing, throwing and blocking. In the context of physical education classes, the integration of exercises inspired by handball can be an effective means for the development of this motor quality in high school students. The main purpose of this research is to demonstrate that a program of exercises taken from handball contributes to the development of upper limb strength among high school students.

Material and methods. If a program based on exercises for the development of the strength of the upper limbs is implemented in the physical education lesson of the 10th grade students, it will determine the improvement of the execution capacity specific to handball.

The experiment took place in the school year 2024–2025, and the application of the improvement program was carried out for 8 weeks. The subjects included in the experiment were 25 students from the 10th grade from the "Neagoe Basarab" Theoretical High School in Oltenita, evenly divided between boys and girls.

Results. Statistically significant differences are observed between the indicators obtained by the students at the initial and final testing, in terms of progress, as a result of the application of the program. Applied tests revealed a clear improvement in upper limb strength, with a balanced mean progress and standard deviation, confirming the formulated hypothesis.

Conclusions. The implementation of a program based on handball exercises in physical education lessons contributes to the development of upper limb strength in high school students.

Keywords: handball, upper limb strength, dynamic exercises, physical education, high school.



ABSTRACT

Static balance and general coordination in middle school students: A comparative analysis by gender

Florin COTOSa*, Bogdan-Constantin UNGUREANb

a PhD Student, Doctoral School in Science of Sport and Physical Education, „Al. I. Cuza” University of Iasi, Romania

b Professor PhD Hab., Faculty of Physical Education and Sports, "Al. I. Cuza" University of Iasi, Romania

* Corresponding Author: cotosf@yahoo.com

The purpose of this study is to examine whether gender differences exist in the level of motor indices, static balance, and general coordination among middle school students. The study was carried out between April and June 2025 at “Grigore Ghica Voievod” Lower Secondary School in Suceava and included 111 students (44 girls and 67 boys). Static balance was assessed using the Flamingo Test, and general coordination was assessed using the Matorin Test. The analysis of the results indicates differences between the two groups for both static balance and general coordination. Girls recorded better results in static balance (a lower Flamingo Test score = superior static balance performance) ($MA = 18.54$ for boys and $MA = 16.77$ for girls), $t(109) = 2.170$, $Sig. < 0.05$, mean difference = 1.765, while boys recorded higher values in general coordination ($MA = 594.63$ for boys and $MA = 537.73$ for girls), $t(109) = 2.170$, $Sig. < 0.05$, mean difference = 21.375. The results confirm previous research indicating that gender affects balance and general coordination.

Keywords: static balance, general coordination, middle school students



ABSTRACT

Analysis of physical effort during the game in senior basketball players

Florin NINIa, Constantin CIORBĂb*

a State University of Moldova, 60 Alexei Mateevici Street, Chisinau, Republic of Moldova

b "Ion Creangă" State Pedagogical University, 1 Ion Creanga Street, Chisinau, Republic of Moldova

* Corresponding author: ciorbaconst@yahoo.com

In recent years, basketball, both men's and women's, has become one of the most preferred sports among youth and beyond. It is no coincidence that this sport has been the subject of several researches by local and foreign specialists on various issues related to sports training at different levels. Women's basketball in Romania currently has a quite good evolution nationally and internationally. Nevertheless, there are a number of unresolved issues related to their sports training, here we refer to the motor preparation of the athletes, as a basic compartment in sports training in any sport. It is a known fact that the competitive period in basketball at the senior level is quite long and can even reach 3-4 months, depending on the number of participating teams and the calendar of sports competitions. In this situation, the main problem is maintaining sports form in terms of motor skills throughout the competitive period, which is quite difficult for many coaches. In this regard, an experimental program is proposed, focused on directing physical effort in senior basketball players, both in the training process and during the game, having clear information about the physical condition of each player and the team as a whole, in order to intervene in one situation or another. The implementation of the given program had a positive impact on maintaining the level of motor preparation of the senior basketball players, both for each individual match and for the entire competitive period. Thus, the number of technical-tactical actions performed by the senior basketball players during a match was analyzed, the number of regulatory fouls for each period of the game was determined, the intensity of the physical effort during a specific match was analyzed, and this allowed the coach to intervene in their sports training process, in this case, the optimization of the motor preparation level of the senior athletes.

Keywords: senior basketball players, physical effort, intensity of effort, physical preparation



ABSTRACT

Regular physical exercise and its impact on life expectancy and healthy living in the european union

Gabriel Ioan MANGRAa*, Alexandru Octavian SIMIONa

a University of Craiova, A.I. Cuza 13, Craiova, România

* Corresponding author: gabriel.mangra@edu.ucv.ro

Regular physical exercise is widely recognized as a key determinant of public health and longevity. This study explores the influence of regular physical exercise on life expectancy and healthy life years across European Union countries. Using data from the European Commission's Eurobarometer, the research applies factor analysis and cluster analysis to identify patterns and group similarities among member states. The findings indicate a clear positive association between regular engagement in physical exercise and both longevity and quality of life. However, regional disparities suggest that cultural, economic, and policy factors also shape these outcomes. The study emphasizes the importance of promoting active lifestyles through sustained public health initiatives to enhance both the duration and the healthiness of life in the EU population.

Keywords: physical exercise, healthy living, life expectancy, factor analysis, cluster analysis, European Union.



ABSTRACT

Effects of a combined plyometric and isometric exercise program on explosive strength development in U19 handball players

Gabriel-Benone ARMANU^a, Bogdan-Constantin RAȚĂ^{a,b}

^a Doctoral School of Sport Science and Physical Education, National University of Science and Technology POLITEHNICA Bucharest - Pitești University Centre, Str. Targul din Vale, no.1, Pitesti, Romania

^b "Vasile Alecsandri" University of Bacau, Calea Mărășești, no. 157, Bacău, Romania

e-mail: armanug@yahoo.com

The present paper aims to highlight the effectiveness of introducing, within handball training sessions, a set of plyometric exercises combined with isometric exercises, applying the circuit method to U19 handball players competing in the National Championship. The research subjects are 18 male players from a Romanian handball team, with an average age of up to 19 years. The experimental program consisted of a circuit of 8 exercises (4 plyometric and 4 isometric), performed twice a week for a period of 8 weeks. To assess physical performance, the 10m sprint test, 20m sprint test, and T-test (agility) were used, both at the beginning and at the end of the training protocol. The results showed improvements in times for both speed tests (10m and 20m) and the T-test (agility), with players demonstrating higher speed and a better ability to change direction quickly. In conclusion, using a circuit that combines plyometric and isometric exercises systematically within handball training can contribute to the efficient development of explosive strength in U19 athletes. Integrating these methods into specific training planning optimizes physical performance and enhances the ability to adapt to current competitive demands.

Keywords: handball, explosive strength, training, U19



ABSTRACT

The importance of plyometric training in the strength of soccer players

Germina COSMA^a, Aurora UNGUREANU-DOBRE^{b,c*}, Marian DOBRE^c

^a University of Craiova, Faculty of Physical Education and Sport, Romania

^b University of Craiova, Faculty of Physical Education and Sport, Romania

^c Sport Club Universitatea Craiova, Romania

* Corresponding author: ungureanu.aurora@edu.ucv.ro

Introduction: Explosive strength is an essential skill in soccer, directly influencing the effectiveness of specific actions such as duels, quick changes of direction, or technical executions (kicks, jumps, headers). This study aimed to improve explosive strength by applying a program based on plyometric exercises, adapted to female soccer players.

Material and Methods: The study was conducted over a period of three months at a club playing in the second division, during the pre-competitive stage. The program was implemented two times a week as part of specific physical training sessions. A total of 24 participants were evaluated before (Ti) and after (Tf) the intervention period using the Optojump platform to monitor the evolution of jump parameters (Countermovement Jump – CMJ) and lower limb asymmetry).

Results: Statistical analysis showed a significant improvement between the initial and final tests. For CMJ1-T1 vs CMJ1-T2, a significant increase was observed ($p=0.0029$, $d=0.66$), and for CMJ free-T1 vs T2, the difference was even greater ($p=0.0002$, $d=0.87$). There were also considerable increases in explosive strength in the lower limbs for both left and right legs. Before the intervention, there was a significant asymmetry between the right and left limbs ($p=0.021$), but in the final test the differences decreased ($p=0.58$), indicating a functional balance of strength between the limbs.

Conclusions: All pairs analyzed showed statistically significant differences ($p < 0.05$), with moderate to very large effects. The results demonstrate the effectiveness of the plyometric program in increasing explosive strength and reducing asymmetry between the lower limbs, which are essential for performance and injury prevention in female's soccer.

Keywords: plyometric training, soccer, female, strength.



11th International Conference

"Physical Exercise – A Modern and Complex Way to Promote Healthy Living,"
Craiova, Romania, from October 30th to November 1st, 2025

ABSTRACT

Ways to provide training in the game of basketball at the junior level, category 16-17 years old, depending on the energy system necessary to achieve performance

Ilie Andrei BADEA^a, Luminița GEORGESCU^b, Julien Leonard FLEANCUB, Ștefan TOMA^{b*}

^a Doctoral School of Physical Education and Sport Science, National University of Sciences and Technology Politehnica Bucharest, Pitesti University Center, Str. Tg. Din Vale, nr. 1, Pitești, Roumania

^b National University of Sciences and Technology Politehnica Bucharest, Pitesti University Center, Str. Tg. Din Vale, nr. 1, Pitești, Roumania

Corresponding author: stefan.toma1305@upb.ro

Introduction: In the development of the human body, the specialization of vital functions appears more and more pronounced, which allow motor activities to become more and more accentuated factors, in the direct participation of the organism in adapting it to the changing conditions of the environment in which it carries out its activity. As a result of the study on the specialized works that appeared over time, it is increasingly highlighted that each individual acquires during his life, the ability to evaluate as correctly as possible the distances and temporal dimensions, his own speed of coordination in movement, precision and orientation in space. Within the game of basketball, it is known that athletes perform an average of 105 actions of high intensity and short duration (2 – 6 seconds) during a basketball game, each action taking place every 21 seconds. Following the development of sports activity, both energy systems, aerobic and anaerobic, are involved.

Material and Methods: The theoretical objective is to argue, based on specialized scientific works, the deepening and explaining of the concepts regarding the monitoring of the training in the basketball game at the age of 16-17 years old, depending on the energy system necessary to achieve your tasks. The application objective consists in the elaboration and implementation of a specific intervention plan regarding the monitoring of the training in the basketball game at the level of 16-17 years old, depending on the energy system necessary to achieve the performance.

Results: The equipment and research instruments, the aerobic, anaerobic exercise capacity assessment tests, as well as the physiological assessment tests proposed within the research project, are meant to ensure the optimal framework for the monitoring and evolution of the effort parameters within the training process.



Conclusions: Given the importance of the preparation process in the game of basketball, accurate evaluation methods are essential. Coaches rely on reliable and valid measurement techniques that simulate real movements in the game. This allows for consistent assessments of the player's progress at different stages of the training program. To ensure reliable data, assessments should be performed at multiple stages of training, such as before, during, and after a program, and environmental factors such as test surface and time of day should be standardized. This approach ensures that any changes in performance are due to improving the athlete's training process and not to variations in testing conditions, age, gender and playing position in the design of training programs and evaluation protocols, coaches can better adapt approaches to the individual needs of basketball players and optimize the training process.

Keywords: basketball, 16-17 years old category, energy system, energy resources



11th International Conference

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ABSTRACT

Optimizing pedagogical strategies: A framework for operationalizing specific competencies in physical education

Ion MIHĂILĂa, Florin-Valentin BIDIREANUb*, Camelia ARAMĂ (PANFILOIU)b

a Professor, PhD- Doctoral School of Sport Science and Physical Education, National University of Science and Technology Politehnica Bucharest-Pitești University Center, Romania

b PhD Student- Doctoral School of Sport Science and Physical Education, National University of Science and Technology Politehnica Bucharest- Pitești University Center, Romania

c PhD Student- Doctoral School of Sport Science and Physical Education, National University of Science and Technology Politehnica Bucharest- Pitești University Center, Romania

* Corresponding author: email: florin_bidireanu@yahoo.com

This research contributes to a deeper understanding of the impact of operationalizing specific competencies in physical education and sports and highlights the need to adapt teaching strategies to meet students' needs in the contemporary context. The study focused on the survey methodology, conducted through an online questionnaire administered to 150 high school physical education and sports teachers from Prahova County. The questionnaire was designed to assess the pedagogical approaches used to operationalize specific competencies, the evaluation of students' specific competencies, and the impact of technology on the educational process.

The analysis and interpretation of the data were carried out using statistical functions, charts, and pivot tables for organization and visualization in the Microsoft Excel Data Analysis program. The results indicate that 75% of respondents integrate various teaching methods, such as holistic education and discovery learning, suggesting that diverse pedagogical strategies are perceived as essential for the operationalization and development of students' competencies. Furthermore, 80% of teachers use formative assessments, such as systematic observations and self-assessments, emphasizing the importance of continuous feedback in students' progress.

The recommendations refer to improving physical education programs, including promoting technological innovation and more effective assessment methods. These findings provide a solid foundation for future studies on the effectiveness of operationalizing specific competencies in physical education and sports, as well as on how pedagogical methods can be optimized to support student performance.

Keywords: operationalization, specific competencies, pedagogical strategies



ABSTRACT

Initiation into Martial Arts: characteristics of sports training in Karate Do in the first stage of practitioners' preparation – A Systematic Review

Ionuț Marian GHEORGHIANA^a, Liliana Niculina MIHĂILESCU^a, Răzvan Liviu PETRE^b

^a National University of Science and Technology Politehnica Bucharest, University Centre of Pitești, Doctoral School of Sports Science and Physical Education, Romania (RO).

^b National University of Physical Education and Sports, Bucharest, Romania (RO).

* Corresponding author: ionut_marian.14@yahoo.com

Introduction: In contemporary society, Karate has developed considerably, especially among young people, as evidenced by the establishment of numerous martial arts sports federations. The first stage in martial arts-specific training represents a fundamental phase in the systematic development of practitioners' careers, being built upon the natural stages of cognitive, emotional, and psycho-physical development. At the same time, attention must be paid to the formation of fundamental motor skills and abilities, learning the basic principles specific to each martial arts style, as well as internalizing the values that define martial arts (respect, character development, self-control, courage, honesty, etc.). In this stage of training, practitioners should benefit from sports preparation at a low intensity, with priority given to games and enjoyable/fun activities.

Materials and Methods: For the development of this article, various prestigious national and international scientific databases were consulted, such as: ResearchGate, PubMed, Web of Science, and Google Scholar. Additionally, other complementary sources (specialized works, physical education and sports journals, doctoral theses) were also considered to support the article. The studies focused on the following aspects: analysis of sports training specific to martial arts, initiation programs, development of motor skills, and the methods, materials, and tools used in the early training of athletes.

Results: This article indicates that the first stage of martial arts training for practitioners aged 6–9 has a considerable impact on their motor, cognitive, and emotional development.

Conclusions: Scientific research in martial arts has diversified considerably; however, there are few studies focusing on the analysis of the specific characteristics of sports training at the beginner level. A comprehensive approach is required in the early stage of beginner practitioners' training—one that combines various methods, tools, and educational materials.



Keywords: sports training, Martial Arts, early preparation, sports games, motor, cognitive, and emotional development



ABSTRACT

Design and validation of an age-specific selection and training model for middle school basketball players

Janina-Maria GHERDANa,b*, Larion Alin LARIONa

a Ovidius University of Constanța, Doctoral School of Sport Science and Physical Education, Institute of Doctoral Studies, Constanța, Romania

b University of Oradea, Faculty of Geography, Tourism and Sport, Department of Physical Education and Kinetotherapy, Oradea, Romania

*Corresponding author: gherdanjanina@gmail.com | ORCID: 0009-0005-8629-9377

This study aimed to design, implement, and validate an operational model for the selection and training of middle school basketball players aged 12–15 years. Fourteen male students enrolled in middle school physical education programs participated in a structured, four-month intervention that integrated physical, technical, and tactical components. Anthropometric and motor performance indicators were assessed at baseline and post-intervention. Statistical analysis using descriptive indicators, coefficients of variation, and paired t-tests revealed significant improvements in agility, explosive strength, and shooting accuracy ($p < 0.05$). The results confirm the effectiveness and transferability of the proposed model, highlighting its applicability to school-based training contexts. The findings support a structured, age-appropriate, and inclusive approach to youth basketball development, consistent with current principles of physical education and long-term athlete development.

Keywords: youth basketball, selection model, physical education, motor performance, shooting accuracy, training optimization, long-term athlete development



ABSTRACT

Evaluation of leg power and fatigue resistance in elite breaststroke swimmers via optojump analysis

Jari MAHDİa, Luciela Maria VASILEa, Alexandru DANCUa

a National University of Physical Education and Sports, Faculty of Physical Education and Sport, Bucharest, Romania

*Corresponding author: Jari12m@hotmail.com

Introduction: The ability to generate and maintain explosive leg power is essential in sprint breaststroke, particularly for starts and turns. OptoJump Next allows objective measurement of neuromuscular performance through jump-based tests.

Material and Methods: Five national-level male breaststroke swimmers completed two OptoJump assessments: a BFS vertical jump test (best of three attempts) and a 60-second repeated jump test. Following a six-week targeted dryland program, post-test measures were compared with pre-test values. Variables included jump height, reactive strength index (RSI), power ($\text{W} \cdot \text{kg}^{-1}$), total number of jumps, and fatigue index (performance drop across 10-second intervals).

Results: Improvements were observed in BFS jump height (+3.1 cm), RSI (+0.06), and power (+1.3 $\text{W} \cdot \text{kg}^{-1}$). In the 60-second test, swimmers achieved +6 additional jumps on average, with RSI rising by +0.06 and fatigue index decreasing by -5.2 points, indicating enhanced endurance of explosive output.

Conclusions: OptoJump proved effective in tracking neuromuscular adaptations to dryland training. Increased jump performance and reduced fatigue support the use of vertical jump monitoring in optimizing breaststroke-specific strength, detecting fatigue, and guiding individualized interventions.

Keywords: OptoJump; reactive strength index; fatigue index; breaststroke; swimming performance



ABSTRACT

AI-Driven deep learning video analytics for estimating pairwise distances and speeds in soccer

Jeawoog LEE^{a*}, Jin SHIXU^a, Sung-Je PARK^a

^a College of Sports, Chung-Ang University, Anseong, Korea

* Corresponding author: email: yyizeuks@cau.ac.kr

Introduction and Background: Tactical analysis depends on spatiotemporal descriptions of player movement, yet sensor-based tracking is costly and hard to deploy beyond elite venues. We present a vision-only pipeline that derives player speeds and inter-player distances from broadcast video by combining object detection, multi-object tracking, and field key-point detection. A recovered homography aligns footage to a canonical top-down pitch, enabling pixel-to-meter conversion without extra hardware.

Material and Methods: A YOLO-style detector yields class-specific boxes that are linked across frames to maintain persistent track identifiers. A key-point model detects touchlines, penalty areas, the center circle, and the center spot; these landmarks drive a perspective transform from image to metric coordinates. Team membership is inferred from uniform colors in RGB space, with goalkeepers handled separately to reduce confusion. Instantaneous speed is computed as frame-to-frame Euclidean distance divided by elapsed time using the frame rate; a moving average smooths estimates, and values are capped at 40 km/h. Nearest-opponent distance is obtained by scanning opposing tracks in each frame and keeping the minimum. The logic initializes track histories, handles missing projections, and applies smoothing. Throughput is increased with batched GPU processing, asynchronous queues, caching, and automatic batch sizing. Training imagery covers varied stadiums, camera angles, and lighting, and outputs include structured data and annotated overlays.

