10th ASM PDSKO
in conjunction with
2nd MISS 2025

PROCEEDINGS BOOK

The 10th Annual Scientific Meeting (ASM) of Indonesian Sports Medicine Association (ISMA) in conjunction with the 2nd Malaysian-Indonesian Sports Symposium (MISS)

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The Prime Plaza Sanur Hotel
Bali, October 30 - November 1, 2025

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Greetings from Chairman of Indonesian Sports Medicine Asssociation

As the chairman of Indonesian Sports Medicine Association (ISMA), I am so grateful that we are organising the 2025 Annual Scientific Meeting (ASM) in conjunction with the Malaysian-Indonesian Sports Symposium (MISS) in Bali from October 30 - November 1, 2025.

With the theme of "The Winning Team: Integrating Sports Medicine into Primary Care", ASM are aiming to re-affirm our role in building a healthier nation through our profession , which extend not only to the competitive athlete, but also to general population. Moreover, since Sports Medicine Specialists is still scarcely distributed through out the nation, itis imperative to integrate Sports Medicine knowledge in Primary Healthcare services.

On the other hand, MISS is focusing on one of the most common sports injury and musculoskeletal injury in the community, i.e. ankle sprain. Various aspects of ankle sprain, from epidemiology to the current update of its management will be discussed to improve the management of ankle sprain in the community.

Thus we sincerely hope this event will bring significant impact in improving the quality of the medical / sports professionals services for all the audience while enjoying the refreshing ambience of Bali, the Paradise Island.

Thank you for your participation and contribution in this event.

Warm regards,

DR. Dr. Rika Haryono, Sp.K.O., Subsp. ALK (K)

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Opening Speech from Chairperson of Annual Scientific Meeting 2025

Greetings,

We express our deepest gratitude to the God Almighty for granting us the opportunity to organize the Annual Scientific Meeting (Pertemuan Ilmiah Tahunan – PIT) of the Indonesian Sports Medicine Association (Perhimpunan Dokter Spesialis Kedokteran Olahraga – PDSKO).

This year's theme, "The Winning Team: Integrating Sports Medicine into Primary Care," highlights our commitment to ensuring the sports medicine can assist the primary care provider in their clinical practice. We believe that sports medicine should be accessible to all levels community—young and elderly individuals, competitive and recreational athletes, men and women, as well as those with or without underlying health conditions.

In addition, we are proud to announce that this year's scientific event will be held in conjunction with the Malaysian-Indonesian Sports Symposium, which will focus on the theme "Ankle Injury." This collaboration reflects our shared commitment to enhancing knowledge exchange and fostering regional cooperation in the field of sports medicine. By integrating expertise from both countries, we aim to strengthen the clinical approaches and rehabilitation strategies for ankle injuries, ensuring better outcomes for athletes and general population.

As medical professionals, we acknowledge the importance of sharing the latest research findings and clinical best practices to improve healthcare services. This event serves as a important platform for collaboration, bridging the gap between academics and practitioners, and ultimately contributing to the well-being of society.

On behalf of the organizing committee, I would like to extend my sincere appreciation to everyone who has contributed to this event. We are committed to delivering a high-quality and insightful seminar, and we apologize in advance for any shortcomings.

Thank you for your support, and we look forward to a successful and inspiring event.

dr. Muh. Ikhwan Zein, Sp.KO., Subsp.ALK (K)

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Committee Member

The 10th Annual Scientific Meeting (ASM) of Indonesian Sports Medicine Association (ISMA) in conjunction with the 2nd Malaysian-Indonesian Sports Symposium (MISS)
Bali, October 30 - November 1, 2025

