



**INTERNATIONAL
SPORT
CONFERENCE
BANSKÁ BYSTRICA 2025**

Main editor

Dr. Dávid Líška, PhD.

9. SPORT INTERNATIONAL CONFERENCE COLLECTION OF ABSTRACTS

(4.10.2025)

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Publisher: Belianum. Matej Bel University Press 2025

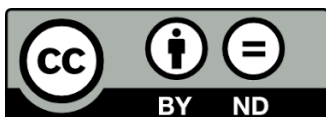
Cover design: Laura Pauhofová

ISBN 978-80-557-2287-0

EAN 978805572287-0

<https://doi.org/10.24040/2025.9788055722870>

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Dear colleagues, esteemed participants, and honoured guests

It is with great respect and genuine pleasure that I welcome you to the 9th International Sports Conference (4.10.2025) organized by the Slovak Medical University in Bratislava, Faculty of HealthCare based in Banská Bystrica and Faculty of Sport Science and Health, Matej Bel University. Once again, we gather in the spirit of shared interest – to explore, develop, and exchange the latest knowledge in the fields of sport, health, and movement sciences. Over the years, our conference has established itself as a respected platform among professional and academic events in Slovakia and abroad, bringing together experts from various areas of sports science, medicine, physiotherapy, and performance research. This year's conference is held under the theme of promoting a multidisciplinary approach to sport, health, and human movement. The integration of knowledge from different disciplines - from clinical practice and physiotherapy to training methodology and scientific research - represents the pathway to a deeper understanding of the complexity of the human body and physical performance.

In the modern world, true progress in science and practice can only be achieved through cooperation, dialogue, and shared perspectives among fields that might once have seemed distant. Multidisciplinary is not merely a fashionable term; it is a necessity for any modern, evidence-based approach to human health, performance, and well-being. Physiotherapists, physicians, strength and conditioning coaches, nutritionists, psychologists, and educators all form essential parts of one comprehensive system whose goal is to understand the human being. Each profession contributes its own expertise and experience, and together they create a synergistic network that enables us to respond more effectively to the needs of athletes, patients, and the general population. The purpose of this conference is not only to present new research findings but also to create space for dialogue, for the exchange of ideas, for the sharing of best practices, and for discussion about innovative methods, new technologies, and emerging trends in sport and rehabilitation. Each presentation, each abstract, and each discussion has the potential to spark new ideas and to inspire progress in our respective disciplines.

Sport science is a dynamic and ever-evolving field. Each new discovery, validated method, and clinical experience pushes the boundaries of what we know about human performance and health. Today, the importance of research in sport extends beyond professional competition - it plays a crucial role in supporting healthy lifestyles and preventing civilization-related diseases. In a world increasingly focused on performance and efficiency, we must remember that sport is not only about competition; it is also a means of personal development, prevention, and sustainable health

I extend heartfelt thanks to the members of the organizing and scientific committees, to all presenters, reviewers, and participants who have invested their time, energy, and expertise. Your dedication and willingness to share knowledge prove that our academic and professional community in sport and health is active, vibrant, and ready to face new challenges. Special thanks are also due to all partners and institutions who have supported this conference, whether through organizational, material, or professional contributions. Your involvement allows us to create an environment that encourages professional growth, networking, and collaboration across disciplines and countries. Dear colleagues, let this conference be more than just an exchange of scientific knowledge, let it be an inspiration for your professional journey. May it provide you with new perspectives, meaningful connections, and valuable impulses for future projects and research. I sincerely believe that together we will embody the main idea of this year's event, the promotion of a multidisciplinary approach as the cornerstone of a modern and effective understanding of sport, health, and human performance. Thank you for being part of this conference, for contributing to the development of our professional community, and for affirming through your work that sport, health, and science hold a vital place both in Slovakia and internationally.



Dr. Dávid Líška, PhD.

Main conference guarantor

Peroneal injury

Líška D.