Results: The system converts MP4 broadcasts into aligned trajectories without sensors. Player-level speed estimates remain stable across broadcast variability due to temporal smoothing and the 40 km/h cap that limits outliers and camera jitter. Frame-level nearest-opponent distances are computed reliably and can be queried to study pressing proximity and team compactness. In practice, GPU batching and asynchronous execution enable near real-time operation. RGB-based uniform modeling and goalkeeper handling reduce identity confusion across lighting changes, improving team assignment and track persistence.

Conclusions: This work delivers a sensor-free pipeline that turns broadcast video into spatiotemporal data for coaching, scouting, and storytelling. By estimating a



homography to a canonical pitch, the system enables pixel-to-meter conversion without specialized infrastructure. Robust speed estimation and opponent-distance computation provide interpretable signals for examining pressing, spacing, and compactness, while GPU-accelerated batching makes the approach practical at scale. The resulting trajectories also support higher-level analysis, including identification of off-ball runs, recovery sprints, and spacing around the ball carrier. Planned extensions include multi-camera fusion, richer event detection, and unsupervised discovery of tactical roles from learned spatiotemporal embeddings.

Keywords: Vision AI, Deep Learning, Multi-Object Tracking, Soccer



ABSTRACT

Analysis of fan perceptions for each professional baseball team using Big data-based topic modeling and sentiment analysis

Jiyeon LEEa, Sungje PARKa*

a Chung-Ang University, 84, Heukseok-ro, Dongjak-gu, Seoul, Republic of Korea

*email: sungjes@cau.ac.kr

Professional baseball is South Korea's representative sports industry, where each team's fandom directly influences team management and competitiveness (Choi, 2016; Oh, 2024). With the recent surge in social media-based club-fan interactions (Han & Na, 2022), managing fan perception has emerged as a key factor determining a club's sustainable growth, alongside performance (Kim, Moon & Lee, 2010). Changes in fan sentiment per team reveal internal dynamics and crisis signals in team operations that cannot be captured by numerical metrics. Therefore, this study aims to identify team-specific fan interests and emotional trends by applying topic modeling and sentiment analysis to fan posts.

The research subjects are fan forum posts from five of Korea's ten professional baseball teams (Hanwha Eagles, Kia Tigers, Kiwoom Heroes, LG Twins, Lotte Giants) during the 2023–2025 regular seasons. Data was collected using Python libraries BeautifulSoup and Selenium. After noun extraction and stopword removal, topic modeling was performed using NetMiner4 (Kim & Noh, 2023; Moon & Song, 2019; Oh, 2020). Sentiment analysis was also performed using Python libraries KoNLPy and Okt for preprocessing, followed by the KNU Korean Sentiment Dictionary (Kang & Seo, 2023; Park, Cho, Han, & Yoo, 2022; Park, Na, Choi, Lee, & On, 2018).

Topic modeling results yielded a total of 32 major topics across the five teams. For Lotte, key topics were rookie player development and managerial tactics; for Hanwha, pitching staff instability and managerial change; for Kia, championship pressure and key player injuries; for Kiwoom, the An Woo-jin controversy and Lee Jung-hoo's promotion; and for LG, championship contention and injury management. Fan discourse for each team centered around unique concerns and issues. Sentiment analysis revealed that only Kiwoom achieved a positive sentiment score. Lotte saw an increase in sentiment score, LG maintained a stable score, while Hanwha and Kia experienced declines. Kiwoom demonstrated a pattern of positively transforming controversies, and LG showed the smallest fluctuation. Hanwha experienced a sharp drop in sentiment score accompanied by a significant decrease in fan engagement, while Kia exhibited a continuous decline in sentiment score.

Fan sentiment toward professional baseball teams varied significantly based not only on performance but also on team management style, communication methods, and fan culture. Kiwoom's positive shift resulted from a tolerant fan culture and future-oriented



thinking, while LG's stability stemmed from trust built on championship experience. Conversely, the sentiment deterioration at Kia and Hanwha reflected reliance on key players and persistent issues. This suggests that building sustainable fan relationships requires comprehensive operational capabilities extending beyond game results.

Keywords: Big Data, Topic Modeling, Sentiment Analysis, Professional Baseball Teams, Fan Perception Analysis



ABSTRACT

Beautifying the history of a sports club in periods of low sports performance

Leonardo Daniel PĂȘĂRINA^a, Vlad Antonius SANDUB^{*}, Roberto Nicușor ȚIUB, Dan Eugen COSTIN^c, Dragoș Laurențiu DIACONESCU^a, Marius Cătălin POPESCU^a, Marian Gabriel POPA^a

^a University of Craiova, Faculty of Physical Education and Sport, Craiova, Romania

^b University of Craiova, Doctoral School of Social Sciences and Humanities, Craiova, Romania

^c "Dunărea de Jos" University of Galați, Faculty of Physical Education and Sport, Galați, Romania

^{*} Corresponding author: email: sandu.vlad.z5m@student.ucv.ro

Sport is both a cultural practice and a social phenomenon that extends beyond the results achieved on the field. Clubs are not defined only by victories or defeats, but also by how they construct and communicate their own history. In periods of low performance, sports organizations frequently employ strategies of beautifying the history, placing emphasis on glorious moments of the past, on the symbolic role of tradition, and on the cultivation of supporter loyalty. This paper examines the case of Universitatea Craiova, one of Romania's most emblematic football clubs, which has experienced both periods of remarkable success and moments of decline. The analysis begins with a brief historical overview of the club, highlighting the achievements that have shaped its identity and symbolic value. The study then considers the marketing mix applied by the club - product, price, distribution, and promotion - with particular attention to how these tools have been adapted to preserve the club's image during challenging times. The empirical part of the research is based on a questionnaire carried out between April 5 and May 24, 2025, on a sample of 150 respondents. The instrument, composed of 23 items, explored perceptions of the club's promotional strategies, the symbolic associations fans attribute to the team, and the solutions considered necessary for overcoming periods of low performance.

Findings indicate that fans primarily associate Universitatea Craiova with "pride" and local identity, regardless of recent results. Match-day atmosphere, evocation of historical achievements, and effective use of digital platforms emerge as key factors in maintaining resilience. The study concludes that heritage branding and storytelling strategies can compensate for poor performance and ensure the continuity of strong emotional bonds between club and supporters.

Keywords: sport, history, marketing, heritage branding, storytelling



ABSTRACT

The importance of the psychological factor in achieving performance in shooting sports - from the coaches' perspective

Liliana CIUPITU^a*, Amalia- Raluca STEPAN^b, Bogdan BURCEA^c, Marian-Alexandru COSMA^c

^a University of Craiova, Doctoral School of Social Sciences and Humanities, Craiova, Romania

^b University of Craiova, Teacher Training Department, Craiova, Romania

^c University of Craiova, Faculty of Physical Education and Sport, Craiova, Romania

* Corresponding author: email: lgciupitu@gmail.com

Introduction: Recognizing the crucial role that mental training and psychological preparedness play in achieving optimal performance in shooting sports, this research aimed to explore key aspects of training practices that contribute to performance enhancement. The study was conducted between September 2023 and January 2024, over a period of four months, with data collected every 15 days. A total of 25 coaches affiliated with the Romanian Shooting Federation, representing different levels of professional experience, participated in the research.

Material and Methods: The questionnaire, entitled "Questionnaire for coaches regarding some aspects addressed in sports training in order to maximize performance in shooting sports", was developed by us and administered online. The questionnaire included 16 items, supplemented with questions regarding the sociodemographic data of the respondents, with the option to answer with multiple answer options for some of the items. The purpose of this instrument was to obtain the coaches' perspectives on their needs in order to improve the coach-athlete relationship, as well as the working methodologies used in training.

Results: Statistical analysis of the data was recorded using the SPSS program, performing descriptive statistics, as well as inferential statistics (non-parametric tests, e.g. Chi square).

Conclusions: Summarizing the coaches' responses, we state the following: respondents attach great importance to all stages of preparation, not just one, mental preparation is perceived as indispensable, but not as a substitute for physical preparation, and the sports psychologist, the material factor and the team of specialists are recognized as having a major role in performance.

Keywords: Questionnaire, coaches, shooting sports, sports psychologist



ABSTRACT

Students as consumers of fitness services

**Luminița-Maria BRABIESCU CĂLINESCU^{a*}, Gheorghe IONESCU^a,
Robert MUNTEANU^b, Mirela SHAAO^a**

^a Faculty of Physical Education and Sports, University of Craiova, Romania

^b CSS Ploiesti

* Corresponding author: lumi_calinescu@yahoo.ca

Introduction: In the context of growing interest in health and physical activity, this study investigates students' behaviors and attitudes toward practicing sports and the frequency of physical activities during leisure time. The objective is to identify motivational factors, preferences for the type and context of sports activities, as well as perceptions of their usefulness.

Materials and methods: An online questionnaire was administered to a sample of 101 students, who answered questions about gender, educational level, social status, frequency of physical activity, motivation, and preferences related to sports. The data were analyzed descriptively by frequencies and percentages, and chi-square tests (for categorical variables) and correlations (where relevant) were used for comparisons between subgroups (e.g., gender, educational level).

Results: 77.2% of respondents were men and 22.8% were women. In self-assessment of personal activity: 42.6% considered themselves "very active" and 50.5% "active". Compared to their peers, 52.5% considered their level of physical activity to be "higher" and 32.7% "much more intense/higher". Regarding the benefits of teaching physical activities, most responses were at the "agree" level (high values). The main motivating factors were an active living environment (family, parents) — 81.2%, friends — 38.6%, social networks — 30.7%, high school teachers — 29.7%. Regarding the frequency of physical activity: 36.6% consider it healthy to do sports "daily", and 57.4% "several times a week". The dominant motivator for doing sports was "maintaining good health" (66.3%).

Conclusions: The results show a high level of awareness and positive attitude towards physical activity among the students surveyed, with strong motivations related to health and the influence of the family environment. The preference for strength training and muscle mass indicates a focus on aesthetic/functional goals, not just general cardio. The fact that more than half do not have a gym membership suggests that accessibility or costs may be barriers. Limitations of the study include non-random selection, self-reporting, and lack of detailed inferential analysis. Future studies could investigate differences between faculties, the academic impact on physical activity, and the effects of motivational interventions.



Keywords: physical activity, students, sports motivation, exercise frequency, training preferences



ABSTRACT

Balancing game integrity and player mobility: athletes' rights in the EU legal order

Maria SHAAOa*, Marian Costin NANUb, Mirela SHAAOb

a University of Craiova, Doctoral School of Social Sciences and Humanities, A.I. Cuza Street nr. 13, Craiova, Romania

b University of Craiova, Faculty of Physical Education and Sport, Brestei Street nr. 146, Craiova, Romania

* Corresponding author: mariashao@yahoo.com

The balance between the autonomy of sports governing bodies and the protection of athletes' rights has long been a central issue of the European Union (EU) law and institutions. The Court of Justice of the European Union (CJEU) has progressively clarified that while the sport domain enjoys a certain degree of autonomy under Article 165 of the Treaty on the Functioning of the European Union (TFEU), it is not exempt from the application of EU law and principles – particularly Treaty rules on competition (Articles 101-102 TFEU) and EU internal market rules (especially Article 45 TFEU – free movement of workers). The recent CJEU Case C-650/22 [Federation Internationale de Football Association (FIFA) v BZ] reaffirms that sports rules and regulations must respect the principles of proportionality, transparency, non-discrimination and freedom of movement.

This paper combines a review of the specialised literature with a doctrinal analysis of the relevant jurisprudence of the CJEU concerning the application of Articles 45, 101 and 102 TFEU in sport, in order to examine how the balance between the autonomy of sport and athletes' rights has evolved within the EU legal order.

The analysis reveals a gradual transition from respecting the autonomy of sports organisations to carefully scrutinising their rules in light of EU fundamental rights and freedoms, subjecting them to a stricter legal control focused on protecting athletes' rights. Starting with the *Bosman* case (C-415/93) and refined in *Meca-Medina* (C-519/04 P), the European Court established that sports rules with economic effects must comply with EU law. Later cases, such as *International Skating Union* (C-124/21 P), *European Superleague Company* (C-333/21) and *Royal Antwerp* (C-680/21) reinforced the principles of transparency and proportionality in sports governance. Case C-650/22 further consolidates these principles, confirming that fair competition and game integrity must coexist with athletes' rights. Thus, these rulings define clear limits on rules restricting athletes' rights, including access to competition or professional opportunities.



In conclusion, case C-650/22 consolidates an important jurisprudential framework in which preserving fair competition and safeguarding game integrity must coexist with athletes' freedoms and fundamental rights. The judgment marks a further step towards athlete-centred governance and reinforces the applicability of EU law to the regulatory activities of sports governing bodies.

Keywords: sports law; rights protection; Court of Justice of the European Union.



ABSTRACT

Analysis of the impact of a plyometric and ballistic program on explosive strength parameters in competitive volleyball players

Marian Alexandru COSMA^a, Dănuț PASCU^a, Florin VOINEA^b, Marilena COJOCARU^c, Adin COJOCARU^c

^a Faculty of Physical Education and Sports, University of Craiova, Romania

^b Faculty of Physical Education and Sports, Ovidius University of Constanța, Romania

^c Faculty of Physical Education and Sports, Spiru Haret University, Bucharest, Romania

Corresponding author: marian.cosma@edu.ucv.ro

Introduction: Volleyball is a complex sport characterized by intense neuromuscular demands and a rapid succession of explosive actions, such as jumping, attacking, and blocking. These actions predominantly involve plyometric muscle contractions, in which the muscles are stretched immediately before a rapid concentric contraction, which contributes to the effective development of explosive strength. For this reason, performance in volleyball depends to a large extent on the ability of athletes to generate maximum force in a very short time. In the literature, numerous studies have shown that plyometric and ballistic exercises can improve explosive strength parameters, reaction speed, and intermuscular coordination, but their specific effects in the context of a structured program for elite players require further analysis.

Materials and Methods: The purpose of this study was to evaluate the impact of a six-week plyometric and ballistic training program on the level of explosive strength in a group of 14 volleyball players registered in the first division. The research group consisted of athletes with an average competitive experience of over 5 years, who were in the precompetitive season. The intervention program included two weekly sessions, during which specific exercises were used, such as jumping in place, jumping over obstacles, ballistic medicine ball throws, and rapid reaction exercises. Before the start of the program and immediately after the completion of the six weeks, the athletes underwent a battery of standardized tests to assess explosive strength: Drop Jump, Countermovement Jump (CMJ), and CMJ Free. The values obtained were statistically analyzed, and the average differences and the level of significance of the progress recorded were calculated through SPSS software.

Results: Data analysis showed statistically significant improvements ($p < 0.01$) in all tests applied. In particular, a significant increase in jump height was observed in the CMJ test, indicating an effective development of explosive force production capacity in combined contraction (eccentric-concentric). Also, the Drop Jump test showed a reduction in ground



contact time, suggesting an improvement in the neuromuscular reaction mechanism and a superior ability to use elastic energy. The progress recorded in the CMJ Free test confirms the transfer of adaptations acquired in free execution conditions, without additional mechanical constraints.

Conclusions: The results obtained demonstrate that a structured program of plyometric and ballistic exercises, applied systematically for six weeks, can generate significant increases in explosive strength in competitive volleyball players. Therefore, the integration of such methods into specific training planning contributes to the optimization of athletic performance, the improvement of game efficiency, and the reduction of the risk of injury by strengthening muscle capacity and neuromotor control. The study confirms the importance of modern approaches based on dynamic exercises adapted to the biomechanical characteristics of volleyball, while also providing a practical basis for coaches seeking to develop explosive strength at a higher level.

Keywords: elite volleyball, male, plyometric, ballistic, performance.



ABSTRACT

Training-based determinants of vault performance in junior female gymnastics- A Systematic Review

Marius- Cristian UȚĂa, Germina- Alina COSMAa,b

a University of Craiova, Doctoral School of Social Sciences and Humanities, Craiova, Romania

b University of Craiova, Faculty of Physical Education and Sport, Craiova, Romania

* Corresponding author: utamariuscristian@gmail.com

Introduction: The aim of our study was to conduct a comprehensive literature review of scientific research focused on the vault event in female artistic gymnastics. The vault represents one of the most dynamic and technically demanding apparatuses, requiring an optimal combination of strength, speed, coordination, and psychological readiness. Understanding how training influences performance, injury prevention, and biomechanical efficiency is essential for coaches and physiotherapists who work with elite and developing gymnasts. Despite its importance in competition, scientific evidence addressing the vault in women's gymnastics is still limited compared to other apparatuses such as floor or balance beam.

Material and Methods: To conduct this review, we followed the PRISMA 2020 guidelines for systematic reviews. Searches were performed in major databases, including PubMed, Scopus, Web of Science, and Google Scholar, using combinations of keywords such as "vault," "female gymnastics," "biomechanics," "injury prevention," and "training." We included peer-reviewed articles written in English between 2000 and 2025. The exclusion criteria for the studies were as follows: vault analyzed in relation to other sports (n=89), inclusion of male gymnasts (n=57), studies with non-competitive or different age categories (n=30), and papers not available in open access format (n=13). After the full-text assessment, a total of 17 studies met all the inclusion criteria and were included in the qualitative synthesis.

Results: The included studies focused mainly on the analysis of take-off and landing biomechanics, kinematic parameters of the Yurchenko and Tsukahara vaults, and strength training strategies specific to lower limb explosive power. A consistent finding among studies was that targeted plyometric and resistance training significantly improved vertical take-off velocity, flight time, and landing stability. Several studies also emphasized the role of trunk muscle endurance and dynamic balance in controlling rotation and reducing the risk of lower limb injuries. Electromyographic analyses showed an increased activation of the quadriceps and gastrocnemius muscles during pre-flight phases, highlighting the importance of neuromuscular coordination. However, there is still a lack of longitudinal studies examining the effects of specific training programs over an entire competition season.



Conclusions: Within the limitations of the current review, the evidence indicates that specific strength and conditioning programs focusing on lower limb power, core stability, and landing technique can substantially enhance vault performance and decrease injury incidence in female gymnasts. The small number of studies demonstrates a clear research gap in this area, suggesting the need for future investigations with larger sample sizes, standardized biomechanical protocols, and comparative analyses between vault types. artistic gymnastics.

Keywords: the vault, female gymnastics, training, literature review.



ABSTRACT

Effects of integrated recovery on performance and perceived recovery: A Year-Long Case Study in a Female 100-m Hurdler

Marius-Ionuț BORTĂa, Niculina-Liliana MIHĂILESCUa

a Doctoral School of Sport Science and Physical Education, Pitești University Center, National University of Science and Technology Politehnica Bucharest

Aleea Școlii Normale No. 7 (former Gheorghe Doja Nr. 41), Pitești, România

marius_bortza@yahoo.com

Introduction: For high-performance athletes, the ability of the body to recover spontaneously after intense effort from trainings and competitions is no longer enough or too slow. Modern recovery methods targeting physiological and psychological processes can mitigate fatigue and enhance performance.

Material and methods: We tracked the performance trajectory of a young female sprinter over one competitive year while integrating recovery modalities (compression boots, a massage gun, stretching, foam rolling, and neuromuscular electrical stimulation - Compex) into her training program. Recovery status was assessed with the Recovery–Stress Questionnaire for Athletes (RESTQ-Sport), and performance was monitored via training-load metrics and 100m hurdles competition times.