Person in Charge	:	Dr. dr. Rika Haryono, Sp. K.O., Subsp. ALK (K)
Advisor	:	dr. Leny Pintowari, Sp.K.O., Subsp. APK (K)
		Prof. Dr. dr. Irfannuddin, Sp.K.O, M.Pd.Ked., Subsp. APK (K)
		Dr. dr. Nani Cahyani Sudarsono, Sp.K.O., Subsp. APK (K)
Committee Chair	:	dr. Muhammad Ikhwan Zein, Sp.K.O., Subsp. ALK (K)
Vice Chair	:	dr. Marco Ariono N, Sp.K.O
Secretary		dr. Elina Widiastuti, Sp.K.O
		dr. Siti Shalihah Suriadiredja, Sp.K.O
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Treasurer 2	:	dr. Anna Steven, Sp. K.O.
Program/Event Section Coordinator	:	dr. L. Grace Tumbelaka, Sp.K.O., Subsp. ALK (K)
Member	:	dr. Levina Azarine T, Sp.K.O
Member	:	dr. Inarota Laily, Sp.K.O., Subsp. APK (K)
Member	:	dr. Sophia Benedicta Hage, Sp.K.O., Subsp. APK (K)
Member	:	dr. Edrick Purnomo Putra, Sp.K.O
Scientific Section Coordinator	:	dr. Angelica Anggunadi, Sp.K.O., Subsp. ALK (K)
Member	:	Dr. dr. Susiana Candrawati, Sp.K.O., Subsp. APK (K)
Member	:	dr. Mokh. Rakhmad Abadi, Sp.K.O
Member	:	Dr. dr. Listya Tresnanti Mirtha, Sp.K.O., Subsp. APK (K), MARS
SKP (Accreditation) Section Coordinator	:	dr. Regina Varani, Sp.K.O
Member	:	dr. Anggia Prathama Nasution, Sp.K.O
Publication & Documentation Section Coordinator	:	dr. Alvin Wiharja, Sp.K.O
Member	:	dr. Muhammad Andeansah, Sp.K.O
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Member	:	dr. Eny Riangwati Tanzil, Sp.K.O., Subsp. APK (K)
Member	:	dr. Bernadette Laura, Sp.K.O
Accommodation Section Coordinator	:	dr. Ari Setyaningrum, Sp.K.O
Member	:	dr. Febianto Nurmansyach, Sp.K.O
Member	:	dr. Monica Harvriza, Sp.K.O

Schedule

The 10th Annual Scientific Meeting (ASM) of Indonesian Sports Medicine Association (ISMA) in conjunction with the 2nd Malaysian-Indonesian Sports Symposium (MISS)
Bali, October 30 - November 1, 2025

Day 1, October 30, 2025
Malaysian-Indonesian Sports Symposium (MISS) 2025
ANKLE INJURIES

07.00 – 08.00		Registration	Sie Registrasi
08.00 – 08.15		Opening by MC C singing lagu Indonesia Raya dan Negaraku	MC
08.15 – 08.30		Welcoming Speeches	PDSKO MASM IDI Bali
08.30 - 08.40		Opening Ceremony: Performance Pencak Silat	
08.40 – 08.50		Documentation C souvenirs presentation	Committee
08.50 – 09.10	Ankle Sprain: the facts and lessons	Epidemiology, Diagnosis and Long-term Complication of Ankle Sprain	Dr. Anthony, Sp.K.O
09.10 - 09.30		Conservative vs Operative management of Ankle Sprain: Lessons learned from Amsterdam UMC, The Netherlands	dr. Charles Apulta Meliala, Sp.OT (K)
09.30-09.45		Q & A	DR. Dr. Susiana Candrawati, Sp.K.O
09.45-10.00		Coffee Break	
10.00 – 10.20	Ankle Sprain Management	Early phase Ankle Sprain Management: what to do and when to start exercise therapy	Dr. Angelica Anggunadi, Sp.K.O., SubSp. ALK (K)
10.20 - 10.40		Evidence-based therapy for Ankle Sprain	Dr. Aparajitha A/P M.P. Krishnan
10.40 – 10.55		Q & A Session	Dr. Siti Shalihah, Sp.K.O
10.55 – 11.15	Ankle Sprain Management 2	Pain Management for acute and chronic ankle injuries	Dr. Ahmad Muttaqin 'Alim, Sp.An-TI, FIP, M.Sc, DM
11.15 – 11.35		Role of regenerative medicine in ankle injury	Dr. Sandy Qlintang, M.Biomed
11.35 – 11.50		Q & A Session	Dr. Levina Azarine, Sp.K.O
11.50 – 12.10		Closing C Photo Session	
12.10 – 12.30	LUNCH		
12.30 – 12.50	Lunch symposium	Footwear – one influential factor to ankle functionality	Dr. Muhammad Ikhwan Zein, Sp.K.O., SubSp. ALK(K)
12.50 – 13.00		Q & A Session	