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Abstract

Peroneal injuries represent a significant yet often underdiagnosed cause of lateral ankle and lower leg pain in athletes. These injuries include peroneal tendinopathy, tendon subluxation or dislocation, commonly resulting from repetitive ankle inversion, overuse, or acute trauma. This presentation reviews the epidemiology, mechanisms, and clinical manifestations of peroneal injuries across various sports, emphasizing the importance of early recognition and differential diagnosis. Diagnostic approaches such as dynamic ultrasound and MRI are discussed for accurate assessment of tendon integrity and associated pathologies. Evidence-based rehabilitation strategies are presented, focusing on strengthening, proprioceptive training, and progressive return-to-sport protocols. Surgical options and outcomes are briefly outlined for chronic or unstable cases. Understanding peroneal injury mechanisms and implementing individualized management plans are essential to reduce recurrence and optimize athletic performance.

Keywords: peroneal tendon, sports injury, ankle instability, rehabilitation, biomechanics

New possibilities for the objectivization of the functional score of Achilles tendon tendinopathy

Bubelínyová P., Snitková, M.

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Abstract

Achilles tendinopathy is a common condition among physically active individuals and athletes, leading to pain and reduced lower limb function. Patient-reported outcomes (PROs) are increasingly used to objectively assess severity of symptoms and functional limitations. The aim of this study was to translate, culturally adapt, and pilot test the Tendinopathy Severity Assessment (TENDINS-A). Tendinopathy questionnaire into Slovak, and to evaluate its clarity and clinical applicability. It included dual forward translation, reconciliation, back translation, expert review, and pretesting in a sample of patients diagnosed with Achilles tendinopathy. Participants underwent physiotherapy assessment and completed the Slovak version of the questionnaire. The Slovak version of the TENDINS-A questionnaire demonstrated high comprehensibility and linguistic accuracy. Expert review confirmed terminological precision and cultural relevance for Slovak clinical settings. It can be recommended for both clinical practice and research, but confirmation in 50 patients is required.

Keywords: Achilles tendon, tendinopathy, functional score, questionnaire, cultural adaptation, translation

Is zone 2 really the holy grail for health and endurance?

Lendvorský L.

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Abstract

In recent years, training in the so-called “Zone 2” has become one of the most discussed topics in sports science as well as among recreational athletes. It is often presented as the key to better metabolic health, greater resistance to fatigue, and a longer, higher-quality life. The foundation of these claims lies in the positive effects of low-intensity training on mitochondrial biogenesis, metabolic flexibility, and improved aerobic capacity. However, the question remains whether everyone who speaks about Zone 2 training actually means the same thing. This lecture will therefore focus on methods of identifying Zone 2, its real benefits, and an evaluation of whether it can truly be considered the holy grail of health and endurance.

Keywords: zone 2 training, endurance, aerobic capacity, mitochondrial biogenesis

Eat like a pro: what every athlete in Slovakia needs to know

Čupka, M.

Abstract

Nutrition represents a key determinant of athletic performance, recovery, and long-term health sustainability. Despite the growing interest in nutritional interventions, significant knowledge gaps and persistent myths remain in the practice of Slovak sports clubs and training environments, negatively affecting both performance and athlete well-being. The aim of this paper is to analyze the most common nutritional misconceptions and to present the comprehensive concept Eat Like a Pro, based on current scientific evidence in sports nutrition. Observations and available data indicate that up to 91% of athletes demonstrate insufficient knowledge of sports nutrition principles, and 64% of coaches admit uncertainty in this area. Empirical findings reveal the persistence of misguided practices such as training without adequate carbohydrate intake, hydration restriction during exercise, elimination of fruit, or the use of low-carbohydrate diets during periods of high training load. These practices often lead to chronic energy deficits, impaired recovery, increased risk of overuse injuries, and long-term hormonal or metabolic imbalances.

The paper presents five case studies illustrating typical nutritional errors among athletes of different levels and disciplines. Based on these examples, recommendations are formulated to optimize energy intake, hydration, meal timing, and evidence-based supplementation. The findings confirm that implementing simple yet systematically timed nutritional interventions significantly improves performance, recovery, and perceived energy levels.