Results: This case study shows that integrating targeted recovery modalities within an efficiently periodized training program can accelerate post-exercise recovery and optimize sprint performance. The athlete reported improved perceived recovery and race readiness, and her 100m hurdles time improved from 13.55 s to 13.17 s (–0.38 s; ≈2.8%).

Conclusions: Intensive training and competitive efforts elicit fatigue and short-term drops in performance. Integrating recovery strategies into the training plan promoted beneficial adaptations, supported performance progression, and enhanced perceived recovery.

Keywords: recovery, sprint, periodization, performance



ABSTRACT

Serve placement and gaining tactical initiative in Table Tennis

M. PLĂEAȘUa*, Ionel MELENCOa

a "Ovidius" University of Constanța, Doctoral School of Sport Science and Physical Education, Aleea Universității, Constanța, Romania

*Corresponding Author: plaeasumihaela@yahoo.com

The serve is the first action that can steer a rally toward offense or defense. Its placement across the backhand, middle (elbow), or forehand zones, and whether short, half-long, or long shapes the time available to the receiver, the return angles, and the ball height. Through these constraints, the server can increase the chance of gaining tactical initiative, understood as the first offensive attack at the start of the rally.

A well-disguised short serve reduces the amplitude of the return stroke and limits the receiver's options to a push or a controlled flip, thereby creating windows that favor the server's attack. Short placement to the backhand narrows the receiver's natural counter-attack angle and favors the server's opening, whereas a short serve to the "elbow" introduces decision ambiguity and delays the receiver's preparation. Conversely, a predictable long serve especially to the opponent's active forehand tends to concede initiative by facilitating an offensive receive.

The effectiveness of placement depends on variation and spin disguise. Alternating zones and lengths, together with disguising spin (backspin/sidespin/top/no spin), reduces the opponent's anticipation and increases the likelihood that the server dictates the first exchanges. Integrating these rules into training clear placement targets, short-half-long sequences, and combinations with spin disguise consolidates control of initiative at both the microcycle and game-plan levels.

As a concluding remark, the serve placement functions as a central technical-tactical instrument for gaining initiative.

Keywords: table tennis; serve; placement; tactical initiative; first attack



ABSTRACT

Cultivating the fan experience through special events

Mihai Constantin Răzvan BARBU^a*, Vlad Antonius SANDU^b, Roberto Nicușor ȚIU^b, Marian Gabriel POPA^a, Leonardo Daniel PĂSĂRI^a, Dan Eugen COSTIN^c, Dragoș Laurențiu DIACONESCU^a, Marius Cătălin POPESCU^a

^a University of Craiova, Faculty of Physical Education and Sport, Craiova, Romania

^b University of Craiova, Doctoral School of Social Sciences and Humanities, Craiova, Romania

^c "Dunărea de Jos" University of Galați, Faculty of Physical Education and Sport, Galați, Romania

* Corresponding author: email: mihai.barbu@edu.ucv.ro

Sporting events have become, in recent decades, more than simple competitions between teams or athletes – they are true global spectacles that attract millions of fans and generate huge audiences.

From Champions League matches to the Super Bowl to the Olympics, sports are a universal language that unites people from all corners of the world. And technology has completely transformed the way we interact with sports – whether it's watching live broadcasts, analysing real-time statistics or placing bets.

Hosting a special sporting event is a great opportunity to bring people together, promote an active lifestyle, and build community relationships. But to make such an event truly memorable, it requires meticulous planning, impeccable execution, and careful selection of the right resources. From setting goals to managing post-event feedback, every detail contributes to the overall success.

Organizing a successful sporting event requires attention to detail, creativity and the right products. Maybe less acknowledge is the target audience that require a personalisation of the sport event. Creating a memorable experience for participants and spectators is crucial. Smart planning, effective promotion and attention to detail are the keys to making a special sporting event a guaranteed success.

The objective of this study is to examine how special events organized by sports clubs and organizations enhance the fan experience by strengthening emotional connections, increasing engagement, and fostering loyalty towards the team or brand.

In the paper we tried to make a brief presentation of what special sports events mean and what the experience of fans who participate in such events entails in the first part, and in the second part are presented the results based on the topic discussed in this paper.

Keywords: fans, sport, special events, experience, community



ABSTRACT

Rapid-restart protocol, faster players: A practical strategy to maximize playtime and performance

Mohamed Aamine LTIFI^{a,b*}, Cristina Ioana ALEXE^c, Dragoș Ioan TOHĂNEAN^d, Camelia Alina POTECE^e, Dan Iulian ALEXE^{c*}, Ridha AOUADI^b

^a University of Gafsa, Higher Institute of Sport and Physical Education of Gafsa, Gafsa 2112, Tunisia;

^b Research Laboratory (LR23JS01) Sport Performance, Health & Society, Higher Institute of Sport and Physical Education of Ksar Said, University of Manouba, Tunis, Tunisia;

^c Department of Physical Education and Sports Performance, "Vasile Alecsandri" University of Bacău, Calea Mărășești 157, 600115, Bacău, Romania;

^d Department of Motric Performance Transilvania University of Brașov, Eroilor nr. 29, 500036, Brașov, România

^e PhD Student, National University of Physical Education and Sports in Bucharest, Constantin Noica, Nr. 14, 060057, Bucharest, Romania

* Corresponding author: mohamedltifi19@gmail.com; alexedaniulian@ub.ro

Background: Effective playing time (EPT) is a crucial determinant in the physical, technical, and cognitive development of young soccer players. Reducing match interruptions may enhance game rhythm and support player progression. This study examined the effects of a rapid-restart protocol, based on the availability of spare balls, on EPT, sprint performance, and agility in young Tunisian players.

Methods: Sixty male youth players (aged 11–16) from a Tunisian first-division club were randomly assigned to an experimental group: EG (n = 30) or a control group: CG (n = 30) across three age categories (U12, U14, U16). The EG played 10 weekly matches using the rapid-restart protocol, while the CG competed under standard conditions. Sprint performance (5 m, 10 m, 20 m) and agility (Illinois Agility Test: IAT) were assessed at baseline (T0), mid-intervention (T1), and post-intervention (T2). EPT was determined through video analysis.

Results: Compared with controls, the EG demonstrated significant improvements in sprint (5 m and 20 m) and IAT across all age categories ($p < 0.01$) compared to CG. EPT increased, providing additional opportunities for physical, technical, and cognitive development, including goalkeepers. The protocol also reduced contact between ball retrievers and players, thereby improving safety and minimizing interruptions.



Conclusions: The rapid-restart protocol effectively enhances EPT, match intensity, and youth player performance. Its simplicity, low cost, and safety benefits make it a practical strategy for coaches, organizers, and the Tunisian Football Federation. This approach can optimize learning, overall player development, and safety during official youth competitions.

Keywords: youth soccer players, effective playing time, sprint, agility, rapid-restart protocol, player development, match intensity, Executive Functions, Physical Fitness,, Preschool Children, Psychomotor Performance



ABSTRACT

Study regarding the communication styles in the parent-coach relationship in beginner football teams

Radu ABABEIa*, Anișoara SANDOVICa, Constantin NECHIFORb, Cătălina ABABEIa

a "Vasile Alecsandri" University of Bacău, Faculty of Movement, Sports, and Health Sciences, Department of Physical Education and Top Athletic Performance, 157, Calea Mărășești, Bacău, Romania

b "Petre Andrei" University of Iași, Departament of Psychology and Social Assistance, 6, Codrescu, Iași, Romania

* Corresponding author: email: ababeicatalina@ub.ro

Communication is a fundamental psychological activity within any human interaction that is based on a common, clearly defined goal. In the case of children who practice various team sports, optimal communication between parents and coaches becomes the axis that facilitates the structuring of trust and mutual support. The type of communication, together with the parenting style and the learning style applied by the children's coaches, become essential variables in the perception of satisfaction with the results achieved by the children in sports. On the one hand, parents can significantly contribute to motivating children to practice sports only to the extent that they establish optimal communication with coaches (Azimi & Tammien, 2022). On the other hand, the communication style adopted by coaches, combined with the imposed learning style, will significantly influence both the quality of the communication relationship with parents and the perceived level of satisfaction with the children's results. The purpose of this research was to verify whether the communication styles adopted by parents and coaches significantly influence the degree of satisfaction felt regarding the children's performances. We also aimed to verify to what extent parental communication styles correlate with the parenting style adopted. Finally, we aimed to establish the relationship between coaches' communication styles and the learning styles applied in relation to child athletes. The research included 200 parents of children enrolled in private football clubs in the counties of Bacău, Vrancea, and Botoșani, as well as 70 coaches from the same counties. We expect the results to confirm the premises of the research. Furthermore, depending on the results, we aim to develop and implement a program to improve the emotional and social skills of coaches. In this way, they will be able to mediate the communication relationship with parents and children who practice team sports much more effectively.

Keywords: coaches, parents, communication style, learning style, parenting style



ABSTRACT

Developing the paracyclists' effort capacity in order to participate in sports competitions - case study

Raluca Maria COSTACHE^a, Aurora MIHALCEA^b,

^a National University of Physical Education and Sport Bucharest, Romania

^b Vasile Voiculescu Secondary School, Pârscov, Buzău, Romania

* Corresponding author: email: rally_kyn@yahoo.com

Introduction: Paracyclists are part of the category of athletes who have lower limb disabilities that require the use of a manually operated bicycle. There are five classes of manual cycling, but we present only the relevant categories for this study, namely: H1: tetraplegics with severe upper limb impairment at the level of the C6 vertebra; H2: tetraplegics with minor upper limb impairment from C7 to T3. The purpose of this study is to show the importance of physical training in the basic training of tetraplegic cyclists with severe upper limb impairment.

Materials and methods: bibliographic study method, case study method, pulse belt observation method and last but not least, the pulse tester.

Results: Following the applied programs, it was found that the I.O. athlete experienced an improvement in vital capacity, heart rate and competition time due to the increase in muscle mass and the improvement of strength in the upper limbs.

Conclusions: Following the tests and the applied program, it was found that physical training exercises are beneficial for the development of upper limb strength, the development of abdominal muscles and is also beneficial for the production of power for smooth pedaling, which leads to an improvement in effort capacity and last but not least to a superior approach to the race.

Keywords: paracyclists, case study, vital capacity, pulse belt



ABSTRACT

The impact of integrated training on rugby referees' knowledge of the laws of the game

Robert DIACONESCU^{a*}, Nicolae BRAGARENCO^b

^a Ovidius University of Constanta, Mamaia Blvd., no. 124, University Alley no. 1, Constanta, Romania;

^b State University of Moldova, Alexei Mateevici Street 60, Chisinau, Republic of Moldova.

* Corresponding author: ardfr@gmail.com

Introduction: Modern rugby refereeing demands intermittent effort, optimal positioning, and consistency in decision-making and signaling. In this context, deep knowledge of the Laws of the Game is an indispensable prerequisite for coherent decisions. Accordingly, referee education should be structured in an integrated manner, under conditions as close as possible to real match situations. The present study aims to determine the effect of an integrated training program on referees' knowledge of the Laws of the Game among participants in the pedagogical experiment.

Materials and Methods: A quasi-experimental design with repeated measures at three time points: TI (initial test), TInt (intermediate test), and TF (final test), on a sample of 12 referees enrolled in the same training program. The instrument was a 35-item test covering representative domains of the Laws of the Game; performance was expressed as the number of incorrect answers and the error rate. Test administration was standardized (identical instructions, fixed time, no supporting materials allowed). For triangulation and thematic coherence, both the online "Laws of the Game (IRB)" exam (pre-experiment) and an internal digital platform (intermediate and post-experiment testing) were used, both administered under uniform conditions. The independent variable was the integrated referee training program, and the statistical analysis included descriptive statistics of central tendency and variability and paired-samples Student's t-tests between measurement moments.

Results: The mean number of incorrect answers decreased from 10.00 (initial test) to 7.00 (intermediate test) and 5.42 (final test), corresponding to a reduction in the mean error rate from 28.57% to 20.00% and 15.47%. The differences were statistically significant: $t_1 = -3.20$; $p < 0.01$ (TI-TInt), $t_2 = -5.06$; $p < 0.001$ (TInt-TF), and $t = -5.65$; $p < 0.001$ (TI-TF). A redistribution toward higher performance bands was also observed, suggesting genuine progress and cognitive-functional homogenization of the group.



Conclusions: The application of the integrated training program produced significant improvements in rugby referees' knowledge of the Laws of the Game, confirming its utility through targeted instructional interventions.

Keywords: rugby refereeing; Laws of the Game; pedagogical experiment



ABSTRACT

MediaPipe-based Real-time Feedback System for Apparatus Pilates Movements

Suhyeon PARKa, Sungje PARKa*

a Chung-Ang University, 84, Heukseok-ro, Dongjak-gu, Seoul, Republic of Korea

* email: sungjes@cau.ac.kr

In modern society, prolonged sitting and poor posture are major causes of musculoskeletal disorders (Kim, Kim, Seo, & Kim, 2014), and Pilates is increasingly recognized as an effective solution (Kim, Lee, & Kim, 2022). However, accurate performance requires detailed feedback from instructors (Bang, Park, & Song, 2022), which creates economic and time constraints (Jung, 2021). Recently, Google's MediaPipe has been used for exercise correction due to its accessible and lightweight design while maintaining high recognition accuracy (Zhao, Lu, & Guan, 2024). Its potential for real-time feedback has been shown in squat and yoga correction (Kim, 2023; Debalaxmi et al., 2024) and turtle neck analysis (Han & Park, 2020). Yet, research has mainly focused on bodyweight exercises, with limited application to apparatus-based Pilates. This study aims to implement a MediaPipe-based real-time feedback system for apparatus Pilates movements. A system was developed to provide real-time feedback for the Sidebend movement on the Ladder Barrel. Key points were the shoulder, pelvic, and ankle centers. Proper alignment between the shoulder and pelvis was defined as 0° , and deviations beyond $\pm 8^\circ$ were judged incorrect, triggering immediate feedback via color and text. Participants performed 10 Sidebend movements in a realistic exercise setting. Recognition accuracy and error rates were calculated by comparing system results with expert evaluations. The system showed an average accuracy of 79% compared with expert judgments, demonstrating meaningful performance even in its early stage. Gender analysis showed 88% agreement for female participants, indicating precise recognition of correct and incorrect movements. Male participants had a lower agreement of 70%, likely due to greater body type diversity affecting keypoint detection.

This study confirms that a MediaPipe-based real-time feedback system can effectively improve the accuracy of apparatus Pilates movements. It enables users to self-assess and correct movements without instructors, enhancing posture through repetitive learning. High agreement with expert evaluations demonstrates reliability, and further accuracy improvements are expected through algorithm refinement for diverse body types. The system can be extended to various apparatus Pilates movements, supporting accurate execution and learning.



Keywords: MediaPipe, Coputer Vision, Pose Estimation, Apparatus Pilates, Real-time feedback



ABSTRACT

Digital tools, motivation and performance in physical education

Teodora Sabina BOBEȘa, Antoanela OLTEANb*

a PhD student, Doctoral School of Sport Science and Physical Education, Institute of Doctoral Studies, Ovidius University of Constanța, Constanta, 900470, Romania

Secondary School Teacher, Secondary School No. 21, Sibiu, 550362, Romania

b Associate professor PhD supervisor, Institute of Doctoral Studies, Ovidius University of Constanța., Constanta, 900470, Romania

* Corresponding author: olteantoanela@gmail.com

Introduction: The integration of digital tools and gamification in physical education (PE) has emerged as a transformative approach to enhance student engagement, motivation, and performance. Recent literature highlights the potential of digital applications, exergames, mobile apps, and virtual reality to stimulate active participation, improve skill acquisition, and foster psychological well-being. These innovations align with global educational challenges, particularly the shift towards online and blended learning models after the COVID-19 pandemic.

Material and Methods: This study is a theoretical review of relevant literature, analyzing recent systematic reviews, empirical findings, and conceptual frameworks on the role of digital technologies in PE. Sources include research focused on gamification, exergames, wearable technologies, mobile tracking applications, flipped learning strategies, and artificial intelligence applied to physical education.

Results: The synthesis of findings reveals that digital tools positively influence both intrinsic and extrinsic motivation, leading to higher participation rates, improved physical fitness, and enhanced learning outcomes. Evidence suggests that gamified approaches reduce anxiety, foster collaboration, and improve classroom climate, while digital feedback systems (e.g., heart rate monitoring, mobile applications) increase self-efficacy and performance. However, barriers persist, including teacher digital competence, unequal access to technology, and concerns regarding psychological well-being.

Conclusions: The integration of digital tools into PE presents a promising pedagogical pathway for improving motivation and performance in students. Success depends on strategic implementation, teacher training, and adequate infrastructure. A balanced approach, combining digital innovation with traditional methods, ensures relevance and sustainability in PE while promoting lifelong engagement with physical activity.

Keywords: physical education, gamification, digital tools, motivation, performance



ABSTRACT

Assessment of the relationship between movement quality and athletic performance in young basketball players

Umut CANLIa*, Carla Cristina VIEIRA LOURENÇO^b, Marta BICHOWSKA-PAWESKA^c, Sohom SAHA^d, Dan Iulian ALEXE^e*

a Tekirdağ Namık Kemal University, Tekirdağ, Türkiye

b Centre for Studies in Education and Innovation, Polytechnic Institute of Viseu, University of Beira Interior, Portugal

c Gdansk University of Physical Education and Sport, Gdansk, Poland

d Lakshmibai National Institute of Physical Education, Gwalior, Madhya Pradesh, India;

e Department of Physical and Occupational Therapy, "Vasile Alecsandri" University of Bacau, 600115, Bacău, Romania;

*Corresponding author: ucanli@nku.edu.tr; alexedaniulian@ub.ro

Background: This study aimed to evaluate the relationship between movement quality and elements of athletic performance in young basketball players.

Material and Methods: A total of 76 male basketball players (age = 12.50 ± 0.60 years; height = 162.25 ± 9.10 cm; body weight = 50.45 ± 7.36 kg; BMI = 18.25 ± 2.14), who had been participating in basketball training for at least two years and competing in matches, voluntarily took part in the study. The Functional Movement Screen (FMS) test battery was used to assess participants' movement quality. To evaluate athletic performance, vertical jump, standing long jump, sprint, and agility tests were administered.

Results: The results revealed a moderate negative correlation between FMS scores and both agility and sprint performance ($r = -0.41$ and -0.44 , respectively; $p < 0.05$). A moderate positive correlation was found between FMS scores and standing long jump performance ($r = 0.54$, $p < 0.01$). However, no significant correlation was observed between FMS scores and vertical jump performance ($p > 0.05$).

Conclusions: Based on the results, it appears that movement quality in young basketball players is correlated with certain components of athletic performance. It is suggested that incorporating training strategies aimed at improving movement ability and movement quality may contribute to the enhancement of athletic performance parameters.

Keywords: agility, speed, strength, basketball, functional movement ability



ABSTRACT

Body composition as a key factor in elite judo training: the specialists' perspective

Ioniță VALERICĂa*, Luminița GEORGESCUb, Ștefan TOMAb

a Doctoral School of Physical Education and Sport Science, National University of Sciences and Technology Politehnica Bucharest, Pitesti University Center, Str. Tg. Din Vale, nr. 1, Pitești, Roumania

b National University of Sciences and Technology Politehnica Bucharest, Pitesti University Center, Str. Tg. Din Vale, nr. 1, Pitești, Romania

Introduction: In judo, weight categories are essential for ensuring fairness and competitiveness in matches. Understanding the theoretical and practical aspects of body composition and weight management is crucial for high-performance athletes, as these factors directly influence their performance, health, and competitive success. Numerous authors have written about the variation in the physical and physiological profile of judokas during the training season, as well as other studies that have monitored this profile during competitions.