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13.00 -14.30		WS.1. Kinesiotaping for lower extremity (Muhd Noorfaizalazrul bin Muhammad Azalai)	WS.2. USG-Guided diagnostic and injection of the ankle joint (Dr. Arshad Puji, Dr. Nik Haziman Wan Hamat)
14.30 – 14.45		Coffee break	
14.45 – 16.15		WS.3. Exercise-based preventive and rehabilitative program for Ankle Sprain (Ftr. I Made Buda Kurniantara, S.Kes, M.Fis)	

Day 2, October 31, 2025
Indonesian Sports Medicine Association Annual Scientific Meeting (ASM) 2025
"The Winning Team: Integrating Sports Medicine into Primary Care"

TIME	THEME	TOPIC	PIC/SPEAKER	Moderator*
07:00 - 08:00	Registration		Committee	
08.00 – 08.30	Pitch Poster Presentation 1			
08.30 – 09.00	Oral Presentation 1			
09.00 – 09.10		Opening Singing Indonesia Raya Mars PDSKO	MC	
09.10 – 09.25		Welcoming Speeches	Governor of Bali, Chairman of Organizing Committee, Chairmanof PDSKO	
09.25 – 09.40		Documentation C souvenirs presentation	Committee	
09.40 – 10.00	Coffee Break + POSTER PRESENTATION			
10.00 – 10.15	Keynote speech 1	Sports cardiology in multidisciplinary athlete care	Harald T. Jorstad, MD. PhD	
10.15 – 10.25		Q & A session		Dr. Anita Suryani, Sp.K.O.
10.25 – 10.30	Morning exercise			
10.30 – 10.45	Exercise as Medicine	Low back pain: acute soft tissue injury vs nerve impingement	DR. Dr. Rika Haryono, Sp.K.O, SubSp.ALK	
10.45 – 11.00		Prescribing High Intensity Interval Training for Diabetic Patients	DR. Dr. Nani Cahyani Sudarsono, Sp.K.O., SubSp.APK	
11.00 - 11.15		Q & A Session		Dr. Marco Ariono, Sp.K.O
1.15 – 11.30	Sport medicine in community	Heat stroke prevention and management	Dr. Wawan Budisusilo, Sp.K.O	
11.30 – 11.45		Sports Tourism in Indonesia: Current policy and development	Dr. Leny Pintowari, Sp.K.O	