The Eat Like a Pro concept integrates scientific knowledge from sports physiology, nutrition, and behavioral psychology. It encompasses key areas such as sleep, energy balance, macronutrient composition, hydration, pre-, during-, and post-exercise fueling, women's and youth nutrition, and rational supplementation. The project's main objective is to enhance nutritional literacy among athletes and coaches, promote individualized approaches, and establish sustainable nutrition strategies within Slovak sport. The conclusion emphasizes the need for systematic education in sports nutrition as an integral part of the training process. Proper nutrition should not be viewed merely as a supportive element but as a determinant of performance, health, and athletic longevity.

Keywords: sports nutrition, energy balance, hydration, recovery, education, nutrition

Shoulder pain - simple and effective

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Abstract

Shoulder pain is among the most frequent musculoskeletal complaints, yet its clinical assessment and management are often unnecessarily complex. Numerous diagnostic tests with limited accuracy remain in use, while the multifactorial nature of shoulder disorders calls for a more pragmatic and patient-centered approach. The first step in clinical reasoning is to exclude red flags such as fractures, dislocations, systemic diseases, or referred pain from visceral or neurological sources. Equally important is the evaluation of psychosocial “yellow flags” (fear of movement, catastrophizing, depression, low self-efficacy), which significantly influence outcomes. Historically, too much emphasis has been placed on scapular positioning and dyskinesia. Current evidence shows that scapular deviations are common even in asymptomatic individuals and are not consistently associated with pain. The scapula should only be considered relevant if symptom modification (e.g., scapular assistance or retraction tests) results in meaningful improvement. Meakins’ classification offers a useful framework, identifying three main patterns: (1) stiff and painful shoulder, (2) weak and painful shoulder, and (3) unstable and painful shoulder. Management of a stiff and painful shoulder may benefit from eccentric loading to restore mobility, alongside strategies to maintain function and minimize secondary weakness. Weak and painful shoulders should be managed with progressive loading of the rotator cuff, starting from supported isometrics and advancing toward dynamic and compound exercises. Unstable shoulders require strengthening of stabilizers and graded exposure to activity, while surgical options remain reserved for selected high-risk patients. In summary, simplifying shoulder assessment and management by excluding serious pathology, identifying the dominant pain pattern, emphasizing progressive exercise, and integrating psychosocial factors provides a clear and patient-oriented pathway. While more research is needed, such an approach may help reduce over-medicalization, enhance patient confidence, and ultimately contribute to better functional outcomes.

Keywords: shoulder pain, shoulder, red flags, yellow flags, pain, myth of shoulder

MRI examination of the heel and Achilles tendon

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Abstract

Heel pain and Achilles tendon disorders represent a common health issue not only among recreational and elite athletes but also within the general population. In athletes, the most frequent cause is overuse associated with increased training load. Acute injuries of the heel and Achilles tendon are usually managed conservatively; however, in more severe lesions, surgical intervention is required. Chronic ankle pain, which often does not respond adequately to conservative treatment, poses a greater clinical challenge and significantly limits the athlete's return to full activity.

Magnetic resonance imaging is considered the modality of choice in these cases, as it provides detailed visualization of soft tissue structures, the complex ankle anatomy, and a wide spectrum of pathological conditions, including Achilles tendon lesions, plantar fasciopathy, stress fractures, and calcaneal apophysitis.

Keywords: magnetic resonance imaging, Achilles tendon, plantar fasciitis, stress fracture, calcaneal apophysitis, ankle pain

The role of temporomandibular disorders in sports medicine

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Abstract

Temporomandibular disorders (TMD) affect the temporomandibular joint (TMJ), masticatory muscles, and related craniofacial and cervical structures. In athletes, TMD is often under-recognised despite its potential to impair performance, recovery, and return to sport. Causes may be intra-articular, such as disc displacement with or without reduction, degeneration, or inflammation, or extra-articular, including bruxism, malocclusion, muscle spasm, and parafunctional habits. Risk factors in sport include facial trauma, repetitive head impacts, helmet or mouthguard use, high training loads, and whiplash injuries. Symptoms include jaw pain, limited or asymmetric opening, joint sounds, headaches, tinnitus, and dizziness. Diagnosis should consider dental, neurological, ENT, and cervical spine causes, and can be supported by DC/TMD criteria and imaging (OPG, cervical spine radiographs, MRI, CT). Sports-related TMJ injuries include condylar fractures, luxation's, and post-traumatic trismus, most frequent in contact sports such as football, hockey, boxing, and baseball. Management ranges from education, behavioural change, medication, physiotherapy (manual therapy, posture correction, stabilization, and movement retraining), and selective occlusal splint use, to surgical intervention for severe structural pathology. Postoperative rehabilitation focuses on restoring mobility, reducing pain, and preventing maladaptive patterns. Greater awareness of TMD in sports medicine enables early identification, targeted management, and prevention through screening after craniofacial trauma, custom-fitted mouthguards, and athlete education.