Material and Methods: Body composition and nutritional status are recognized as key determinants of both health and athletic performance. Indeed, in many sports, an athlete can gain a competitive edge by altering their body mass or body composition characteristics. However, many athletes often undergo severe weight reductions through caloric restriction in order to compete in a lower weight class, aiming to gain an advantage over other judokas within that category. To reach the weight required to compete in a specific class, many competitors impose drastic dietary restrictions, particularly during the week leading up to competition. The weight lost is typically regained afterward as athletes compensate for energy depletion through excessive food consumption in the post-competition period. This rapid fluctuation between weight loss and regain is known as "weight cycling." For example, senior judokas have shown a higher use of weight-cutting methods, especially during the week preceding competitions, compared to their junior counterparts. Judokas become more involved in their dietary practices and experience greater weight reduction as they progress in age.

Results: Over a 4-month period of administering a questionnaire to specialists, we surveyed 100 individuals involved in the field—coaches, sports methodologists, doctors, masseurs, physiotherapists, and managers—who kindly responded to our questionnaire. The correlation between athletic training, body composition, and other preparation factors is essential for the success of elite judokas. Through a holistic and personalized approach,



which includes strength, cardiovascular, technical, and mental training, proper nutrition, and recovery programs, athletes can achieve and maintain an optimal state of readiness, maximizing performance and minimizing injury risks.

Conclusions: Collaboration between coaches, nutritionists, sports psychologists, and physiotherapists is crucial to ensure comprehensive and effective preparation for judokas. The alignment of specific judo training with body composition management and weight category strategies is crucial for the success of high-performance athletes.

Keywords: judo, body composition, weight management



ABSTRACT

Effects of a 6-month virtual reality exergaming intervention on muscle strength in 12-year-old children: A quasi-experimental study using the muscle meter from MAT (Movement Assesment Technologies)

Horatiu Dacian GHEJANa*, Vlad Teodor GROSUa*, Alexandra Diana ZBANCAa, Nicolla MANCINI, Carlos HERVAS-GOMEZ, Emilia Florina GROSU

a University Babes-Bolyai Faculty of Physical Education and Sport, Cluj-Napoca, Cluj

*Email autor corespondent: horatiughejan217@gmail.com, vlad.grosu@mdm.utcluj.ro

Background: Virtual reality (VR) based exercise programs have gained increasing attention as engaging, gamified training tools that may enhance adherence and produce meaningful physical adaptations. However, evidence regarding their long-term effectiveness on maximal strength, particularly in complex multi-joint movements such as the deadlift, remains limited. This study aimed to investigate whether a six-month VR exergaming intervention could improve maximal deadlift performance in healthy young adults compared to a control group.

Methods: A total of 64 participants (32 in the VR intervention group and 32 in the control group) voluntarily participated in this study. Both groups completed pre and post intervention assessments of one repetition maximum (1RM) deadlift strength. The intervention group engaged in a structured six-month VR exergaming program designed to simulate resistance training, incorporating dynamic movement, coordination, and balance challenges within an immersive environment. The control group maintained their usual physical activity without VR exposure. Data were analyzed using repeated measure ANOVA and paired-samples *t*-tests to assess within and between group changes in deadlift performance over time.

Results: Descriptive statistics indicated that the control group showed negligible change across the six-month period (pre = 69.41 ± 16.97 kg; post = 68.88 ± 15.63 kg). The within-subjects analysis for the control group confirmed no significant effect over time ($F(1,31) = 1.772$, $p = .193$). In contrast, the VR exergaming group demonstrated a significant increase in deadlift strength ($t(31) = -6.655$, $p < .001$), indicating a robust training effect. Between-subjects analyses showed a clear divergence in strength outcomes favoring the intervention group, suggesting that VR-based resistance training effectively enhanced muscular performance.

Conclusions: Six months of VR exergaming produced a significant improvement in maximal deadlift strength compared to a non-intervention control group. These findings



suggest that immersive VR training environments can provide sufficient stimulus to elicit meaningful neuromuscular adaptations, potentially by increasing engagement, motivation, and training volume. VR exergaming represents a promising modality for promoting strength development, particularly for individuals seeking an alternative or supplement to conventional resistance training.

Keywords: Virtual reality, exergaming, Beat Saber, children, muscle strength, MAT dynamometer, physical activity, pediatric fitness



***SPORTS & EXERCISE MEDICINE
&
HEALTH (MH)***



ABSTRACT

Impact of spinning and swimming exercises on metabolic and functional parameters in a female patient with type 1 diabetes mellitus (T1DM)

Adelina SCHEULEACa, Elena VIZITIU LAKHDARIb*

a Institute of Physical Education and Sport of USM, 22 Andrei Doga Street, University of Physical Education and Sports, Chişinău, Republic of Moldova

b Interdisciplinary Research Center for Motor Sciences and Human Health, "Ştefan cel Mare" University of Suceava, Str. Universităţii 13, 720229, Suceava, Romania

*Corresponding author: elenav@usm.ro

Review of the literature shows that regular physical activity plays a proven role in improving insulin sensitivity, glycemic control, and overall functional status. Aerobic exercise, performed consistently and tailored to individual capacity, contributes to glucose metabolism regulation, increases cardiorespiratory fitness, and improves quality of life in individuals with type 1 diabetes mellitus (T1DM). The study included a 17-year-old female patient with T1DM diagnosed at age 10, treated with a basal-bolus insulin regimen. The intervention program spanned four months and comprised two types of aerobic activity: spinning, two sessions per week, up to 45 minutes per session, at moderate intensity (60–75% of maximum heart rate), and swimming, two sessions per week, up to 40 minutes per session. Working hypothesis: Regular inclusion of moderate-intensity spinning and swimming will lead to significant improvements in metabolic control (lower blood glucose and HbA1c) and in functional capacity (better physical fitness and reduced resting heart rate) in the patient with T1DM, without increasing the risk of hypoglycemia. General objective: To evaluate the impact of spinning and swimming on metabolic and functional parameters in a female patient with T1DM. Results: After four months of combined training (spinning and swimming), significant improvements were observed in both metabolic and functional parameters. Conclusions: Regular, closely monitored physical activity tailored to the individual level contributes significantly to improved metabolic control, reduced HbA1c, increased exercise tolerance, and a more favorable lipid profile. The combination of spinning and swimming proved effective and safe, exerting a positive impact on metabolic and functional health in this patient with T1DM.

Keywords: impact, spinning (indoor cycling), swimming, type 1 diabetes mellitus (T1DM), case study



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ABSTRACT

The influence and reliability of physical activity level, evaluated by the pai (physical activity index) questionnaire, on spinal postural deficiencies in students with kyphosis and lordosis

Adrian Titus SERSENIUC URZICĂa, Luciela VASILEb*, Emilian TARCAŪa, Theodora URSUa, Klara KALMANa

a Human Performance Research Center, Department of Physical Education, Sport and Physiotherapy, University of Oradea, Romania.

b National University of Physical Education and Sports, Faculty of Physical Education and Sport, Bucharest, Romania.

*Corresponding author: lucielav05@gmail.com

Introduction: Posture deficiencies are a growing concern among middle school children, as they can significantly impact physical health and overall well-being. Modern lifestyles are marked by two opposing trends: a decrease in varied physical activity and an increase in static, asymmetrical movements and overloads that can cause lasting alterations in the body's functional and motivational systems. These negative adaptations contribute to reduced physical fitness and may lead to postural deviations as early as preschool age.

Material and methods: This process resulted in a total of 60 participants — 24 diagnosed with kyphosis and the remaining 36 with lordosis. They were selected from an initial group of 113 children who had previously been evaluated for postural deficiencies. The participants completed the PAI questionnaire (Physical Activity Index, a standardized tool used to assess the participants' physical activity levels, including the type, frequency, and duration of activities), as well as a custom questionnaire specifically designed to assess postural habits.

Results: Overall, 63.3% (38/60) of participants fall within suboptimal zones ("sedentary" + "relatively sedentary"; 95% CI: 51.1–75.5%), while 20.0% (12/60) report an active/very active level (95% CI: 9.9–30.1%). This distribution thus indicates a predominance of low activity levels, with a relatively small proportion of active individuals.

Conclusion: The results of the two questionnaires suggested that the distribution of postures adopted while sitting, writing, or using a phone is predominantly in flexion, and the differences between types of postural deficiency (kyphosis vs. lordosis) are minimal, indicating that the type of deficiency does not significantly influence these postural behaviors. Engagement in posture-corrective exercises is low (88.3% do not perform them at all), with a slight predominance of inactivity among those with lordosis.

Keywords: Physical Activity Index, middle school children, posture



ABSTRACT

The role of physiotherapy in the development of fundamental motor skills in children receiving palliative care: a Case Study

Alexandra-Mihaela IONICĂ^a*, Silvia-Violeta TEODORESCU^a

^a National University of Physical Education and Sport, Constantin Noica Street, no. 140, Bucharest, Romania

* Corresponding author: alexandraionica99@yahoo.com

Introduction: The integration of physiotherapy into the multidisciplinary management of patients with chronic kidney disease (CKD) serves a key role in optimizing residual functionality. In palliative care settings, physiotherapy contributes to the maintenance of motor function through individualized interventions aimed not only at preserving mobility but also at enabling participation in recreational and sports activities. This case study explores the functional outcomes of a physiotherapeutic intervention in an adolescent with CKD, vesicoureteral reflux-related uropathy, hydronephrosis, and microcephaly.

Material and Methods: A structured physiotherapy program was implemented, targeting segmental strength and functional performance in walking, jumping, and running. The intervention included proprioceptive neuromuscular facilitation (PNF) techniques, analytical and segmental exercises adapted to the patient's motor impairment level, and strength/stabilization training using the Rocher cage and TRX system. Cardiovascular endurance was addressed through treadmill running at 12.0 km/h with a 15% incline for 10 minutes at the start of each session. The program followed principles of individualization and progression, with in-clinic sessions conducted twice weekly (30 minutes/session), supplemented by home-based jump rope and running exercises three times per week. Progress was monitored using a customized functional test assessing: Vertical jump height, number of consecutive stationary and obstacle jumps, ability to alternate walking, jumping, and running over short distances.

Results: Post-intervention assessments showed notable improvements: Increased vertical jump height and consecutive jump count, indicating improved coordination and segmental strength, enhanced cardiovascular endurance, with the patient completing 800 meters on the treadmill at the set parameters without excessive fatigue, functional test results confirmed the ability to alternate between walking, running, and jumping, closely simulating real-world conditions. The intervention culminated in the patient's successful participation in a 2.5 km marathon race, completed through intermittent running and short recovery breaks.



Conclusions: This case study demonstrates that a personalized and progressive physiotherapy program can significantly improve motor function, cardiovascular endurance, and quality of life in adolescents with CKD. Beyond physical gains, the patient achieved greater functional autonomy and self-confidence, underscoring the essential role of physiotherapy in the holistic care and social reintegration of pediatric patients with chronic conditions.

Keywords: chronic Kidney Disease, Physiotherapy, Pediatric Rehabilitation, Functional Performance, Quality of Life



ABSTRACT

The relationship between resistance training and visceral fat decrease in middle aged women

Anamaria GORGANa*, Mihai DRAGOMIRa, Alexandru Gabriel CHIVĂRANa, Denisa ENESCU BIERUa

a University of Craiova, Faculty of Physical Education and Sport, Sport Medicine and Physiotherapy Department, Craiova, Romania

*anamakese@gmail.com

Introduction: Middle aged women, 40–60 years, experience progressive visceral fat accumulation and diminish muscle mass, which lead to metabolic imbalance, sarcopenia and less functional independence.

Material and methods: This review analyzed 15 studies published between 2010 and 2025, that followed the effects of resistance training on visceral and subcutaneous fat, lean mass and metabolic parameters in middle aged women. The duration of studies ranged from 8 to 24 weeks, with a training frequency of 3–5 sessions per week, to an intensity from moderate to high (60–80% 1RM). Bioelectrical impedance analysis (BIA) and anthropometric proved valid and practical methods for evaluating fat distribution. Progressive overload programs using elastic bands, free weights and body weight exercises effectively reduced abdominal fat and preserved muscle strength, especially when combined with brief aerobic components.

Results: According to the studies, resistance training produced significant reductions of visceral fat (–10% to –18%) and waist circumference (-3.2 ± 1.1 cm) and also lean body mass increase ($+1.8 \pm 0.7$ kg) and BMI improve (-1.4 ± 0.5 kg/m²).

Conclusions: The founded evidences support the inclusion of the structured resistance physical training as part of a non-pharmacological strategy, in preventive and therapeutic programs for middle aged women with visceral fat.

Resistance physical exercises improved insulin sensitivity, increased the resting metabolic rate and created a better postural stability, key aspects for preventing sarcopenia and maintain life quality.

Keywords: resistance physical training, visceral fat, middle aged women.



ABSTRACT

Influence of the sedentary lifestyle on spinal mobility and grip force

Andreea Maria ROȘCAa*, Mihaela ZĂVĂLEANUa, Cătălin POPAa

a University of Craiova, Department of Kinetotherapy and Sports Medicine, Craiova, Romania

* Corresponding author: andreea.rosca@edu.ucv.ro

Introduction: Lifestyle is influenced by the daily life activity that the individual carries out. Sedentary lifestyle has a major impact on joint mobility and functionality with major long-term effects over the quality of life.

Materials and methods: The study aims to identify among physiotherapy students the values of spinal flexibility (Ott, Schober, finger-floor distance (FFD)) and functional shoulder mobility (testing according to the "Functional movement screen-FMS" or back-scratch) and grip force in relation to lifestyle. The tests were performed symmetrically for both upper limbs, the average of the two being statistically processed.

30 subjects with an age of mean= 24.07, median=21, (min=20, max=61) were evaluated, of which 16 women and 14 men, 18 of whom presented pain at different levels of the spine.

The evaluation was carried out according to the methodological norms in the field, aiming to identify the fitness status and the effects of sedentariness.

Results: for cervical mobility left-right, just 1 student could obtain optimal range of motion. For FFD test, only 6 students out of 30 performed normal range of motion. Regarding Ott test, only 5 students gained minimum 4 cm or more, while on Schober test 9 students obtained 4 cm or more.

Conclusions: Based on the values of the examined indices, our conclusions are that although young people are largely active, they also present periods of sedentariness in positions that require their spinal joint structures and the amplitudes of movement at the level of joints such as the shoulders have values that decrease functionality.

Keywords: sedentarism, spinal mobility, FFD, Ott, Schober



ABSTRACT

The importance of early assessment using the GMA method in guiding physiotherapy intervention in newborns with perinatal hypoxia – case study

Andreea MIU MANEAa*, Silvia TEODORESCUa

a National University of Physical Education and Sports, Faculty of Physical Education and Sport, Bucharest, Romania

*Corresponding author: email: andreeamiu80@gmail.com

Introduction: One of the most sensitive tools for early identification of neuromotor risk is the qualitative assessment of spontaneous movements using the Precht General Movements Assessment (GMA) method. In the case of perinatal hypoxia in newborns, early detection of possible motor disorders allows for immediate physiotherapeutic intervention during the critical period of neuroplasticity, in order to prevent their occurrence and support the child's optimal development.

Material and Method: The present study refers to the case of a male newborn, born naturally, at term, with an Apgar score of 1 at the first minute, who required resuscitation and assisted ventilation. Transfontanellar ultrasound revealed transient cerebral edema. The first GMA assessment was performed at 39 weeks postmenstrual, during the writhing period, using the General Movements Optimality Score – Revised (GMOS-R), with a result of 29/38. This confirmed the absence of a pathological pattern but signaled a transient risk of neuromotor delay, indicating an active but immature nervous system.

At the recommendation of the neonatologist, early physiotherapy was initiated three weeks postnatally, with a frequency of two sessions per week, coordinated by a GMA-accredited pediatric physical therapy specialist. The therapeutic program included neuromotor therapeutic massage, symmetrical postures, and MIT-PB (Movement Imitation Therapy for Preterm Babies) techniques, aimed at regulating tone, facilitating axial control, and sensory self-regulation. The second assessment, performed at 12 weeks and 4 days postnatal, during the fidgety period, the physical therapist, in collaboration with the neonatologist, used the Motor Optimality Score (MOS), with a result of 27/28, indicating an optimal motor profile. Repeating the transfontanellar ultrasound at the same age confirmed good organization of the brain structures, consistent with clinical evolution.

Results: Clinical evolution was favorable, with normalization of muscle tone, balanced posture, and complete motor repertoire. Spontaneous movements became fluid, continuous, and symmetrical, without the presence of pathological movements (cramped-synchronized or jerky). Interdisciplinary collaboration (physical therapist–neonatologist)



and the active involvement of parents in daily exercises contributed to the continuity of the therapeutic process and the consolidation of motor self-regulation.

Conclusions: The present case demonstrates that, although the onset was severe (Apgar 1), early GMA assessment, in correlation with the MOS score, was an essential tool for predicting neuromotor evolution and guiding immediate and personalized physiotherapy intervention. The clinical and imaging results (optimal motor organization at 3 months of age) confirm the effectiveness of the integrated approach and the predictive value of the GMA assessment in neonatal physical therapy practice.

Keywords: early assessment; spontaneous movements; GMA; MOS; perinatal hypoxia; physiotherapy intervention; neuromotor development



ABSTRACT

Perceptions of telerehabilitation among physiotherapy students: opportunities and challenges

Andreea - Daniela BRĂGUȚĂ^{a*}, Adriana - Mihaela DUMITRESCU^b, Elena - Taina AVRAMESCU^b

^a University of Craiova, Doctoral School of Sport Science and Humanities, 13 A.I. Cuza Street, 200585, Craiova, Romania

^b University of Craiova, Faculty of Physical Education and Sports, Brestei Street, no 146 , Craiova, Dolj, Romania

* Corresponding author: braguta.andreea@yahoo.com

Introduction/Background: Physiotherapy students' perceptions of telerehabilitation are increasingly recognized as a key factor influencing its future adoption in clinical practice. Recent studies show that students generally value the relevance of digital practice and support hybrid care models, yet many report limited curricular exposure and lack confidence in remote physical assessment and patient engagement. Opportunities identified include enhanced accessibility, flexible learning, and strengthened patient education, while challenges commonly relate to insufficient hands-on training, technical barriers, and concerns about therapeutic alliance. These findings highlight the need for structured digital education in physiotherapy curricula. In response, the e-PHYSIO project (2023–2026) was launched to modernize bachelor-level physiotherapy programs in the Western Balkans through innovative digital resources, interactive learning platforms, and robust quality assurance.

Materials and Methods: The project involved eight higher education institutions from Albania, Kosovo, Romania, Bulgaria, and Turkey. Educational outputs included: a Telerehabilitation Course, a course on Digital Approaches for Online Education, Online Rehabilitation Protocols across clinical specialties, Online Rehabilitation Modules, and updated structured rehabilitation courses. All were delivered through the e-PHYSIO e-learning platform and virtual space. Pilot testing engaged 37–62 participants per output, including students and educators. Structured questionnaires and a mixed-methods design combined descriptive statistics with thematic analysis of qualitative feedback, evaluating clarity, usability, interactivity, and overall impact.