11.45 – 12.00		Q & A Session		Dr. Ade Jeanne Tobing, Sp.K.O
12.00 – 13.15	Lunch + POSTER PRESENTATION			
13.15 – 14.15	Oral Presentation 2			
14.15 – 14.30	Medical Management in Sports	Organizing Medical Services in Sports Events	Dr. Mokh. Rakhmad Abadi, Sp.K.O.	
14.30 – 14.45		Shoulder injury in sports: current epidemiology	Dr. Erica Kholinne, Sp.OT (K), Ph.D	
14.45 – 15.00		Return to Sports with Cardiac Disease: First Aid or First Place?	Harald T. Jorstad, MD. PhD	
15.00– 15.15		Q & A Session		Dr. Ratna Annisa Noor Fitria, Sp.K.O.
15.15 – 15.20	Mid-day exercise			
15.20 – 15.50	Oral Presentation 3			
15.50 – 16.20	Pitch Poster presentation 2			
16.20 – 16.40	Coffee Break + POSTER PRESENTATION 2			
16.40 – 16.55	Beyond the theme	Traditional Herbal Medicine for Athlete Recovery: From Local Wisdom to Scientific Evidence	Prof. Dr. dr. I Made Jawi., M.Kes	
16.55 – 17.10		Regenerative medicine for musculoskeletal injuries	dr. I Gusti Ngurah Putra Eka Santhosa, M.Fis, AIFO-K	
17.10 – 17.25		Q & A Session		Dr. Zeth Boroh, Sp.K.O
17.25 – 18.00	Closing	Evening exercise		
		Quiz		
		Abstract winner announcement		
		Appreciation to the Sponsors		

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Day 3, November 1, 2025
WORKSHOP ASM 2025

TIME	ROOM A	
	TOPIC	SPEAKER
08:00 - 10.00	Physical therapy modalities in sports injury the use of laser	Salvatore Germano, Dr. Grace Tumbelaka, Sp.K.O., Subsp.ALK
10.15 - 12.15	Injection Technique for Shoulder Injury Management	Dr. I Ketut Sumadi, M.Biomed, Sp.OT, Dr. Elina W. Sp.K.O.
12.15 - 13.00	Lunch	
13.00-15.00	Basic exercise prescription for primary care physician (for GP)	DR. Dr. Listya Tresnanti Mirtha, Sp.K.O., SubSp.APK, MARS, Dr. Edrick Purnomo Putra, Sp.K.O

TIME	ROOM B	
	TOPIC	SPEAKER
08:00 - 10.00	Sports injury First aid for primary health care (musculoskeletal and head injury)	Dr. Risky Dwi Rahayu, Sp.K.O., Dr. Muhammad Ikhwan Zein, Sp.K.O., Subsp.ALK
10.15 - 12.15	Recovery strategies in athletes	Dr. Sophia B. Hage, Sp.K.O, SubSp. APK (K) Dr. Taufan Favian., Sp.K.O.
12.15 - 13.00	Lunch	
13.00 – 15.00	Challenging cases in Sports Cardiology: From primary care to Advanced cardiology	Harald T. Jorstad, MD. PhD., Dr. Inarota Laily, Sp.K.O., Dr. Putra Rizki, Sp.K.O.

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SPEAKER

Evidence-based strategies for ankle sprain rehabilitation

Aparajitha Krishnan

Ankle sprains, particularly lateral ligament injuries, are common and require thorough management to prevent chronic instability and recurrent injury. Clinically, this presentation aligns with established guidelines that recommend an initial phase focusing on protection, pain and edema control, and avoiding activities that stress the injured ligaments.

Early use of manual therapy, cryotherapy, and functional supports like taping or braces is emphasized. Gradual progression into range of motion (ROM) exercises, strength training, and proprioceptive (balance) exercises follows. Rehabilitation is tailored to the patient's healing timeline, functionality, and goals, with criteria for advancing phases based on pain, swelling, strength, and ROM gains.

From an evidence perspective, multiple clinical practice guidelines advocate for: Use of Ottawa ankle rules for fracture exclusion, Early mobilization and ambulation, Short-term NSAIDs for pain and inflammation, Functional supports rather than prolonged immobilization, Manual therapy for early symptom relief, Balance and strengthening exercises to reduce recurrence risk, Avoiding passive electro-physical modalities that have shown limited benefit, A criterion-based, phased approach to rehabilitation adapted by clinicians to individual progress.

This approach integrates best-available scientific evidence and expert consensus to optimize functional recovery, reduce reinjury risk, and safely return patients to high activity or sports participation, emphasizing patient-specific modulation of therapy phases based on clinical response and goals. Thus, this abstract encompasses both clinical recommendations for treating ankle sprains through progressive functional rehabilitation and the robust research evidence supporting these strategies.