Keywords: temporomandibular joint, temporomandibular disorder, sports medicine, mandibular fracture, luxation, trismus, physiotherapy, occlusal splint, athletes, maxillofacial trauma

USG examination of the hamstring

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Abstract

Injuries to the posterior thigh muscles are among the most common musculoskeletal injuries in athletes, particularly in football and athletics. Ultrasonography (USG) represents the first-line imaging method for diagnosing these lesions due to its accessibility, speed, ability to perform dynamic assessments, and cost-effectiveness. The lecture focuses on the indications for musculoskeletal ultrasonography, the advantages and limitations of the method compared with magnetic resonance imaging (MRI), and the imaging appearance of normal and injured muscle tissue. Special attention is given to the anatomy and sonographic landmarks of the hamstrings, the BAMIC classification of muscle lesions, and the role of USG in evaluating acute and chronic injuries. Several case studies from sports practice are presented to illustrate the importance of USG in grading injuries, monitoring the healing process, and supporting decision-making regarding an athlete's return to training and competition.

Keywords: hamstring injuries, posterior thigh muscles, sports injuries, musculoskeletal ultrasound, hamstring anatomy, return to play, sports medicine

Stability of the hip joint under pressure from extraphysiological ranges of motion

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Abstract

Extra-physiological ranges of motion represent a unique model on which it is possible to observe the boundary between physiological mobility, extra-physiological mobility, and pathological instability. The aim of this paper is to present the results of original research conducted on professional dancers and to highlight their clinical impact and applicability to other athletes (gymnastics, figure skating, acrobatics). The research, conducted on a group of 50 professional classical ballet dancers, evaluated the effect of 12 weeks of targeted kinesiotherapy. Stability was monitored using clinical tests (AB-HEER, HEER, Prone Instability Test), muscle strength (HHD, MVIC), range of motion, and subjective pain perception (PQRST questionnaire). The results showed a 66% reduction in positive clinical tests, a significant increase in the muscle strength of the periarticular muscles, and a reduction in subjectively perceived pain, while the range of motion remained unchanged. The research provides an innovative perspective on the prevention and management of microinstability in environments with extreme physical demands. It demonstrates that targeted kinesiotherapy can redefine the standard of training preparation from a reactive to a proactive approach. Although the research was conducted in the ballet environment, its principles are universal and applicable

Keywords: hip joint, instability, extraphysiology, physiotherapy

How to improve sport in Slovakia?

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Abstract

Elite sport in Slovakia is currently at a stage that requires fundamental systemic changes and a long-term development strategy. Despite the presence of many talented athletes and occasional international successes, Slovak sport remains constrained by insufficient investment, outdated infrastructure, and inefficient management. The aim of this presentation is to analyse the current state of elite sport in Slovakia, identify its main weaknesses, and propose measures that could contribute to improving performance, stability, and international competitiveness among Slovak athletes. A key issue lies in the fragmentation of the sports support system. Funding is often dispersed among multiple institutions and lacks a coherent long-term vision. There is no effective mechanism for evaluating program effectiveness, and analytical tools for planning the development of individual sports are underutilized. Moreover, support for youth sport is unevenly distributed, and many promising athletes leave the country in search of better training and educational conditions abroad. A fundamental step towards improvement is the need for strategic investments in sports infrastructure - the modernization of training centres, the construction of central regional sports preparation, and the establishment of a network of sports diagnostics facilities. Equally important is the professionalization of sports management through the adoption of modern managerial approaches, transparent allocation of financial resources, and stronger cooperation between the state, local governments, sports federations, and the private sector. An essential part of development is also the systematic education of coaches and sports professionals. A well-prepared coach is a decisive factor in the success of any athlete; therefore, it is necessary to improve the conditions for their education, knowledge exchange, and professional growth. Improving elite sport in Slovakia requires a coordinated approach, long-term planning, and the courage to implement reforms. Only through the integration of sports policy, education, and modern management can an environment be created in which Slovak athletes consistently achieve top international results while inspiring younger generations to pursue an active and healthy lifestyle.