Results: The Telerehabilitation Course was well received: 98.2% of respondents confirmed an appropriate theory–practice balance and 96.3% recommended it, despite most having no prior experience. In the Digital Approaches Course, 73.7% of staff had limited digital skills, yet 96.3% found the content relevant and 87% considered materials well



structured. The e-learning platform was rated user-friendly by 75.9% of participants, with 77.8% reporting no technical issues, though 22.2% noted slow loading or navigation challenges. Online Rehabilitation Protocols and Modules were praised for interactivity and clinical applicability, with calls for more multimedia content, practical case studies, and personalized pathways.

Conclusions: Pilot testing confirmed that digital physiotherapy resources can be effectively integrated into education in the Western Balkans. Students and educators expressed strong engagement and satisfaction, citing interactivity, case-based learning, and content relevance as major strengths. Challenges included limited prior exposure to telerehabilitation, technical constraints, and the need for further personalization. The e-PHYSIO project thus offers a scalable and innovative model for aligning physiotherapy education with global digital health strategies and preparing graduates for contemporary rehabilitation practice.

Keywords: Telerehabilitation; Digital Physiotherapy Education; e-Learning; Curriculum Innovation; Western Balkans



ABSTRACT

The impact of physical exercise on the shaping of a healthy lifestyle among young girls

Constantin PEHOIU^a*, Bianca FERRARIO^a, Ciprian PRISĂCARU^a

^a a "Valahia" University of Targoviste, Faculty of Humanities, Romania, cpehoiu@yahoo.com/
constantin.pehoiu@valahia.ro

* Corresponding author: cpehoiu@yahoo.com/ constantin.pehoiu@valahia.ro

Introduction: Sports activities represent an essential factor in the formation and development of human personality, contributing to the shaping of responsible, balanced, and high-performing attitudes. By valuing positive individual and group experiences, sport stimulates courage, perseverance, team spirit, and social awareness, while also reducing psychological tension and fostering an optimistic and active environment. In the context of modern education, physical activity must be integrated into a formative model that harmonizes formal and informal education and promotes a healthy lifestyle, turning sport into a tool for physical, psychological, and social balance.

Purpose of the research: The aim of the study was to highlight the role of sports activities in improving the quality of life and lifestyle among young women through the implementation of an adequate, attractive, and adaptable physical exercise program.

Working hypotheses: a) It is considered that the systematic application of physical exercise programs adapted to the young participants' training level can significantly contribute to improving their quality of life.

b) It is assumed that the efficiency of these programs depends on the degree of awareness regarding the importance of physical exercise in maintaining health and developing an active attitude toward one's lifestyle.

Methodology: The research was carried out over the course of one academic year (28 weeks, totaling 56 hours) on a sample of 709 young women aged between 19 and 25, divided into an experimental group and a control group. The experimental group followed a structured physical exercise program - including aerobic gymnastics, athletics, fitball, Pilates, and team games - designed to stimulate autonomy, self-acceptance, and personal development. The methods used included observation, questionnaire survey, somatic and functional evaluation, motor testing, and statistical analysis (KY-PLOT software). The motor tests targeted strength (standing long jump, squat jump, trunk lifts), speed (30 m sprint, ruler test), endurance (Cooper test), flexibility (hip joint mobility test), and balance (Flamingo test).



Results: The analysis of the nine motor tests showed significant improvements in all components of general motor ability - strength, endurance, speed, coordination, and balance - for the experimental group ($p < 0.05$ – $p < 0.001$), except for hip joint mobility, where the differences were not statistically significant. Conversely, the control group did not show notable progress, which demonstrates the effectiveness of the systematic intervention.

Conclusion: The results confirm the research hypotheses, demonstrating that the systematic application of a physical exercise program adapted to the participants' training level leads to the improvement of life quality and motor performance, while its efficiency depends on the awareness of the importance of physical activity for health and the adoption of an active lifestyle.

Keywords: physical activity; quality of life; young women; motor skills; healthy lifestyle



ABSTRACT

Study on the effectiveness of deep transverse massage in the treatment of gonarthrosis

Cristina-Elena STOICA^a*, Gabriel Stănică LUPU^a

^a a “Vasile Alecsandri” University of Bacău, Faculty of Movement, Sport and Health Sciences, Bacău, Calea Marasesti, 157, 600115, Romania

* Corresponding author: email: cristina.popa@ub.ro

Introduction: Gonarthrosis can be primitive or secondary. In general, factors mentioned in the aetiology of arthrosis are incriminated in the production of primitive gonarthrosis: endocrine factors, obesity, venous disorders. Primitive gonarthrosis constitutes the majority; However, numerous gonarthroses are secondary. Those with femorotibial onset are secondary to disorders of femorotibial joint mechanics, either of traumatic origin (femur or tibia fractures, severe dislocations or sprains, meniscus tears) or of static origin.

Material and Methods: The present paper represents a study conducted on a group of 8 female subjects diagnosed with gonarthrosis, divided into two groups: four subjects constituting the control group and four the experimental group. To highlight the effectiveness of the deep transverse massage, the experimental group benefited from physiotherapy programs such as kinetic techniques, neuromuscular-proprioceptive facilitation techniques, therapeutic physical exercises, and with the control group we performed the same program, but without applying the deep transverse massage.

Results: When comparing the two groups, it can be seen that on the experimental group, the results were better in terms of reducing pain on palpation and reducing knee circumference, due to the application of antalgic massage and drainage on periarticular elements, an improvement of mobility, by reducing stiffness and toning the stabilizing muscles of the knee, which led to improvement of symptoms of the subjects of the experimental group.

Keywords: deep transverse massage, reducing pain, drainage.



ABSTRACT

Differences between sports regarding muscular parameters

Denisa ENESCU BIERUa, Mirela Lucia CĂLINAA, Oana Maria NEAMȚUa, Marius Cristian NEAMȚUb, Mihai Robert RUSUc, Anamaria GORGANA

a Faculty of Physical Education and Sport Craiova, Kinesiotherapy and Sport Medicine Department, Craiova, Romania

b University of Medicine and Pharmacy Craiova, Department of Pathological Physiology, Craiova, Romania

c Faculty of Physical Education and Sports, Theory and Methodology of Motor Activities Department, Craiova, Romania

*denisa.enescu@edu.ucv.ro

Introduction: Our research objective was to measure and compare some of the muscular force curve parameters at athletes, such as volleyball players and fencers, in order to outline possible different electroneurophysiologic patterns characteristic to each studied sports, necessary to emphasize the optimum specific programme training.

Material and Methods: Was studied a lot formed of 22 professional sportsmen represented by 12 fencers and 10 volleyball players, with an average age of 23 years, which practice professional sportive activity for at least 5 years.

Were recorded the muscular force curve parameters by using a SS25L hand dynamometer appertaining to BIOPAC MP 150 system connected to a PC Pentium IV, obtained through voluntary maximum isometric contractions, performed by flexors muscles of both athletes hands fingers.

Results: A specific index, the slope, expressed in percentage, was measured for the muscular force curve parameters, represented by frequency, time and suddenness.

The obtained values of slope percentage at fencers were for suddenness 109,59 mV/ms and for frequency 97,60 Hz, while for volleyball players were 93,01 mV/ms and 106,32 Hz.

Conclusions: Fencers due to the physical effort specificity, recorded the highest values for slope index regarding suddenness, in comparison with volleyball players, which presented the highest values for frequency parameters, cause to the mixed effort, aerobic/anaerobic, used partially by these sportsmen, differences that prove the existence of electroneurophysiologic patterns characteristic to each studied sportive discipline.

Keywords: muscular force, athletes, electroneurophysiology



ABSTRACT

The role of physical exercise in managing lymphedema and enhancing quality of life in post-mastectomy patients

Denisa PIELEa*, Ligia RUSUa, Oana Bianca BUDEANCA-BABOLEAa, Eva ILIEa, Catalin POPAa, Andreea Daniela BRAGUTAa

a University of Craiova, Faculty of Physical Education and Sports, str Brestei no 146 , Craiova, Dolj, Romania

* Corresponding author: email: denisa.piele@edu.ucv.ro

Introduction: Lymphedema remains one of the most frequent and disabling complications after breast cancer surgery, with a significant impact on functionality and overall quality of life. The aim of this study is to depict correlations settled between lymphedema severity and quality-of-life outcomes assessed through the EORTC QLQ-C30 questionnaire.

Materials and Methods: The study included 30 post-mastectomy patients with a clinical diagnosis of stage II lymphedema. At baseline, lymphedema staging (according to clinical and circumferential criteria) and quality of life (EORTC QLQ-C30) were assessed. Participants underwent a supervised exercise program lasting 16 weeks, focusing on drainage stimulation. At the end of the intervention, both lymphedema stage and quality of life were reassessed

Results: Following the exercise program, a majority of patients demonstrated improvement in lymphedema stage, progressing from stage II to stage I or showing measurable reductions in limb circumference. EORTC QLQ-C30 results revealed significant improvements in global health status and physical functioning. Lymphedema severity showed a negative correlation with physical functioning and a positive correlation with symptom scales. In multivariate models, advanced lymphedema emerged as an independent predictor of reduced quality of life, regardless of other clinical variables.

Conclusions: This study highlights that structured exercise interventions can positively influence both the clinical stage of lymphedema and patient-reported quality of life. These findings support the integration of targeted exercise programs into rehabilitation strategies for breast cancer survivors, with potential to slow disease progression and enhance long-term outcomes.

Keywords: lymphedema, EORTC QLQ 30, exercise, assessment



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ABSTRACT

Physical exercise, a means specific to physical education and physical therapy used in the recovery of coxarthrosis

Dumitru Niculae CRISTEA^{a*}, Cristian-Florian SAVU^a, Bogdan ALEXANDRU^a, Luciana-Roberta CRISTEA^b

^a Universitatea „Valahia” Târgoviște; Romania; dimitrucristea61@yahoo.com

^b Colegiul Național Pedagogic „Constantin Cantacuzino”, Târgoviște, România, translator

* Corresponding author: email: dimitrucristea61@yahoo.com

Physical education and medical kinetology use, for prophylactic and therapeutic purposes, specific and non-specific means. A criterion for systematizing technical physical exercises is to classify them into static exercises, which include isometric positions and contractions, respectively dynamic exercises, which involve passive, active free movements or with external resistance. From a methodical perspective, the exercises are divided into two main categories: static and dynamic. Depending on the effects produced on the various apparatus and systems of the body, physical exercise, procedures and methods of prevention and recovery may be general or specific to certain anatomical and functional components. Primary coxarthrosis accounts for about 35-40% of all cases of coxarthrosis and are forms for which a clear etiology cannot be identified. They occur more frequently in women, and radiological investigations do not reveal dysmorphia or joint disalignment. The clinical onset is usually between 40 and 60 years of age and involves bilateral coxarthritic changes. The symptoms begin with mechanical, intermittent pain, with irradiation to the knees and the inner thigh, negatively influencing walking. The evolution is slowly progressive, and the therapeutic approach is, in most cases, conservative.

Methods, purpose, tasks, objectives of research : In order to carry out this work, we used a series of research methods specific to the field of medical recovery and physical therapy, selected in such a way as to respond as faithfully as possible to the proposed objectives and to ensure a rigorous and objective analysis of the evolution of the patient with hip coxarthrosis. The importance of an appropriate methodology lies in guaranteeing the coherence, validity and reproducibility of the results.

The scientific method is a set of rational and systematic procedures, used to obtain, process and interpret data in order to understand and explain the phenomena studied

The main purpose of the research is to select and apply the specific and non-specific means of physical education and physical therapy, in order to develop a perfected and individualized program, adapted to the condition, age, functional possibilities of the



patient, the clinical form of the disease, the moment of initiation of treatment and the capacity for effort.

The present study aims to identify those methods with maximum efficiency, appropriate for each patient with coxo-femoral disorders, without neglecting the importance of subjective factors, especially motivational ones, involved in the process of functional recovery and social reintegration. The development of an original recovery program, which facilitates the social reintegration of patients, is based on the clinical experience gained in the field of physical therapy.

Research tasks: Collecting and centralizing clinical and functional data obtained from patients; Formulating relevant general and experimental conclusions; Scientific argumentation of the criteria used to validate or invalidate the results obtained.

The elements of originality of the research are represented by:

Personalized methodology for the application of physical exercises, specific to physical education and physical therapy, in the context of the recovery of patients with coxarthrosis and their social reintegration. Designing differentiated and individually adapted programs, depending on the particularities of each patient. The objectives achievable by practicing physical exercises are classified according to the effects induced on morphological structures, functional (cardio-vascular, respiratory, etc.), neuropsychological (relaxation, coordination, balance, etc.) and social-educational sides. The fundamental requirement in the achievement of objectives is to formulate them as precisely as possible in order to easily deduce the appropriate means, methods and forms of organization.

Premises of the research: Social reintegration, correlated with functional performance, is defined by three essential pillars: involvement in responsible professional activity, independent living in a stable family environment and the existence of a social support network;

1. The assessment of the degree of reintegration is crucial in situations where the therapeutic objectives are not aimed at complete recovery, but at the effective management of the disease or infirmity;
2. Musculoskeletal disorders are the main cause of functional disability in developed societies, significantly influencing the quality of life and generating considerable costs for health systems;
3. The literature contains numerous studies on coxo-femoral disorders, but few of them explicitly address the social reintegration component in the context of kinetic therapy;
4. It is necessary to expand the scientific base on the use of physical exercise as a fundamental functional unit in the recovery of patients with coxarthrosis, from the perspective of social reintegration;
5. The clinical examination of the subjects confirmed their ability to sustain the effort involved in the recovery program;



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1. The program was differentiated according to the age and level of physical training of each participant.

Research hypotheses: The application of a recovery program based on classical, specific and non-specific means of physical education and physical therapy, designed according to a methodology perfected and validated by clinical experience, has the potential to improve the quality of life and support the social reintegration of patients with coxarthrosis;

The level of functional recovery and social reintegration, including professional, in patients with degenerative diseases of the coxo-femoral joint is significantly influenced by the type of treatment applied (conservative or radical).

Results: The results obtained confirm the hypothesis that an individualized physical therapy program can significantly contribute to the improvement of symptoms and improvement of the function of the coxo-femoral joint. The reduction of pain and the increase in the capacity for effort implicitly led to an increase in autonomy and, in the future, to a more efficient social reintegration of patients.

Compared to the control group, which followed only conventional treatments (anti-inflammatory drugs, passive physiotherapy), the patient who benefited from an active, personalized program had superior results in all functional plans evaluated.

Another important aspect is the motivational component: the patient's active involvement in their own recovery process played an essential role in maintaining adherence to the program and in achieving functional progress.

Conclusions:

1. Coxarthrosis is a disease that, through specific consequences such as: pain, loss of joint mobility, reduced ability to move, can induce the sufferer a decrease or loss of independence and restrictions in interaction with society. Consequently, improving the program of physical exercise and applied physical therapy can contribute to increasing the chances of social reintegration of some patients suffering from this disease.

2. People with disabilities are a problem for society because they use health services more frequently, require more visits to the doctor, investigations, medication, and hospitalization, consequently involving higher costs for society.

3. Increasing the effectiveness of prevention and treatment methods through physical exercise leads to benefits for both the individual and society, as it can reduce the costs that society has to allocate to the care of individuals with coxofemoral joint disorders.

4. The new therapeutic guidelines in the recovery of patients with coxofemoral suffering through the use of physical exercise can be of real use in their social reintegration, if the link between social reintegration and the functional performance of the individual is taken into account.

5. Therapeutic physical exercise finds wide applications in the major departments of rehabilitation, being indispensable both for medical recovery and



mental rehabilitation, as well as for professional re-education and social reintegration.

Keywords: coxarthrosis, exercise, dynamic exercise, recovery



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ABSTRACT

Kinesiotherapeutic approaches integrated into the functional recovery of patients suffering from coxarthrosis

Elena RABOLUa, Geanina TOMAa, Ioana Cristina NEAGOEa, Ștefan TOMAa*

a National Polytechnic University for Science and Technology of Bucharest, University Centre of Pitesti, Department of Medical Assistance and Physical Therapy, Tg. Din Vale, no. 1, Pitesti, Romania

* stefan.toma1305@upb.ro

Introduction: As a degenerative condition, coxarthrosis affects 2-4% of adults aged between 40 and 70 and 10% of those over 70, characterized by progressive degradation of the articular cartilage, leading to pain and limited mobility.

The implementation of a standardized medical gymnastics program is an essential component in maintaining the functionality of the hip joint, by preserving joint mobility and the muscle mass necessary to stabilize it. Strict adherence to this protocol contributes significantly to the prevention of functional limitations.

Material and methods: The study was conducted on a sample of 30 patients with stage II coxarthrosis, the diagnosis being confirmed prior to presentation at the kinesiotherapy clinic. The patients included in this study followed a complex recovery protocol, which integrated the fundamental, auxiliary, and associated means of kinesiotherapy (massage, mobilization, stretching, neuroproprioceptive facilitation techniques, electrotherapy), and the therapeutic regimen was adapted and individualized according to the clinical particularities of each patient in order to optimize functional results.

Results: The results obtained following the application of the recovery protocol highlight a significant impact of physiokinesitherapy on the symptoms and functional status of patients with coxarthrosis. A considerable reduction was observed in pain intensity, along with improved joint mobility, stability, and muscle strength, which are essential for maintaining functional independence. Post-intervention assessments also indicate an increase in exercise tolerance and an improvement in the ability to perform daily activities.

Conclusions: The results obtained support the importance of personalized therapeutic intervention in reducing the clinical impact of the disease and improving patients' quality of life. Thus, physiokinesitherapy is confirmed as an essential component in the conservative treatment strategy for coxarthrosis.

Keywords: coxarthrosis, kinesiotherapy, pain, functional impotence, quality of life



ABSTRACT

Research trends in the field of myofascial release techniques. A bibliometric and visual analysis.

Elena-Adelina PANAET^a, Huseyin Sahin UYSAL^b, Pamela PATANÈ^c, Bogdan-Alexandru ANTOHE^{a*}

^a Faculty of Movement, Sports and Health Sciences, “Vasile Alecsandri” University of Bacau, Bacau 600115, Romania; panaet.adelina@ub.ro, antohe.bogdan@ub.ro

^b Faculty of Sport Science, Burdur Mehmet Akif Ersoy University, 15500 Burdur, Turkey; hsuysal@mehmetakif.edu.tr

^c Department of Public Health, Experimental Medicine and Forensic Science, University of Pavia, 27100 Pavia, Italy, pamela.patane@unipv.it

* Corresponding author: email: antohe.bogdan@ub.ro

Introduction: Although myofascial release techniques have been widely studied, the literature lacks a comprehensive bibliometric analysis. This study aimed to evaluate global research trends in this field using data from the Web of Science (WoS) database.

Methods: The study design followed the BIBLIO checklist protocol to ensure high reporting quality. The WOS database was used to obtain bibliometric data, and 286 research articles meeting the inclusion criteria were included in the study.

Results: Between 1988 and 2025, 1,254 authors published 286 articles on the myofascial release techniques. The number of publications showed exponential growth beginning in 2000, peaking in 2020. Average citation rates ranged from 3 to 4 citations per year, with a peak of 6 citations between 2012 and 2016. The top three contributing countries were the USA, India, and Spain. The Journal of Bodywork and Movement Therapies was the most prolific journal, publishing 47 articles on the topic, while no other journal published more than 10 articles. Also, Journal of Bodywork and Movement Therapies was the most cited journal on this topic, reaching 608 citations.