Keywords: ankle sprain, rehabilitation, clinical practice guidelines

Role of regenerative medicine in ankle injury

Sandy Qlintang M.Biomed

Ankle injuries, particularly ligament sprains and osteochondral lesions, represent a significant clinical challenge due to the joint's complex biomechanics and poor intrinsic healing capacity. Conventional treatments often provide symptomatic relief but fail to address the underlying tissue degeneration, leading to chronic pain, functional impairment, and a high risk of post-traumatic osteoarthritis. Regenerative medicine offers a paradigm shift by targeting the underlying pathophysiology. This approach leverages stem cells from various sources, with growing interest in umbilical cord-derived mesenchymal stem cells (UC-MSCs). UC-MSCs offer advantages such as high proliferative capacity, low immunogenicity, and avoidance of donor-site morbidity. Their therapeutic mechanism is predominantly paracrine, mediated by a secretome of growth factors, cytokines, and extracellular vesicles. This bioactive cargo orchestrates healing by modulating inflammation, promoting angiogenesis, and recruiting endogenous progenitor cells. Compared to bone marrow or adipose-derived MSCs, UC-MSCs may exhibit a more potent and primitive secretome, potentially enhancing regenerative outcomes. In ankle injuries, intra-articular administration of these cells or their purified secretome/exosomes creates a pro-regenerative microenvironment. This stimulates the synthesis of type II collagen and proteoglycans in cartilage and improves the tensile strength and organization of repaired ligaments. Preclinical and clinical evidence indicates that such treatments can reduce pain, improve function, and promote structural restoration of damaged tissues. By harnessing the potent paracrine actions of UC-MSCs and other stem cell sources, regenerative medicine presents a promising therapeutic strategy to achieve biological healing and alter the progressive.

Keywords: ankle injuries, paracrine action, regenerative medicine, UC-MSCS

Footwear: One influential factor to ankle stability

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Ankle instability remains a prevalent issue in sports medicine area. This injury contributing to recurrent sprains, impaired performance, and long-term joint dysfunction. Intrinsic factors such as proprioceptive, neuromuscular control, and ligamentous integrity are well recognized, but footwear often become underestimated modifiable extrinsic factor influencing ankle stability. Therefore, individualized footwear prescription should consider sport-specific demands, playing surface, and foot morphology.

This presentation aims to explain the association between biomechanics and footwear design to the ankle joint stability, emphasizing both preventive and performance-related perspectives. Understanding the role of footwear in ankle stability is important not only for clinicians but also for athletes, coaches, and the designers. We hope this presentation will improve insights into the current evidence and recommendations for footwear selection, and implications for ankle injury prevention strategies.

Keywords: ankle, footwear, injury prevention, stability.

Kinesio tape for lower extremities

Muhd Noorfaizalazrul bin Muhammad Azalai

Background: Kinesiotaping is increasingly utilized in sports medicine and physiotherapy as a supportive intervention for high-performance athletes.

Unlike rigid taping, it provides dynamic stabilization while preserving range of motion, which is essential for the functional demands of the lower limb in elite sport. This abstract outlines the techniques and purposes of kinesiotaping applied to the lower extremities in high-performance athletes, with emphasis on its clinical and performance-related benefits.

Methods: Kinesiotaping techniques are adapted to specific therapeutic goals. Facilitation techniques are employed to enhance muscle activation (e.g., quadriceps, gastrocnemius) for explosive actions, while inhibitory applications assist in reducing hyperactivity or fatigue in overused muscles. For joint instability, such as knee or ankle ligament insufficiency, kinesiotape provides proprioceptive input and a sense of mechanical support without restricting agility. Additionally, it is frequently applied for soft tissue conditions including hamstring strains, patellar tracking issues, and iliotibial band tightness. Its potential to improve local circulation and lymphatic drainage supports recovery following intense training or competition.