Keywords: sport, Slovakia, improvement

Modern forms of recovery in youth football and their impact on body regeneration

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Abstract

Nowadays, athletes have access to a wide range of regeneration techniques. However, as practical experience has shown, players, coaches and sports scientists continue to explore which methods are the most effective. The aim of this research is to compare different regeneration techniques to determine, which one has the greatest impact on the body's recovery after physical load. The main objective of this research is to assess the impact of contemporary regeneration techniques on the recovery of youth football players following physical load. The sample consisted of U16 football players from the FC Košice Academy, aged 14-15 years. Out of a total of 21 players, 8 successfully completed all testing sessions. Absences were due to injuries, illnesses, and national team representation commitments. The tested sample was randomly divided into two groups of equal size. To verify the hypotheses established beforehand, a qualitative research method was employed, based on the recording of clinical examinations. Based on the verification of the hypotheses established in this research, it could be concluded that the expected effects of the individual regeneration methods were not confirmed in most cases. The first hypothesis showed no statistically significant differences between protocols in terms of external load (CJM). It was even found that the ice tub, as a form of cold-water immersion, and compression boots had a short-term negative effect. In contrast, for internal load (wellness questionnaire), a positive effect of most regeneration methods was observed, except for the ice tub. Therefore, Hypothesis 1 was not confirmed. Similarly, for the second hypothesis, no statistically significant differences were found between the examined groups - neither in external load (CMJ average, CMJ max) nor in internal load (wellness questionnaire). Hypothesis 2 was therefore not confirmed and was rejected. The results for the third hypothesis were only partially supported. In terms of external load (CMJ), it was shown that the ice tub had a negative effect compared to active forms of regeneration. At the same time, the hot tub demonstrated a more beneficial effect than the massage roller. However, no differences were found in internal load, and thus Hypothesis 3 was not confirmed. The fourth hypothesis was also not supported. Although statistically significant differences in external load (CMJ) were

observed immediately after regeneration – with the ice tub showing a negative effect compared to the hot tub – no differences in internal load were recorded on the following day. Therefore, Hypothesis 4 was not confirmed. The optimal choice of regeneration method depends on the goal, timing and individual response of the player. For the rapid restoration of explosive performance, a hot tub or passive warming appears most suitable, whereas to reduce fatigue and muscle soreness, the ice tub is preferred - especially considering the proximity of the next performance. Correct timing is crucial: an ice tub should not be used immediately before or after a match if another performance follows within 24 hours. In contrast, a hot tub or light active regeneration may help to maintain performance capacity. Regeneration strategies should be individualized based on both subjective and objective indicators. In youth football, however, the fundamental elements of recovery remain sufficient sleep, balanced nutrition, and light physical activity, while modern technologies should serve only as supportive tools.

Keywords: active recovery, passive recovery, performance, physiotherapy, youth football

Influence of yoga breathing techniques - pranayama in the Himalayas

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Abstract

Pranayama - yoga breathing techniques differ from one another in breathing patterns and breathing frequencies. According to Yoga in Daily Life - The System[®], pranayama techniques that reduce breathing frequency include Nadi Shodhana, Ujjayi and Bhujangini. These yogic breathing techniques have been well researched, with the primary effect being modulation of the autonomic nervous system. 20 subjects were exposed to hypobaric hypoxia at altitudes above 3,000 meters above sea level. They practiced modified *Bhujangini Pranayama* according to Maheshwarananda for 5 minutes per day over a period of 3 days. After practicing modified Bhujangini Pranayama, there were statistically significant improvements in blood oxygen saturation levels ($p < 0.001$). Modified Bhujangini Pranayama improved blood oxygen saturation in hypobaric hypoxia at altitude of Himalayas.