Conclusions: This bibliometric analysis provides insight into the current status and emerging trends in myofascial release research. The results may help guide future research directions and identify gaps in the existing literature.

Keywords: Myofascial release techniques, Bibliometric analysis, Web of Science, Research trends



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ABSTRACT

Extracorporeal shock wave therapy in spastic upper limb rehabilitation – a comparative approach

Eugenia ROȘULESCUa*, Radu ROȘULESCUa, Ilona ILINCAa

a University of Craiova, Faculty of Physical Education and Sport, Craiova, Romania

Corresponding author: erosulescu@yahoo.com

Background: Although restoring upper limb (UL) function in post-stroke patients is essential, regaining the full motor function may not always be achievable, depending on the extent of disability. By this study we aimed to examine the effects of a noninvasive rehabilitation method, radial extracorporeal shock wave therapy (rESWT) compared with conventional physiotherapy (CT) on UL spasticity, pain and functional abilities of post-stroke patients.

Material and Methods: We collected data of 40 patients' complete medical records, treated with rESWT and kinesiotherapy - shock wave group SWG (n=20), or CT (electrotherapy and kinesiotherapy) – CTG (n=20), according to the rehabilitation protocols prescribed by specialist clinicians, that had been consecutively treated and evaluated at least three times (T0 at admission, T1 at discharge, and T2 at readmissions within 3 months - control re-evaluation). The outcome measures were pain intensity (visual analogue scale, VAS), modified Ashworth scale (MAS), and upper limb active function (the Modified Frenchay Scale for the upper limb, MFS), performed at baseline (admission, week 0), discharge (week 2) and follow-up (three months, week 12).

Results: Obtained clinical results were encouraging, by achieving a significant improvement after 12 sessions of rESWT or CT in both groups (week 2) in terms of VAS (3.9 ± 1.20 and 4.00 ± 1.40 , $p=0.41$) and spasticity decreasing. We found no differences between groups when compared UL abilities at baseline and the end of follow-up (three months), $p=0.26$. However, the follow-up evaluation showed that rESWT produced greater and significant reduction in spasticity than CT.

Conclusions: ESWT and conventional physiotherapy are valuable therapies for UL rehabilitation, but ESWT combined with kinesiotherapy appeared to be more effective in long term spasticity decreasing.

Keywords: Upper Limb; Spasticity; Extracorporeal Shockwave Therapy



ABSTRACT

The effects of integrating breathing exercises into a rehabilitation program on vital capacity in preadolescents with postural deficit

Eva ILIEa*, Oana Bianca BUDEANCA-BABOLEAa, Denisa PIELEa, Andreea Daniela BRAGUTAa, Cătălin POPAa

a University of Craiova, Faculty of Physical Education and Sports, str Brestei no 146 , Craiova, Dolj, Romania

* Corresponding author: email: eva_moldoveanu@yahoo.com

Introduction: Postural deficit of scoliotic attitude in preadolescents can negatively affect respiratory function by reducing thoracic mobility and vital capacity. Breathing exercises and thoracic mobilization are recognized in the scientific literature as effective methods for improving pulmonary ventilation, trunk stability, and postural control. The aim of this study was to evaluate the effects of integrating breathing exercises into a rehabilitation program on vital capacity in children with scoliotic attitude.

Materials and Methods: The study included 20 subjects (12 girls, 8 boys), aged 8–10 years, diagnosed with scoliotic attitude. They were divided into two groups: the experimental group (n=10), which followed a conventional physiotherapy program with the integration of breathing exercises (paradoxical breathing), and the control group (n=10), which followed a conservative physiotherapy program focused on thoracic expansion and postural mobility exercises. The intervention lasted 4 months, with two sessions per week, each lasting 60 minutes. Vital capacity was assessed using a digital spirometer, and functional evaluation was performed with Adam's test and the Schober test.

Results: At baseline, no significant differences were observed between the two groups ($p>0.05$). After the intervention, the experimental group showed a significant increase in vital capacity (final mean 1.48 ± 0.31 l vs. 1.38 ± 0.34 l at baseline, $p<0.05$), whereas the control group did not show notable changes (1.37 ± 0.45 l final vs. 1.37 ± 0.29 l baseline, $p>0.05$). Intergroup comparisons highlighted a significant improvement in respiratory parameters and normalization rates in the experimental group.

Conclusions: Integrating breathing exercises into a rehabilitation program has significant positive effects on vital capacity in preadolescents with scoliotic attitude, compared to a conservative program based on general postural exercises. These findings support the inclusion of breathing exercises in rehabilitation strategies for this category of patients.

Keywords: breathing exercises, vital capacity, scoliotic attitude, preadolescents, postural rehabilitation



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ABSTRACT

The impact of kinetic programs on improving the quality of life of pregnant women

Gabriela Monica IONESCU^a*, Constantin PEHOIU^a

^a „Valahia” University of Targoviste, Faculty of Humanities, Romania,

moni_gabi24@yahoo.com/ionescu.monica@valahia.ro

* Corresponding author: moni_gabi24@yahoo.com/ionescu.monica@valahia.ro

Introduction: Prenatal kinetic programs are based on exercises that are carefully dosed and adapted to each trimester of pregnancy, the woman's physical fitness level, and individual characteristics. These programs include breathing, postural, toning, and relaxation exercises aimed at maintaining functional capacity, reducing physical discomfort, and improving the pregnant woman's quality of life (Mottola & Davenport, 2022).

This research starts from the idea that a personalized prenatal kinetic program can enhance overall health, reduce musculoskeletal pain, and prepare the pregnant woman for childbirth. At the same time, it helps decrease anxiety levels and promotes faster and more complete postpartum recovery.

The main objective of the study is to highlight the effectiveness of prenatal exercise programs on the general health status of pregnant women, focusing on reducing lumbar pain, improving posture, and supporting psycho-emotional balance.

Working Hypotheses: **Hypothesis 1:** The implementation of a prenatal kinetic program leads to improved joint mobility and posture, as well as to a reduction in lumbar and pelvic pain. **Hypothesis 2:** Regular participation in adapted physical exercises during pregnancy has a positive influence on psychological well-being by reducing anxiety, improving sleep quality, and increasing exercise tolerance. **Subjects and Study Period:** The study was conducted on a group of 14 pregnant women in their second and third trimesters, aged between 22 and 34 years, all at their second or third pregnancy. None of them had previously participated in prenatal exercise programs. The research lasted six months (December 2024 – April 2025), a period during which the physiological and psychological changes specific to pregnancy become significant.

Methodology: Functional and physiological parameters were monitored, including hip and lumbar spine mobility, pain intensity, sleep quality, blood pressure, pulse rate, weight gain, labor duration, and Apgar scores. Evaluation was carried out using goniometry, the Visual Analogue Scale (VAS), the Pittsburgh Sleep Quality Index (PSQI) questionnaire, and clinical observation.

The kinetic program, differentiated for the second and third trimesters, included postural, respiratory, toning, and relaxation exercises, performed under the supervision of a



physiotherapist specialized in obstetric care. All participants signed an informed consent form prior to inclusion.

Results

Weight gain remained within recommended limits, while blood pressure and pulse values stayed stable. Joint mobility increased by an average of 5°, and the intensity of lumbar and pelvic pain decreased by nearly 50%. Sleep quality improved significantly, and anxiety levels decreased. Labor duration was shorter than the average reported in the literature, and all newborns had Apgar scores between 9 and 10. These results confirm both working hypotheses.

Conclusions

The prenatal kinetic program proved to be safe, effective, and well tolerated. It contributed to reducing lumbar and pelvic pain, improving mobility and posture, and promoting a more balanced emotional state and better sleep quality. The study supports the integration of prenatal kinesitherapy into modern preventive and educational medical practice as an effective means of maintaining maternal and fetal health.

Keywords: Prenatal kinesitherapy; Pregnancy exercise program; Maternal health; Postural balance; Quality of life



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ABSTRACT

Heart rate variability and performance in orienteering: a longitudinal case study

George Emilian MINOIU^a*, Ivan SIRAKOV^b, Veronica MINOIU^c

^a University of Craiova, Doctoral School of Social Sciences and Humanities, Craiova, Romania

^b St. Cyril and St. Methodius University of Veliko Tarnovo, Bulgaria

^c University of Craiova, Faculty of Physical Education and Sport, Romania

* Corresponding author: email: minoiu_emi@yahoo.com

Introduction/Background: Orienteering combines sustained aerobic effort with rapid spatial decision-making on varied terrain. Heart rate variability (HRV) is a sensitive marker of autonomic regulation and training readiness. This abstract presents longitudinal (2020–2025) evidence linking HRV dynamics with specific performance and economy of effort in an elite orienteer.

Material and Methods: Single-case, intra-subject design with seasonal phases (general/specific preparation, competitive, transition) and comparable sessions matched by terrain and intensity. Wearables/software: Garmin watch + HRM-Pro Plus, Firstbeat Bodyguard/Firstbeat Sports, Kubios HRV, WinSplits Pro, and LiveloX. Variables: RMSSD/lnRMSSD, SDNN, sympathetic/parasympathetic indices, mean/max heart rate, pace, effective distance, navigation errors, RPE.

Statistics: within-subject longitudinal descriptive analysis; trend assessment using 7–28-day windows and control-to-control split stability; reporting observed differences with confidence intervals where applicable.

Results: During preparation, increases in lnRMSSD and parasympathetic indices were associated with faster pace in control tests. In competition, a pronounced yet controlled sympathetic response coexisted with stable route efficiency. Across within-athlete comparisons, digitally assisted technical sessions tended to show lower effective distance and lower mean heart rate at similar intensities.

Conclusions: Integrating HRV with navigation metrics provides a practical framework for micro-periodization and economy-of-effort management in orienteering. Weekly multimodal reports and 7–28-day windows can support training decisions and the timing of digitally assisted sessions.

Keywords: orienteering; heart rate variability; RMSSD; autonomic regulation; route efficiency



ABSTRACT

Evaluation of muscle training using the tensiomyography parameters

Ileana CRĂCIUNa, Laura Ramona PĂUNa

a University of Craiova, Craiova, Romania

* Corresponding author: email: ligiarusu@hotmail.com

Introduction and Purpose: Sport performance is based on muscle activity which needs a specific behaviour during muscle contraction. This depends on muscle properties which can be evaluate using different techniques. The aim of our study is to make the assessment of muscle behaviour during isometric contraction, before and after specific muscle training based on development of explosive muscle force.

Methods: We study a lot of 20soccers (average age 18 yrs, high 172cm, weight 60kg). The method incudes use of tensiomyography (TMG) for evaluate the two muscle parameters: contraction time(Tc) and sustain time(Ts), during electrical stimulation of muscle. The parameters represent the potential of muscle fiber and depend on muscle composition. Tc is important for describe how fast is the muscle and the Ts gives informations about muscle fatigue.We make the assessment at two moments T1 and T2, and between two moments the soccers participate ina specific training for development the explosive muscle force. The evaluation includes rectus femoris (RF), vastus lateralis(VL), vastus medialis)VM) and biceps femoris(BF) muscles, left and right.

Results: The results show a decrease of Tc for all muscle groups like this: RF(T1 24ms, T2 20ms), VL(T1 24ms, T2 16ms),VM (T1 20ms, T2 14ms), BF(T1 24,T2 16ms). Regarding Ts we observe the following evolution: RF(T186, T2 305ms),VL(T1 242ms, T2 373ms), VM (T1 161 ms, T2 216 ms), BF(T1 198ms, T2 528ms). We observe that the specific training generates a decrease of Tc and increase of Ts, that means a good evolution, an increase of muscle resistance and develop of muscle force, based on fast muscle fibers.
Conclusions: Monitoring the muscle parameters could help to develop the training in specific conditions and also is the main advantage of this measuring set-up, however it provides no information on absolute muscle force.

Keywords: assessment, tensiomyography, muscle force



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ABSTRACT

The effectiveness of neuromuscular taping in the management of ocular torticollis in children

Ionela-Ramona MARINCAa*, Ligia RUSUa

a Universitatea din Craiova, street Brestei 146, Romania

* Corresponding author: email:mramona2005@yahoo.com

Introduction: Congenital torticollis is a common musculoskeletal condition in infants, characterized by unilateral shortening of the sternocleidomastoid muscle, with limited cervical mobility, head tilt toward the affected side, and compensatory rotation to the opposite side. The etiology of this condition is varied and may include musculoskeletal causes, vertebral anomalies, genetic syndromes, or ocular disorders. Early diagnosis is essential to prevent secondary complications such as plagiocephaly, craniofacial asymmetries, and delays in motor development. This paper presents two clinical cases of congenital torticollis, highlighting the effectiveness of neuromuscular taping and the importance of differential diagnosis with ophthalmological con

Material and Methods: The study included two infants diagnosed at 4 months of age with congenital torticollis affecting the left side. The therapeutic intervention consisted of gentle mobilizations, passive and active stretching, stimulation of postural control and application of neuromuscular taping.

Results: In both cases, full recovery of cervical mobility was achieved by the age of 7 months, with therapy continued until the age of 2 years to optimize muscular balance. In the first case, right ocular hypertrophy was identified, while in the second case strabismus was confirmed. These findings required interdisciplinary monitoring and continuation of therapy with neuromuscular taping and physical therapy.

Conclusion: Neuromuscular taping represents an effective complementary method in the treatment of congenital torticollis, contributing to the recovery of cervical mobility and the reduction of postural imbalances. Furthermore, these cases emphasize the importance of multidisciplinary evaluation and periodic monitoring for establishing differential diagnosis and identifying ophthalmological complications.

Keywords: congenital torticollis, ocular torticollis, neuromuscular taping, stretching, differential diagnosis



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ABSTRACT

The effects of physical exercise with data-driven intelligent devices on mitigating digital-use-related postural risks in Generation Z

Iordănica-Daniela MARCU (BUTA)^{a*}, Carmen ENE-VOICULESCU^a

^a Doctoral School of Sports Science and Physical Education, Institute of Doctoral Studies, Ovidius University, Universităţii Street no.1, Constanţa, Romania

* Corresponding author: email: daniellamarcu@yahoo.com

Background: Generation Z (youngsters born generally between 1997-2012) is the first generation to be continuously exposed to digital technology from early adolescence. Although communication and education are enhanced by this digital immersion, sedentary behavior and static postures are also encouraged. Extended use of screens, especially laptops and smartphones, has been connected to forward head posture, musculoskeletal strain, and poor balance. Recent studies show that postural asymmetry and "tech-neck" are becoming more prevalent public health issues among young adults. This study attempts to look into how a data-driven exercise program affects musculoskeletal outcomes and postural balance in members of Generation Z.

Materials and Methods: Eleven female adolescents between the ages of 13 and 17 participated in an experimental pilot study. Inclusion criteria included regular digital device use (>4 h/day) and capacity to perform moderate physical exercise. Among the exclusion criteria were severe spinal deformity, orthopedic abnormalities or neurological disorders that needed specific treatment or surgery. All participants and their guardians provided informed consent. Ethical approval was obtained in accordance with institutional research standards. Using DAVID Spine devices, participants underwent a 4-week physical exercise program centered on joint mobility and spinal muscle strength. The DAVID Spine Profile Graph for strength and mobility assessment, the Numeric Pain Rating Scale (NPRS) for measuring pain intensity, and the Short Form-36 (SF-36) questionnaire for measuring quality of life were used to assess postural parameters. Descriptive statistics were expressed as mean $\pm$ SD. The Wilcoxon signed-rank test was used to compare pre- and post-treatment data. Statistical significance was set at $p < 0.05$.

Results: Pain scores significantly decreased (67%) and the DAVID Spine Profile indicated improved postural balance. SF-36 results showed significant improvements (80-100%) in general health, physical and emotional aspect status. The pain and energy aspects domain present good improvement (53-65%) at 4 weeks assessment, that meanings to continue the physical exercises program to a maximum of 12 weeks, which is essential for supporting, maintaining, and promoting balanced development of the musculoskeletal



system in individuals, as well as ensuring their long-term health. These results suggest DAVID data-driven exercise devices can positively influence musculoskeletal and functional balance in adolescents.

Conclusions: The 4-week DAVID Spine-based program improved spinal posture, reduced pain intensity, and enhanced quality of life. This approach may serve as an effective training for mitigating digital-use-related postural risks in Generation Z. Future studies should include larger and gender diverse samples to validate and expand these findings.

Keywords: Generation Z; digital technology; back pain; musculoskeletal disorders; biomechanics



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ABSTRACT

The importance of physical exercise in individuals with type 2 diabetes mellitus

João BOMBAÇA^a, Daniel DUȚĂ^b, Răducu POPESCU^b, George Cosmin MUȘAT^b, Nicoleta Daniela CALOTĂ^b, Diana Victoria GIDU^b*

^a Politechnic Institute of Setúbal, Campus do IPS-Estefanilha 2910-761, Setúbal, Portugal

^b Ovidius University of Constanta, Bd. Mamaia 124, Constanta, Romania

* Gidu Diana Victoria: email: campiap@yahoo.com

Introduction: This review synthesizes evidence on the effects of different exercise training models on metabolic and cardiovascular outcomes in adults with Type 2 Diabetes Mellitus (T2DM), focusing on glycemic control, body composition, lipid profile, inflammation, and cardiorespiratory fitness.

Material and Methods: A systematic search of PubMed, SciELO and Google Scholar identified randomized controlled trials and systematic reviews published within the last ten years; ten key articles were selected for detailed analysis.

Results: High-Intensity Interval Training (HIIT) and combined aerobic-plus-resistance training produced the most consistent improvements in glycemic control, visceral adiposity (notably liver fat reductions up to $\approx 39\%$), and cardiorespiratory fitness (VO_{2max} increases). Combined training decreased fasting and postprandial glucose, reduced inflammatory markers, and in some cases lowered medication requirements. Resistance training produced notable HbA1c reductions in normal-weight participants. Reduced-exertion HIIT (REHIT) and low-volume HIT showed VO_{2max} benefits and time-efficiency but inconsistent glycemic effects. Moderate Continuous Training (MCT) provided safe improvements in fitness and inflammatory markers.

Conclusions: A prescription combining aerobic and resistance training is recommended for comprehensive benefits; HIIT is effective for cardiometabolic improvements in eligible patients. Multidisciplinary monitoring and progressive supervision enhance safety and adherence.

Keywords: Type 2 Diabetes Mellitus; Physical Exercise; HIIT; Resistance Training; Glycemic Control



ABSTRACT

Digital and physical activity interventions in neurodegenerative Diseases: A systematic review on cognitive and motor outcomes in Parkinson's and Alzheimer's disease

Manuela Violeta BĂCĂNOIU^{a,b*}, Andrei Ionuț SPÎNU^a, Mircea DĂNOIU^a, Gabriela OLARU^c

^a University of Craiova, Faculty of Physical Education and Sport, Craiova, Romania

^b Department of Laboratory Medicine, County Clinical Emergency Hospital of Craiova, Romania

^c Doctoral School, University of Medicine and Pharmacy of Craiova, 200349 Craiova, Romania; olarugabriela03@yahoo.com

Correspondence address: manuela_bacanoiui@yahoo.com;

Neurodegenerative diseases such as Parkinson's disease (PD) and Alzheimer's disease (AD) are characterized by progressive cognitive and motor decline. As current pharmacological options have limited impact on disease progression, non-pharmacological interventions, including physical activity (PA) and digital health intervention, are increasingly explored for their potential to stabilize or even enhance functional outcomes. This systematic review synthesizes evidence from 25 peer-reviewed studies published between 2017 and 2024, retrieved from databases including PubMed, Scopus, and Web of Science. Eligible studies included randomized controlled trials (RCTs), feasibility studies, and pilot interventions focusing on exercise, remote monitoring, digital coaching, or hybrid models targeting cognitive or motor outcomes in PD and AD populations. Findings consistently indicate that PA improved gait, balance, and cognitive processing in both PD and AD. Dual-task training and dance-based therapies were particularly effective in enhancing executive functions and quality of life. Digital approaches such as mobile health (mHealth), wearable sensors, and video-based monitoring technologies demonstrated high adherence rates and user acceptability. When combined with exercise program, digital tools improved both engagement and personalization, particularly in long-term care and home-based settings. The integration of exercise science and digital health technology offer a scalable, patient-centered framework to support neurodegenerative populations. While current findings are encouraging, further longitudinal trials are needed to optimize intervention protocols, establish real-world impact and address ethical and usability issues in digital monitoring.