Results: Evidence indicates mixed outcomes regarding long-term clinical efficacy. However, short-term benefits are reported in pain reduction, proprioceptive enhancement, functional performance, and psychological readiness—factors critical in high-performance environments. Athletes often report improved confidence and perceived stability, which may aid in optimizing return-to-play decisions.

Conclusion: Kinesiotaping for the lower limb should be viewed as a complementary intervention within a comprehensive rehabilitation and performance program. For healthcare providers, applying kinesiotape judiciously can support athletic performance, assist recovery, and enhance confidence, though it should not replace evidence-based rehabilitation strategies.

Keywords: high-performance athletes, kinesiotaping, lower extremities, proprioception

Exercise-based preventive and rehabilitative program for ankle sprain

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Every physical activity that relies on motor abilities such as jumping, running, or sudden changes in direction increases the risk of injury. One of the most common injuries, particularly in the lower extremities, is an ankle sprain. This injury results from excessive stretching or tearing of the ligaments beyond their normal limit. Although it frequently occurs among athletes, an ankle sprain can significantly impair overall performance due to disrupted mechanoreceptors caused by swelling, leading to decreased proprioception and impaired postural control during physical activity. Numerous studies on ankle sprains have provided scientific evidence for developing more effective and evidence-based management protocols. This study uses a literature review approach by analyzing previous national and international research related to ankle injuries, rehabilitation, and prevention. The results indicate that initial treatment with the RICE principle (Rest, Ice, Compression, Elevation) is effective during the acute phase. Following this phase, rehabilitation programs involving proprioceptive and ankle-strengthening exercises are essential to improve performance and prevent recurrent injuries.

Keywords: ankle sprain, ankle injury, evidence-based, proprioception, rehabilitation

Low back pain: Acute soft tissue injury vs nerve impingement

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Low back pain (LBP) is a common musculoskeletal complaint, often associated with soft tissue injury and, in some cases, nerve impingement. LBP describes pain between the lower edge of the ribs and the buttocks. It can cause acute, sub-acute, or chronic manifestations. Chronic lower back pain is more often caused by mechanical pressure, such as a herniated disc. The type of pain has been confirmed as radiculopathy. These conditions significantly impair functional capacity and quality of life, leading to a substantial healthcare burden worldwide. The WHO reports that LBP affects nearly 619 million people worldwide, and cases are expected to increase to 843 million by 2050 due to population growth and aging. Evidence suggests that physical activity and structured exercise play a central role in both prevention and management. Physical exercise is known to improve several indicators of muscle function, such as strength, endurance, and flexibility. It also increases joint range of motion (ROM) and improves postural control. This exercise therapy can reduce soft tissue injury and the recurrence of LBP. Moreover, specific exercise programs can alleviate symptoms of nerve impingement by improving mobility, promoting neuromuscular adaptation, and reducing inflammation. Integrating physical activity and exercise into standard care provides a cost-effective, non-invasive approach to improving patient outcomes and promoting spinal health. Therefore, exercise and related sports such as core stability, aquatic exercise, and yoga can be considered the cornerstone of conservative management for low back pain and related musculoskeletal conditions. In the management of lumbar pain, most cases can be effectively resolved through conservative approaches, such as physical exercise in combination with analgesic therapy. However, ongoing monitoring and evaluation remain essential, and imaging or additional diagnostic tests should be performed when clinically indicated.

Keywords: Low back pain, acute soft tissue injury, nerve impingement, physical activity, exercises

Prescribing high intensity interval training for diabetic patients

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The idea of beneficial exercise should thoroughly consider key aspects, including efficacy, effectiveness, dosage, mechanisms of action, and potential adverse events. For individuals with diabetes, the concept of CRIPE (Continuous, Rhythmical, Interval, Progressive, and Endurance) in exercise programming is also crucial for ensuring effective blood glucose management.