Keywords: yogic breathing, pranayama, Bhujangini Pranayama, hypobaric hypoxia

Poster section

Prevalence of musculoskeletal pain in pole vaulters

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Abstract

Pole vaulting is a technically demanding athletic discipline that requires a combination of strength, speed, coordination, and flexibility. The high intensity of training, repetitive movement patterns, and significant mechanical load can lead to musculoskeletal pain, which negatively affects athletes' performance and increases the risk of injuries. Although musculoskeletal pain is a frequently studied issue in sports medicine, pole vaulting remains a discipline where this aspect has received relatively little attention. The aim of this study is to analyze the occurrence of musculoskeletal pain in pole vaulters. To collect data, the standardized Örebro Musculoskeletal Pain Questionnaire (ÖMPQ) was used, allowing for the assessment of pain and its potential impact on the functional status of athletes. The results showed that the most affected areas were the lower back (33.3%), ankles (23.3%), and shoulders (16.7%). More than 30% of probands reported that their pain had persisted for over a year, indicating a risk of chronic pain development. Despite experiencing pain, most pole vaulters did not miss training sessions, which may contribute to the long-term deterioration of their physical condition. The study confirmed that the biomechanical load in this discipline can lead to structural changes in the musculoskeletal system, highlighting the importance of prevention, proper training adjustments, and rehabilitation strategies to minimize the risk of musculoskeletal pain and injuries. Our findings can serve as a basis for further research in sports medicine, particularly in developing effective prevention programs and compensatory exercises for pole vaulters.

Keywords: pole vaulting, musculoskeletal pain, sports injuries, biomechanical load, chronic pain, sports medicine, Örebro Musculoskeletal Pain Questionnaire (ÖMPQ), prevention, rehabilitation, training adaptation

Long-term physical load and its impact on hematological parameters of endurance female athletes

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Abstract

Prolonged physical exertion represents a significant factor influencing physiological and biochemical processes in female athletes. Among the most responsive indicators of adaptation to sustained training are hematological parameters such as hemoglobin, reticulocytes, erythrocytes, erythropoietin, leukocytes, and platelets. Monitoring these markers is essential for evaluating health status, training adaptation, and recovery, as well as for interpreting the Athlete Biological Passport. The present study analyzed blood samples from a group of elite female endurance athletes across multiple testing sessions conducted during different phases of the menstrual cycle. Laboratory analyses were performed using standardized hematology and immunoassay methods. Statistical evaluation focused on deviations from reference values and on the calculation of indices reflecting erythropoietic activity. The results indicated variability in reticulocyte counts and erythropoietin levels among athletes engaged in endurance disciplines, while team sport athletes generally exhibited values within the expected physiological range. Hemoglobin concentrations remained relatively stable; however, the menstrual cycle was identified as an important factor modulating hematological fluctuations. Individual variability was observed in adaptive responses, without indications of abnormal hematological profiles. In conclusion, long-term physical load leads to measurable adaptive alterations in the hematological profile of female athletes, with the menstrual cycle acting as a key modulatory factor. These findings highlight the importance of continuous hematological monitoring as part of athlete management, performance optimization, and anti-doping programs.

Keywords: endurance athletes, hematological parameters, erythropoietin, menstrual cycle,

Tempo-controlled eccentrics in football: effects on mobility and performance

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Abstract

High-intensity actions such as sprints, accelerations, and direction changes impose strong neuromuscular demands in football. Limited lower-limb mobility and reduced force at longer muscle lengths often restrict performance and elevate injury risk, particularly in the posterior chain and ankle. Eccentric strength work with slow lengthening phases can improve tissue extensibility and strength through extended ranges while supporting explosive actions.

This study evaluated a six-week, once-weekly circuit emphasizing slow eccentrics and fast concentrics, integrated into team practice. The aim was to assess whether this minimal program could reduce sagittal-plane mobility deficits and improve sprint and jump performance in amateur male players. Senior club athletes completed pre- and post-tests including goniometric assessment of hip, knee, and ankle mobility, 10 m and 30 m sprints, and a standing long jump. The intervention, added to the warm-up, involved a nine-exercise circuit performed for several rounds with short transitions. Exercises included squat and hinge variants, unilateral leg work, and calf raises, executed fast concentrically and slow eccentrically (~3-4 s). Coaching emphasized proper alignment and lumbopelvic stability. Loads were self-selected to maintain control without excessive fatigue.