Keywords: Parkinson's disease, Alzheimer's disease, physical activity, digital health, gait, mHealth, remote monitoring



ABSTRACT

Digital innovations and mHealth support in physical therapy for a complex rheumatological condition - Rheumatoid Arthritis

Michi GEAMBESAa*, Mihaela ZAVĂLEANUa

a University of Craiova, str. Brestei nr. 156, Craiova, Romania

* Corresponding author: email: mikigeambesa@gmail.com

A complex rheumatological condition, rheumatoid arthritis (RA) occurs and manifests itself mainly in young adults and involves major therapeutic costs without achieving a complete cure, remissions being rare. Even with multidisciplinary therapies, with immunomodulatory medication, most of those affected reach chronic, disabling stages with a low quality of life.

Innovative approaches, mHealth (digital health applications and devices), want to offer new ways of care, personalized, more precise, faster, easier (for both, the therapist and the patient). In the treatment of RA, in recent years technology is currently traing to redefine the therapeutic approach, through the emergence of telemedicine, online portable devices and artificial intelligence, these offering real-time monitoring, remote consultation, prediction, management and individual planning.

This paper aims to analyze scientific evidence related to the integration of mHealth devices in rehabilitation and more specific in physical therapeutic management, highlighting the changes to be expected in the treatment style of RA.

The objective of the study is to review the knowledge and results of studies from the last 5 years identified in the PubMed database to highlight the advantages and identify possible disadvantages of innovative medical technologies used in the management of RA. Physical therapy specialists need to know the management perspectives in both diagnosis and rehabilitation brought by these digital devices.

Conclusions. "*mHealth interventions*" support both therapists and patients with RA by monitoring symptoms, increasing autonomy and maintaining therapeutic discipline. The studies analyzed show positive results for patient involvement and promoting patient-centered care when digital self-assessment and remote monitoring programs are used. Although there are still many challenges related to the adoption of technology and patient education, these tools can reduce costs, streamline resources, increase scientific information about the condition and the subjects it affects and, above all, can personalize therapy.

Keywords: rheumatoid arthritis, digital health applications, mHealth, rehabilitation, quality of life, self management



ABSTRACT

The perception of family members on participation and daily activities of people with disabilities

Mihaela ZĂVĂLEANU^a, Michi GEAMBES^{Aa}, Gheorghe IONESCU^a, Alin BURILEANU^a

^a University of Craiova, str. Brestei nr. 156, Craiova, Romania

* Corresponding author: email: mihaela.zavaleanu@edu.ucv.ro

Scientific evidence on the perspectives of parents of people with disabilities, children or adults, has rarely addressed this topic of activities and identifying those impediments that reduce participation in an active life.

The main aim of this study was to identify the views of parents regarding sports or leisure activities and the difficulties they face in their living environment. These barriers can influence the well-being and healthy participation in sports activities of people with disabilities.

The method of conducting this study was the application of a questionnaire in Google form format that was distributed in Romania from June 2024 to December 2024 along the associations of parents of persons with disabilities. The participation was voluntarily. 101 responses received from parents and family members from all regions of the country, with most responses being from the southern area. The respondents (87% women, most 30.39% over 56 years old, 13.86% from rural areas) provided answers regarding the level of participation and types of sports and leisure activities their children, peoples with disabilities (average age 21.36 years, min=2, max=48) perform on daily base.

The perception of parents is important for decision-makers who can create interventions at the local level taking into account their needs and barriers that they encounter daily. The main were the lack of locally accessible for their mobility particularity, also specialized services, and parents meet transportation difficulties. The perception of a high number of barriers is associated with a low level of well-being among parents of disability persons. The existence with services for this segment of the population that address the particularities of the living or family environment can shape the participation and influence the quality of life of both people with disabilities and family members, in the long term.

Decision-makers can stimulate and create local support programs that address these particular needs, ensuring a long-term health effect for the entire family, better health and low costs.

Keywords: parents, people with disabilities, participation, activities, barriers



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ABSTRACT

The importance of Pilates in the management of chronic nonspecific low back pain – case study

Mihaela-Maria TIMU (VASILESCU)^a, Marius STOICA^a

^a UNEFS Bucharest

Introduction/Background: Chronic nonspecific low back pain is a prevalent condition that affects functional capacity and quality of life, being one of the main causes of disability in adults. In the context of the need for effective non-pharmacological interventions, the Pilates method has gained popularity due to its emphasis on deep muscle activation, postural control, and conscious movement. This study explores the applicability of the contemporary Pilates method in a case of chronic nonspecific low back pain, with the main objective of reducing pain and improving mobility and muscle tone.

Material and Methods: The case of a 49-year-old female patient diagnosed with chronic nonspecific low back pain, presenting with persistent pain, reduced mobility, and low muscle tone, was analyzed. The intervention consisted of a contemporary Pilates program conducted over a period of 3 months, with a frequency of 2–3 sessions per week. The exercises were progressively adapted, from breathing techniques and active mobilizations to exercises with an increased degree of difficulty, focused on core stabilization, balance, and neuromuscular control. Pre- and post-intervention assessment included the visual analog scale (VAS) for pain, the Schober and Ott mobility tests, as well as clinical postural observation.

Results: After 3 months of systematic training, there was an approximately 60% decrease in low back pain intensity (on the VAS scale), a significant improvement in lumbar and thoracic mobility, and an increase in postural muscle tone. Postural correction and an improved general state of well-being were also noted, including sleep quality and the patient's reported energy level.

Conclusions: This case study indicates that the contemporary Pilates method is an effective and safe intervention in the recovery of patients with chronic nonspecific low back pain. Through its adaptability and ability to stimulate body awareness and neuromuscular control, Pilates can contribute to pain reduction, increased mobility, and improved quality of life. Further research on larger samples is needed to validate these results in a clinical setting.

Keywords: Pilates, chronic low back pain, mobility, postural control, functional rehabilitation



ABSTRACT

Therapeutic management of rotator cuff tendinopathies in athletes

Mirela Lucia CĂLINAA*, Denisa ENESCU-BIERUa, Mihai Robert RUSUb

a University of Craiova, Faculty of Physical Education and Sports, Sports Medicine and Physiotherapy Department, Craiova, Romania

b University of Craiova, Faculty of Physical Education and Sports, Theory and Methodology of Motor Activities Department, Craiova, Romania

Introduction: Shoulder rotator cuff muscles (RC) pathology is the most common cause of chronic pain in this area, it can be tendinopathy, a partial tear or a complete tear.

Tendinitis is quite common in cases of shoulder pain in athletes who overuse their upper limbs: tennis, throwing, swimming, golf, handball, volleyball.

Functional rehabilitation aims to promote tendon healing and prevent recurrence and is effective only if it is adapted to the etiology of the RC pathology, taking into account the circumstances of the pain onset, the incriminated gestures and the type of training, corroborated with the current biomechanical data of the shoulder and the stage of the lesion.

This paper aims to review the methods and limitations of diagnosis and conservative treatment of shoulder pain, based on an analysis of recent data in the literature.

Etiopathogenesis. In terms of **etiology**, shoulder injuries can have a microtraumatic, traumatic, or degenerative origin, with three major theories explaining the occurrence of injuries: **extrinsic** (95% of shoulder injuries), **intrinsic** (injuries caused by progressive tendon degeneration associated with age) and **muscle imbalance** between the internal and external rotator shoulder muscles, associated with shoulder overload and deficient dynamic centering of the shoulder during upper limb lifting.

Regarding the **pathogenesis of RC injuries**, two mechanisms are described for the cause of overuse injuries of the RC tendons: **decoaptation** (passive stretching and active contraction associated in varying degrees) and **impingement** (friction of the tendons under the coracoacromial arch), which are associated with local ischemia.

Conservative treatment aims to achieve pain relief and functional impotence decrease using:

- **physical treatment**
- **postural control**
- **humeral head recenter**, a fundamental technique that must be learned, used by the patient
- **muscle toning**, especially important in sports, where there is an imbalance between the strong agonist muscles and the antagonist muscles



- **neuromotor reprogramming**

- **shoulder school** by assessing patients' activities and adaptation options; patients will be taught to spare their shoulder by reducing the lever arms during movement.

Conclusions. Conservative treatment of shoulder abarticular pathology is based on the development of muscle substitutes to achieve humeral head centering, allowing the patient to obtain a functional shoulder in order to resume all their previous activities. In the case of athletes, recovery aims to achieve optimal muscle potential necessary to resume technical sports training, dynamic realignment of humeral head and neuromotor reprogramming are the necessary steps for optimal management.

Keywords: shoulder rotator muscles, tendinopathy, physical therapy, athletes



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ABSTRACT

Enhancing early childhood development: mini-trampoline training for cognitive and motor benefits

Mohamed Amine LTIFI a,b*, **Cristina Ioana ALEXEc**, **Michal WILKd**, **Dan Iulian ALEXEc***, **Mohamed Souhaïel CHELLYb**

a University of Gafsa, Higher Institute of Sport and Physical Education of Gafsa, Gafsa 2112, Tunisia;

b Research Laboratory (LR23JS01) Sport Performance, Health & Society, Higher Institute of Sport and Physical Education of Ksar Said, University of Manouba, Tunis, Tunisia;

c Department of Physical Education and Sports Performance, "Vasile Alecsandri" University of Bacău, Calea Mărășești 157, 600115, Bacău, Romania;

d Institute of Sport Sciences, The Jerzy Kukuczka Academy of Physical Education, Mikołowska Street 72A, Katowice, Poland;

* Corresponding author: mohamedltifi19@gmail.com; alexedaniulian@ub.ro

Background: Early childhood represents a critical period for both motor and cognitive development, where physical activity plays a fundamental role. Mini-trampoline training has been suggested as a promising strategy to stimulate these domains.

Methods: This study examined the impact of a 12-week mini-trampoline program on executive functions (attention, working memory, and inhibitory control) and motor skills (balance, coordination, and postural control) in Tunisian preschoolers. Fifty-four children (mean age = 3.87 ± 0.47 years) were randomly assigned to either a control group ($n = 27$), participating in routine activities, or an experimental group ($n = 27$), performing mini-trampoline exercises. Motor and cognitive performances were assessed before and after the intervention.

Results: Children in the experimental group demonstrated significant gains in postural steadiness, functional mobility, lower-body strength, and inhibition ($p < 0.001$), while the control group showed negligible changes. ANOVA indicated no significant group $\times$ time interactions, although a trend was observed for postural steadiness ($p = 0.062$), suggesting potential benefits of the program.

Conclusions: These findings provide evidence that mini-trampoline training can positively influence motor abilities and selected executive functions in preschool children, supporting their overall developmental trajectory. Should explore the long-term effects of nap deprivation on children's health and development while developing appropriate interventions to improve their sleep habits.

Keywords: Child Development; Executive Functions; Physical Fitness; Preschool Children; Psychomotor Performance



ABSTRACT

Changes in body composition and physical activity following eight weeks of moderate-intensity training in adults 30–60 years old

Monoem HADDADA*, Maha SELLAMIA, Mohamed A. ELRAYESSb

a Sport Coaching Department, College of Sport Sciences. Qatar University, Doha 2713, Qatar

b Biomedical Research Center, QU Health, Qatar University, Doha 2713, Qatar

* Corresponding author: email: mhaddad@qu.edu.qa

Background: Moderate physical training is recognized for its role in improving overall metabolic health, yet its specific effects on body fat reduction in middle-aged adults remain of interest. Understanding how moderate-intensity aerobic training influences body composition can inform exercise recommendations for long-term health management.

Methods: Participants aged 30–60 years underwent an 8-week of moderate-intensity aerobic training (MAT) program. Pre- and post-intervention assessments included body mass index (BMI); fat mass, muscle mass, metabolic equivalent of task (MET), and the duration of vigorous and moderate physical activity per week; Fasting blood samples were collected before and after completing 8 weeks intervention. Fasting blood sugar, total cholesterol, triglycerides, HDL and LDL were measured using the clinical chemistry analyzer.

Results: After 8 weeks of training, significant reductions were observed in BMI, fat free mass, muscle mass. Lipid profile analysis revealed decreases in total cholesterol, LDL, and HDL. Notably, there were significant increases in MET and moderate physical activity per week, indicating improved physical activity levels;

Conclusions: Eight weeks of moderate-intensity aerobic training led to meaningful improvements in body composition, characterized by reductions in body fat and BMI, alongside enhanced physical activity levels. These results support the effectiveness of moderate exercise as a practical, sustainable strategy for improving metabolic health and managing body fat in adults aged 30–60 years. Continued adherence to such training may further enhance body composition and long-term cardiovascular outcomes.

Keywords: Moderate Physical activity; obesity, body composition, metabolism



ABSTRACT

The rehabilitation of the tennis player lateral epicondylitis on the dominant side by the use of the ai devices – a case study

Nicoleta Daniela CALOTĂa, Adriana CHIRICĂa, Diana Victoria GIDUa, George MUȘATA, Ionuț Gabriel TĂNASEa, Cristian POPAa, Antoanela OLTEANA*

a Physical Education and Sport Faculty, Ovidius University of Constanta, Romania

* Corresponding author: email: olteantoanela@gmail.com

Lateral epicondylitis (tennis elbow) is a degenerative enthesopathy affecting the origin of the extensor carpi radialis brevis, frequently encountered in tennis players, with negative impact on performance and career. The study aimed to examine whether graded, AI-assisted physiotherapy, could improve recovery, compared with conventional physical therapy treatment. A 29-year-old professional tennis player with dominant arm epicondylitis (the right side) was treated for two weeks at Recovery and Balneal Sanatorium Techirghiol. The rehabilitation program included ten physiotherapy sessions, one per day (≈60 min each) using BTS Nirvana, ALEx RS robotic exoskeleton, Virtual Reality Rehabilitation System (VRRS Evo) and Gloreha Aria, complemented by five Intermittent Vacuum Therapy (VACUMED) sessions for elbow edema/inflammation reduction, one per two days. Initial and final evaluations employed Cozen, Mill, Maudsley, goniometry tests and pain-free maximal grip strength measurements. All functional parameters improved: Cozen test endurance increased from 4 s to 9 s, Mill test pain decreased from score 7 to 3, Maudsley test endurance rose from 5 s to 12 s, elbow flexion increased from 100° to 180° and pain-free grip strength normalized. These outcomes indicate faster pain relief and functional recovery than usually reported with conventional therapy. Early, AI-supported rehabilitation, significantly enhanced pain reduction and functional capacity in tennis elbow. The findings highlight the potential of integrating robotic and virtual reality devices into routine management of lateral epicondylitis in athletes.

Keywords: tennis elbow; lateral epicondylitis; AI-based rehabilitation; robotic physiotherapy; sports medicine



ABSTRACT

Contributions to the optimization of functional recovery in patients undergoing revision total hip arthroplasty for acetabular defects through computer-assisted kinesiotherapy

Nicoleta Florența CARAIVAN^{a,b*}, Luminița Ionela GEORGESCU^c,
Claudia Camelia BURCEA^d, Elena Ioana ICONARU^c, Ion MIHĂILĂ^c, Vladimir
POTOP^{c,e}

^a Doctoral School of Physical Education and Sports Science, PhD student, National University of Science and Technology Politehnica Bucharest, University Centre Pitesti, 1 Targul din Vale Street, 110040, Pitesti, Romania.

^b Dr. Carol Davila" Central University Emergency Military Hospital, 134 Calea Plevnei Street, 010825, Bucharest, Romania.

^c Faculty of Science, Physical Education and Informatics, University Center of Pitesti, National University of Science and Technology Politehnica Bucharest, 1 Targul din Vale Street, 110040, Pitesti, Romania.

^d University of Medicine and Pharmacy "Carol Davila", 37 Dionisie Lupu Street, 020021, Bucharest, Romania.

^e Moldova State University, ISEFS, Republic of Moldova.

*Corresponding author: nicoletacaraivan@yahoo.com

Introduction: Total hip arthroplasty (THA) is one of the most effective orthopedic procedures, aiming to restore joint function and relieve pain. Revision THA for acetabular defects, particularly those classified as Paprosky types IIA–IIIA, remains a major challenge for functional recovery. The integration of computer-assisted technologies such as the Huber 360° Platform enables objective evaluation and re-education of balance, strength, and coordination, providing validated support for personalized neuromotor rehabilitation.

Materials and Methods: The study included 10 patients (6 men and 4 women; mean age 69.6 ± 7.2 years) who underwent revision THA for Paprosky IIA–IIIA acetabular defects. Assessments were performed at two time points: T0 (three months postoperatively, before rehabilitation) and T1 (six months postoperatively, after completing a 12-week therapeutic program). The rehabilitation protocol consisted of five weekly sessions: three of conventional kinesiotherapy (60 min) and two using the Huber 360° Platform (30 min), focused on re-educating balance, strength, and coordination. The main parameters (balance, strength, coordination) were quantified through the integrated software, and statistical analysis was performed using the paired-sample t-test ($p < 0.05$).

Results: Comparative analysis revealed statistically significant improvements across all parameters: balance increased by +23.9%, strength by +21.5%, and coordination by +25.7%. All patients demonstrated objective functional progress, with enhanced postural



stability and motor control, reduction of asymmetries, and improved adaptability to postural demands.

Conclusions: Incorporating the Huber 360° Platform into standardized postoperative rehabilitation programs after revision THA for acetabular defects leads to superior functional recovery, as demonstrated by objective improvements in balance, strength, and coordination. The preliminary results support the integration of computer-assisted technologies into modern orthopedic rehabilitation protocols, offering individualized and continuously monitored recovery pathways. Further multicenter studies on larger cohorts are warranted to validate these findings.

Keywords: total hip arthroplasty; acetabular revision; neuromotor re-education; Huber 360° platform; computer-assisted kinesiotherapy.



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ABSTRACT

Quality of life and rehabilitation efficiency in patients undergoing revision total hip arthroplasty with acetabular defects

**Nicoleta Florența CARAIVAN^{a,b*}, Luminița Ionela GEORGESCU^c,
Claudia Camelia BURCEA^d, Elena Ioana ICONARU^c, Ion MIHĂILĂ^c, Vladimir
POTOP^{c,e}**

^a Doctoral School of Physical Education and Sports Science, PhD student, National University of Science and Technology Politehnica Bucharest, University Centre Pitesti, 1 Targul din Vale Street, 110040, Pitesti, Romania.

^b Dr. Carol Davila" Central University Emergency Military Hospital, 134 Calea Plevnei Street, 010825, Bucharest, Romania.

^c Faculty of Science, Physical Education and Informatics, University Center of Pitesti, National University of Science and Technology Politehnica Bucharest, 1 Targul din Vale Street, 110040, Pitești, Romania.