High-Intensity Interval Training (HIIT) is a popular exercise method believed to provide similar health benefits in less time. It is characterised by repeated bouts of relatively intense exercise interspersed with recovery periods. A recent review

supports that HIIT enhances cardiorespiratory fitness more than other forms of exercise, such as moderate-intensity continuous training (MICT). However, variations in HIIT regimens, including different exercise types and intensities, can make comparing programmes across populations difficult.
Recent evidence confirms that HIIT is an effective strategy for managing type 2 diabetes. It improves glycaemic control, insulin sensitivity, and cardiovascular health, often delivering similar or better results than moderate-intensity continuous training (MICT) within a shorter period. HIIT can incorporate various exercise modes and intensities, which may increase enjoyment. This could lead to better exercise adherence and longer-lasting health benefits. However, because HIIT is more physically demanding, caution should be exercised when implementing it. HIIT can be a suitable alternative, provided the patient passes screening for exercise tolerance during HIIT sessions. Monitoring blood glucose levels before and after exercise will reassure the patient and enhance safety, especially at the start of the programme. Ultimately, as physicians, we should consistently integrate exercise into comprehensive diabetes management.
Keywords: diabetes mellitus, exercise, HIIT

Sport-specific medical service organization in mass gathering events: Challenges, standardization, and the critical role of stakeholder negotiation

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Background: The organization of medical services in sports events represents a complex intersection of emergency medicine, event management, and sport-specific safety protocols. Despite growing participation in mass sporting events worldwide, significant gaps persist in the standardization and implementation of medical preparedness plans, particularly in developing countries. This narrative review examines the challenges in organizing medical services for sports events, explores the sport-specific nature of medical planning requirements, and emphasizes the critical role of negotiation between medical directors and event organizers in ensuring athlete and spectator safety.
Methods: A comprehensive literature review was conducted using established databases, focusing on peer-reviewed articles published in Scopus Q1 and Q2 journals addressing medical services organization, emergency preparedness, and mass gathering medicine in sports contexts.
Results: Evidence demonstrates that medical planning cannot be generalized across different sports due to distinct injury patterns, environmental considerations, and infrastructure requirements inherent to each discipline. Successful medical service delivery requires sport-specific protocols, adequate resource allocation, trained personnel, and collaborative relationships between medical teams and organizing committees. Critical gaps in medical documentation and preparedness persist in many regions, including Indonesia, where systematic data on sports-related casualties and medical encounters remain inadequately documented.
Conclusion: Effective medical service organization in sports events demands recognition of sport-specific requirements, evidence-based planning, and robust negotiation between medical professionals and event stakeholders. Future research should focus on developing region-specific guidelines and improving medical surveillance systems in underserved areas.
Keywords: emergency medical services, mass gathering events, medical event planning, medical surveillance, preparedness planning, sports medicine, sport-specific protocols, stakeholder negotiation.

Shoulder injury in sports: Current epidemiology

Erica Kholinne

In sports medicine, shoulder injuries are a major concern due to their high prevalence and significant impact on athletic performance. They rank among the most common sports-related injuries and often lead to substantial time lost from training and competition. The shoulder's extensive mobility and complex anatomy make it particularly susceptible to damage from both acute trauma and chronic overuse. Acute shoulder injuries—such as dislocations, labral tears, and rotator cuff tears—are frequently seen in contact sports. In contrast, chronic overuse injuries, including rotator cuff tendinopathy, internal impingement, and SLAP lesions, are common among athletes involved in repetitive overhead activities.
Several key risk factors for shoulder injury have been identified, including repetitive overhead motions, muscle imbalances, scapular dyskinesis, and inadequate rehabilitation following prior injuries. Early and accurate diagnosis is essential for effective management and is best achieved through thorough clinical evaluation supplemented by appropriate imaging. Management strategies range from structured rehabilitation programs, focusing on restoring muscle balance, scapular control, and sport-specific training, to surgical interventions reserved for severe or refractory cases. Preventive measures remain fundamental; evidence-based programs incorporating workload monitoring, targeted strengthening, and biomechanical corrections have been shown to reduce recurrence rates and preserve long-term athletic performance. Finally, given the increasing demands of modern sport, ongoing efforts to optimize return-to-play protocols and explore biological adjuncts for tendon and labral healing represent promising avenues for future advancement in shoulder injury management.
Keywords: prevention, rehabilitation, return to play, shoulder injury, sports medicine.