After six weeks, mobility improved across all joints, especially in posterior-chain extensibility and ankle dorsiflexion. The proportion of players classified as “restricted” decreased, while those with “adequate” mobility increased. These adaptations occurred without dedicated stretching, showing that low-volume eccentric work can enhance range of motion during the season. Performance also improved slightly: 10 m sprint times decreased and standing long-jump distances increased, reflecting better acceleration and horizontal power. Despite individual variability, overall trends indicated that a simple, low-dose eccentric program can yield measurable short-term benefits.

In conclusion, a six-week, once-weekly circuit combining slow eccentrics with fast concentrics effectively improved mobility and sprint performance in amateur footballers. Its simplicity, low

load, and compatibility with team training make it a practical in-season strategy for maintaining movement quality and explosive ability.

Keywords: eccentric training, mobility, sprint performance, football

Exercise and neurostimulation in the management of steatohepatitis and liver disease

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Abstract

Liver diseases, particularly nonalcoholic steatohepatitis (NASH), represent an increasing global health concern with significant metabolic and cardiovascular consequences, alongside pharmacological treatment, growing attention is being given to the role of physical activity and a holistic approach to patient care. both aerobic and resistance exercise play key roles in improving liver function, reducing fat accumulation, and enhancing quality of life. aerobic training improves fat oxidation, insulin sensitivity, and cardiovascular fitness, while resistance training helps preserve or rebuild muscle mass, which is crucial in preventing sarcopenia and disease progression. a combination of both exercise modalities appears to be the most effective intervention for nonalcoholic steatohepatitis. In recent years, interest has also turned toward the use of electromyostimulation techniques which may raise functional muscle strength and patients frailty.

Keywords: liver disease, frailty, rehabilitation

Funding

Funded by the EU NextGenerationEU through the Recovery and Resilience Plan for Slovakia under the project No. 09I03-03-V05-00009“.

The influence of archery on the musculoskeletal system from the perspective of physiotherapy

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Abstract

Archery is a technically demanding sport characterized by unilateral and repetitive strain, which can lead to muscle imbalances. The aim of this study was to analyze the influence of archery on the musculoskeletal system from a physiotherapy perspective, specifically focusing on muscle imbalances and comparing these asymmetries between archers and the general population. The research sample consisted of 30 archers and 30 persons from the general population. Selected diagnostic methods were used for assessment: muscle imbalance, postural stability using OhmBelt, tensile (pull) and compressive (push) strength during imitation shooting, grip strength, and selected gnostic functions. Furthermore, ranges of motion in selected segments, the presence of shortened muscles, and weight distribution on the lower limbs were measured. The theoretical part of the thesis also addressed the biomechanics and kinesiology of movement during shooting. The results showed that archers exhibit specific asymmetries, particularly in the upper limbs and trunk. A statistically significant difference ($p=0.007$) was found between the compared groups in the presence of shortened muscles, with archers having a statistically significantly higher occurrence of the observed shortened muscles compared to the control group. Archers also demonstrated a statistically significantly higher tensile strength of the right upper limb ($p=0.033$) compared to the control group. Differences in the activation of the deep stabilization system (HSS), grip strength, ranges of motion, and gnostic functions were not found to be statistically significant. The findings confirm the presence of muscle imbalances in archers, which may affect their performance and long-term health status. These results are considered useful for physiotherapists, coaches, and the athletes themselves in the prevention and compensation of muscle imbalances. Based on the data obtained, the thesis proposes recommendations to optimize the training process in order to minimize the risk of injuries and to ensure the long-term functionality of the musculoskeletal system.

Keywords: archery, muscle imbalances, musculoskeletal system, postural stability, physiotherapy

9. Sport international conference

Collection of abstracts

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Online version

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First edition

Published by Belianum. Matej Bel University Press

Banská Bystrica, 2025

ISBN 978-80-557-2287-0

EAN 978805572287-0

<https://doi.org/10.24040/2025.9788055722870>



ISBN 978-80-557-2287-0



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