^d University of Medicine and Pharmacy "Carol Davila", 37 Dionisie Lupu Street, 020021, Bucharest, Romania.

^e Moldova State University, ISEFS, Republic of Moldova.
*Corresponding author: nicoletacaraivan@yahoo.com

Introduction: Revision total hip arthroplasty (THA) for acetabular defects represents a complex surgical and functional challenge, with postoperative recovery directly influencing patients' quality of life. The multidimensional assessment of rehabilitation—functional, sensory, and psychosocial—allows an integrated analysis of therapeutic efficiency and of the patient's perception of their own recovery. The objective of the questionnaire was to analyze the effectiveness of medical rehabilitation and its impact on quality of life in patients undergoing revision THA with acetabular defects.

Materials and Methods: This observational, descriptive, and analytical study included 20 patients (15 females, 5 males; aged 61–78 years) who underwent revision THA for moderate or severe acetabular defects. Evaluation was based on the administration of the *Questionnaire for Identifying the Impact of Physiotherapy Intervention*, a validated instrument comprising 31 questions grouped into three dimensions: functional (pain, mobility, autonomy), sensory (pain perception, movement control), and psychosocial (satisfaction, confidence, reintegration). Data analysis was performed using descriptive methods, percentage frequencies, and correlations between the main variables (pain, stability, satisfaction, compliance).

Results: All three dimensions showed significant improvements. Functionally, 75% of patients reported pain reduction to an average intensity of 2.8 points on the VAS, and 75%



regained independent walking. In the sensory dimension, 80% of patients reported no pain during physiotherapy sessions, while 100% observed improved movement control and reduced stiffness. In the psychosocial dimension, 100% of participants declared themselves “very satisfied” with therapeutic communication and progress, 85% regained confidence in their functional abilities, and 70% reported independence in daily activities. The correlation between therapy frequency and satisfaction level ($r = 0.78$) highlights the essential role of early and continuous rehabilitation.

Conclusions: The multidimensional approach to postoperative rehabilitation after revision THA for acetabular defects leads to significant improvements in quality of life through pain reduction, increased mobility, and restoration of psychological and social balance. The results emphasize the need for integrated patient assessment beyond the biomechanical dimension, as well as the importance of active participation and therapeutic communication. Medical rehabilitation thus becomes a holistic process in which clinical success is inseparable from the patient’s psychological well-being and social reintegration.

Keywords: quality of life; total hip arthroplasty; medical rehabilitation; multidimensional questionnaire; functional recovery



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ABSTRACT

Comparative analysis of spinal deviations frequency in adolescents with multiple sensory impairments and typical adolescents using spinal mouse Idiag

Oana Bianca BUDEANCA-BABOLEA^{a,b*}, Denisa PIELE^a, Eva ILIE^a, Catalin POPA^a, Andreea Daniela BRAGUTA^a, George IONESCU^a, Alexandru CHIVĂRANA^a

^a University of Craiova, Faculty of Physical Education and Sports, str Brestei no 146 , Craiova, Dolj, Romania

^b School Center for Inclusive Education 'St. Vasile', str. Dr. Dimitrie Gerota no 3, Craiova, Dolj, Romania

* Corresponding author: email: oana.budeanca@edu.ucv.ro

Introduction: Correct posture is an essential indicator of spinal health in adolescents. Children with multiple sensory impairments (MSI) are at increased risk of developing spinal deviations due to motor integration difficulties and insufficient postural adaptations. The aim of the study was to compare the frequency of spinal deviations between a group of students with MSI and a group of students with typical development, using the Spinal Mouse Idiag device, which allows the measurement of physiological curvatures and the identification of deviations in the sagittal and frontal planes.

Materials and Methods: The study included adolescents aged 14 to 18 years, divided into two groups: one consisting of students with multiple sensory impairments and one of students without such impairments. Postural assessment was performed using the Spinal Mouse Idiag (M360) device, applied to the spine from the C7 vertebra to the coccyx. Subjects were assessed barefoot, in a standing position, to ensure standardized conditions. The movement of the device was performed uniformly and controlled, to guarantee the accuracy of the measurements.

Results: In the group of students with MSI, spinal deviations such as pronounced kyphosis, scoliosis or lordosis changes were identified, with a higher frequency compared to the group of students without deficiencies. The comparative analysis showed an increased prevalence of postural disorders among students with MSI, which can be explained by the limitations of sensory and motor integration, as well as by the difficulties of coordination, balance and postural adaptation, which favor muscle imbalances and the appearance of vicious compensatory positions. The statistical analysis focused on the Th12–L1 and L5–S1



segments, relevant regions for the assessment of spinal mobility and possible stiffness associated with postural deviations.

Conclusions: Students with multiple sensory impairments are at increased risk of developing spinal deviations, compared to those without impairments. Non-invasive evaluation through Spinal Mouse Idiag proves to be a useful method for screening and monitoring, providing premises for the development of personalized prevention and correction programs.

Keywords: posture, Spinal Mouse Idiag, multiple sensory impairments, adolescents, spinal deviations



ABSTRACT

Biomehcanic and technologic approach of knee rehabilitation after ACL reconstruction

Rares Andrei CIRCIUMARUa*

a Universitatea din Craiova, Romania

raresandrei029@gmail.com

The knee joint is one of the most complex and vulnerable structures of the human musculoskeletal system. Due to its essential role in supporting body weight, locomotion, and shock absorption, it is frequently exposed to intense biomechanical stresses that can lead to anterior cruciate ligament (ACL) injuries. Surgical reconstruction of the ACL is the current standard of care, but the success of functional recovery depends largely on the quality and progression of postoperative rehabilitation protocols. Interdisciplinary advances in biomechanics and digital technologies have enabled the development of personalized rehabilitation strategies using intelligent systems.

This paper summarizes recent data on postoperative rehabilitation after ACL reconstruction, emphasizing the integration of proprioceptive, neuromuscular, and kinesiological exercises. Standard protocols include early controlled mobilization, gradual increase in joint load, balance training, and functional toning of the quadriceps and hamstrings. Modern approaches integrate wearable sensors, motion analysis systems, and intelligent algorithms capable of adapting the effort to the biomechanical characteristics of each patient.

Scientific evidence shows that progressive and individualized rehabilitation programs improve joint stability, reduce pain, and restore functional range of motion. Proprioceptive and neuromuscular training, combined with the application of Kinesio Taping and digital monitoring, contribute to accelerated recovery and reduced risk of recurrence. The integration of intelligent technologies increases patient adherence, assessment accuracy, and the safety of the rehabilitation process.

Postoperative rehabilitation of LIA injuries requires a multidisciplinary and adaptive approach that combines traditional physical therapy with modern biomechanical and technological methods. Smart and Connected Health-based solutions offer promising prospects for personalized recovery, objective assessment, and long-term maintenance of joint stability.

Keywords: knee, ACL, multidiciplinary



ABSTRACT

Foot orthoses modulate tensor fasciae latae activity during running depending on foot type

Ruben SANCHEZ-GOMEZ^{a,b*}, Elena Adelina PANAET^c, Anna ZWIERZCHOWSKA^d, Denis ČAUŠEVIĆ^e, Dan Iulian ALEXE^c

^a Nursing Department, Faculty of Nursing, Physiotherapy and Podiatry, Universidad Complutense de Madrid, 28040 Madrid, Spain;

^b Instituto de Investigacion Sanitaria Hospital Clinico San Carlos (IdISSC), 28040 Madrid, Spain

^c Department of Physical and Occupational Therapy, "Vasile Alecsandri" University of Bacau, 600115, Bacău, Romania;

^d Institute of Sport Sciences, Academy of Physical Education in Katowice; Poland

^e Faculty of Sport and Physical Education, University of Sarajevo, 71000 Sarajevo, Bosnia and Herzegovina;

* Corresponding author: rusanc02@ucm.es

Background: Iliotibial band syndrome (ITBS), mediated through the tensor fasciae latae (TFL), is a prevalent overuse injury among runners. Despite its frequency, the etiopathogenesis of ITBS remains uncertain, and the potential influence of foot orthoses across different foot types has not been fully elucidated. This study aimed to examine the effects of various foot orthoses on TFL electromyographic (EMG) activity during running in individuals with distinct foot postures, to explore their possible role in modulating iliotibial band (ITB) tension.

Methods: Forty-one healthy recreational runners (mean age 32.66 ± 3.51 years) were categorized as neutral (NEUg), supinators (SUPg), or pronators (PROg) according to their Foot Posture Index. Participants ran on a treadmill at 9 km/h for 3 minutes under four randomized conditions: baseline (no insole, SIN), pronating (PRO), supinating (SUP), and heel lift (TAL) orthoses (5 mm). Surface EMG was used to record TFL activity. Test reproducibility was assessed with the intraclass correlation coefficient (ICC), while statistical comparisons employed Bonferroni-adjusted pairwise tests and Friedman analysis.

Results: Test reproducibility was "perfect," with ICC values approaching 1. In the baseline condition (SIN), EMG amplitude significantly increased from NEUg (87.58 ± 4.81 mV) to SUPg (97.17 ± 4.3 mV) ($p < 0.05$). In contrast, TFL activation decreased significantly with the PRO orthosis compared to SIN in both NEUg (87.58 ± 4.81 mV vs 74.69 ± 3.77 mV; $p < 0.001$) and SUPg (97.17 ± 4.3 mV vs 90.96 ± 4.0 mV; $p < 0.001$).

Conclusions: TFL activity was higher in supinators than in neutral-foot runners under baseline conditions. The use of pronating insoles produced a significant reduction in TFL EMG activity, suggesting decreased ITB tension through biomechanical internal



rotation of the lower limb. These findings highlight the importance of considering foot type in ITBS management and support the potential therapeutic role of pronating insoles as an adjunct to conventional treatment strategies.

Keywords: tensor fasciae latae, iliotibial band syndrome, foot orthoses, runners, foot type, therapeutic alternative



ABSTRACT

Postural stability improvement through simulated hippotherapy in adults with chronic low back pain: a practical rehabilitation approach

Svetlana SAVIȚCHIA*, Eugeniu AGAPIIB, Oxana DARIIc, Alexandr TÎMCIUCd

a Department of Medical Rehabilitation, Physical Medicine and Manual Therapy, SUMP „N. Testemițanu”, Chișinău, Republica Moldova

b Department of Physical Therapy and Occupational Therapy, IPES (SUM), Republica Moldova

c Department of Life Sciences, „Dunărea de Jos” University of Galați, România

d Doctoral School of Sports Sciences, IPES (SUM), Republica Moldova

* Corresponding author: email: svetlana.savitchi@usmf.md

Hippotherapy is a form of therapeutic exercise used as a conservative treatment for segmental instability of the lumbar spine and/or hypomobility in individuals with low back pain (LBP). The **aim of the research** was to analyze and demonstrate the effectiveness of simulated hippotherapy in improving postural stability and reducing pain in adults with chronic low back pain, through the application of a kinetic program focused on enhancing functionality and balance control. **Research objectives:** To assess the effects of simulated hippotherapy on postural stability and balance control in adults with chronic low back pain; To determine the influence of the simulated hippotherapy program on pain reduction and overall functional improvement in patients. **Research hypothesis:** It is assumed that the application of a structured simulated hippotherapy program, based on rhythmic movements and postural regulation mechanisms specific to this method, will facilitate the reeducation of postural stability in adults with chronic low back pain, contributing to pain reduction and increased overall functionality.

The study included 10 adults with chronic low back pain (aged 45–65), divided into an experimental group (n=5) and a control group (n=5). The intervention was conducted at the Clinical Hospital for Rehabilitation and Chronic Care and at the Republican School of Equestrian and Modern Pentathlon, where the experimental group additionally participated in simulated hippotherapy sessions. The experimental group performed simulated hippotherapy sessions lasting 25–30 minutes, followed by standard physiotherapy and physical therapy modalities (45–60 minutes), including three-dimensional movements, weight transfers, and postural control exercises with individualized progression. The control group followed only the standard physiotherapy and physical therapy modalities, focused on lumbopelvic stabilization, stretching, and postural education, under identical conditions.



At the end of the program, the ODI score decreased in the experimental group from 34% to 20%, compared to a more modest reduction in the control group (from 33% to 27%), indicating a clinically relevant improvement in functional disability, associated with enhanced axial stability and reduced effort-related pain. VAS values decreased significantly in the experimental group, from 6.6 to 3.6 points, compared to a smaller reduction in the control group (6.4 to 5.3 points, $p = 0.034$), highlighting the analgesic effect of simulated hippotherapy through improved postural control and relaxation of paravertebral muscles.

Overall, the results confirm that the integration of simulated hippotherapy into the kinetic program effectively reduces pain, improves balance and mobility, and demonstrates the efficiency of this method as a complementary tool in the neuromotor reeducation of patients with chronic low back pain.

Keywords: hippotherapy, physiotherapy, back pain, postural control



ABSTRACT

Innovative EU projects in rehabilitation: Insights and Impact

Taina AVRAMESCU^a*

^a University of Craiova, University of Craiova, Department of Kinetotherapy and Sports Medicine, str. Brestei nr. 156, Craiova, Romania

* Corresponding author: email: taina_mistico@yahoo.com

Rehabilitation has traditionally relied on face-to-face assessments and supervised therapy. Advances in digital health and telecommunication technologies have enabled telerehabilitation (TR) and Remote Assessment and Monitoring (RAM). Professional organizations such as APTA and EU policy frameworks now emphasize digital competencies for health professionals. Evidence supports TR in musculoskeletal, neurological, cardiac, and pulmonary rehabilitation, with outcomes often comparable to conventional care. However, challenges remain regarding validation of functional tests, equity of access, privacy, and regulatory frameworks. **In our study** a narrative synthesis was conducted, including systematic reviews, large observational studies, professional guidance, and EU policy documents published between 2019 and 2025. Sources covered technologies for RAM, clinimetric validity of remote tests, clinical effectiveness, safety, economic evaluation, and integration in education. In parallel, European cooperation projects (Erasmus+) coordinated by our faculty since 2021 were analyzed as case studies for curricular innovation. The results showed that telerehabilitation is effective in musculoskeletal pain, COPD, cardiac rehabilitation, and stroke, with comparable outcomes to in-person models and potential cost-effectiveness. Synchronous video assessments, smartphone-based goniometry, and wearable-integrated remote monitoring demonstrate acceptable reliability and safety when standardized protocols are applied. Limitations include validity of complex measures (balance, agility, dual-tasking), equity gaps in digital access, and the absence of standardized privacy and reimbursement frameworks. At the educational level, Erasmus+ projects such as **e-KINE** (2021–2023, Romania–Bulgaria–Turkey), **e-MED-skills** (2022–2024, Romania–Turkey–Bulgaria–Poland), and the ongoing **e-PHYSIO** (2023–2026, Albania–Kosovo–Romania–Bulgaria–Turkey) developed multilingual e-platforms, digital curricula, protocols, and virtual clinics. Collectively, these initiatives modernize physiotherapy curricula, strengthen digital health literacy, and pilot innovative pedagogical models (e.g., tele-OSCEs, virtual patient encounters, interprofessional training). Over 900 users were reached across projects, with >85% reporting improved competencies and stakeholders confirming long-term utility and sustainability. In conclusion RAM and telerehabilitation are now core components of modern rehabilitation. Hybrid models blending in-person and digital care appear most effective and equitable. For clinical integration, research must address validation, privacy, and reimbursement gaps, while policy must prioritize equity and access. For education, embedding telerehabilitation into



physiotherapy curricula—aligned with EU strategies—will prepare graduates for digitally enabled care. Sustainable open learning resources, lifelong learning pathways, and international cooperation projects will accelerate the safe, patient-centered, and innovative delivery of rehabilitation services in Europe.

Keywords: Telerehabilitation; Remote Assessment and Monitoring; Physiotherapy education; Digital health; European cooperation



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ABSTRACT

Assessment of lower-limb average power using jump-based models and short-duration ergometer tests: preliminary evidence of significant differences

Vlad Adrian GEANTĂ^{a,b*}, Pierre Joseph DE HILLERIN^{a,c}

^a Doctoral School of Sport Science and Physical Education, National University of Science and Technology Politehnica Bucharest, Pitesti University Center, Pitesti, 110040 Romania

^b Faculty of Physical Education and Sport, Aurel Vlaicu University of Arad, Arad, 310330 Romania

^c Neuromotrica - Information for Sport and Human Performance Ltd. Bucharest, 021323 Romania

* Corresponding author: vlad.geanta@uav.ro

Background: Average power output is a critical parameter in assessing lower-limb neuromuscular performance, reflecting both mechanical efficiency and energetic capability relative to body mass. It can be determined indirectly through computational models applied to jump tests or measured directly using ergometers. Methodological discrepancies between these approaches often lead to interpretative inconsistencies, limiting cross-study comparability and practical application. This study aims to compare power estimates from jump-based models with direct ergometer measurements.

Material and Methods: In this preliminary cross-sectional within-subjects study, lower-limb average power was assessed using a 15-second bilateral jump test on the OptoJump Next, with raw data analyzed via three computational models: Bosco, Miron Georgescu (MG), and Miron Georgescu Modified-15s (MGM-15). Direct measurements of average power were obtained through 20-second maximal effort tests on Concept2 BikeErg and RowErg ergometers.

Results: Analysis revealed differences among the tested methods. The Bosco and MG models generated power estimates that differed from those obtained via ergometer measurements, while the MGM-15 model provided estimates that were more consistent with the direct measurements.

Conclusions: Methodological choice substantially affects lower-limb power assessment. While ergometers remain the reference standard, the MGM-15 model provides a practical and reliable field-based alternative, yielding mean power values that closely match those obtained from direct ergometer measurements.

Keywords: vertical jump, lower limb power, jump assessment, ergometer, preliminary study, psycho-neuro-motor



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ABSTRACT

The effectiveness of neuromuscular rehabilitation on upper extremity function in post-stroke patients at the comprehensive physical rehabilitation center

Ilona ILINCA^a, Eugenia ROȘULESCU^a, Radu ROȘULESCU^a

^a a University of Craiova, Faculty of Physical Education and Sport, Craiova, Romania

Corresponding author: ilona.ilinca@yahoo.com

Background: In stroke survivors, the incidence of upper limb motor disability remains high many of them have persistent neurological deficits that restrict activities and limit social participation. Although in many cases it is not possible to fully return to pre-stroke functional status to treat for stroke survivors sustained and complex rehabilitation is essential.

The goal of this study is to analyze the impact of neuromuscular rehabilitation based on mirror therapy in addition to a conventional upper limb rehabilitation program on upper limb functions and motor skills in patients with chronic stroke at the comprehensive physical rehabilitation Center.

Material and Methods: This retrospective observational study was conducted on a group of 30 post-stroke patients who met the inclusion criteria and signed informed consent, between February and May 2025, in the city of Craiova, at the Day Center for Adults with Disabilities. Participants were allocated into 2 groups, group A and group B according to the therapy they received. Both the group participated in a stroke rehabilitation program and group A was given mirror therapy in addition. The rehabilitation programme was performed 3 days per week for 12 weeks. The motor functioning of the upper hand and functional independence were assessed before the intervention and 3 months after starting the rehabilitation program, between the two groups and within groups.

Results: An improvement in all parameters evaluated was observed in both groups, but the postintervention scores were significantly higher in the mirror therapy group.

Conclusions: Mirror treatment used in addition to conventional stroke rehabilitation therapy seems to be an effective method to increase functional and motor skills of the upper extremity in elderly patients' post-stroke compared to conventional therapy.

Keywords: Stroke; Rehabilitation; Mirror Therapy; Upper Limb