Herbal medicine for athlete recovery: From local wisdom to scientific evidence

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Physical activity requires a proper recovery period to improve performance and maintain health. Athletes sometimes struggle to achieve this recovery period, necessitating assistance or medications to accelerate recovery. The use of natural remedies has been used since the dawn of humanity, including in efforts to accelerate recovery. Rapid and effective recovery allows athletes to maintain training intensity and prevent tissue injury, which is largely caused by oxidative stress and inflammatory responses. Conventional pharmacological approaches often raise concerns about long-term side effects and compliance with anti-doping regulations.
Learning from past experiences before the development of conventional medicine, efforts to accelerate recovery have been made to utilize natural

remedies or herbal remedies. It turns out that bioactive compounds are found in plants, such as curcumin from turmeric, quercetin from onions and apples, anthocyanins from purple sweet potato tubers, and plant extracts rich in polyphenols or flavonoids. The main mechanisms of action of these secondary metabolites include: 1) Strong antioxidant properties to neutralize reactive oxygen species (ROS) that increase during physical activity and reduce oxidative damage to muscle cells; 2) The ability to modulate anti-inflammatory pathways (such as inhibition of the NF-κB pathway) that reduce systemic and local inflammation; and 3) A role in facilitating glycogen resynthesis and muscle protein repair, thereby improving stamina.

This review discusses how natural ingredient supplementation significantly reduces oxidative stress, reduces inflammation, and accelerates recovery. Natural ingredients offer a promising, safe alternative for sports recovery management, supporting sustained and optimal athletic performance.

Keywords: anti-inflammatory, antioxidant, natural ingredients, sports recovery.

Regenerative therapy for musculoskeletal injury: Exploring the intelligence of platelet-rich plasma, stem cells, and secretome

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Musculoskeletal injuries such as tendon tears, ligament ruptures, and cartilage degeneration are among the leading causes of chronic functional impairment worldwide. The limited intrinsic regenerative capacity of these tissues renders conventional treatments largely symptomatic, often failing to restore true structural integrity or biomechanical function. Within this context, regenerative medicine emerges as a new paradigm—one that harmonizes cellular biology, medical technology, and the innate intelligence of the human body.

Modern regenerative approaches emphasize three primary pillars: platelet-rich plasma (PRP), stem cell therapy, and secretome therapy. These modalities not only represent the frontier of biotechnology but also embody the belief that the body possesses an intrinsic capacity for self-repair when supported by the right biological environment.

PRP functions by releasing growth factors such as platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), and transforming growth factor-beta (TGF-β), which stimulate angiogenesis, fibroblast proliferation, and collagen maturation. This synergistic effect accelerates soft tissue healing and mitigates inflammation in tendinopathy, ligament injuries, and early-stage osteoarthritis. Derived from the patient's own blood, PRP remains a safe and minimally immunogenic intervention that is both accessible and clinically versatile.

Stem cell therapy, particularly using mesenchymal stem cells (MSCs), demonstrates remarkable regenerative potential through two main mechanisms: direct differentiation into osteogenic, chondrogenic, and tenogenic lineages; and paracrine signaling that suppresses inflammation while activating local regenerative cascades. Translational studies show that MSCs enhance cartilage thickness, improve ligament integrity, and significantly reduce pain. Furthermore, MSCs act as natural "bio-factories" that produce secretomes—active molecular messengers that mediate cellular communication and accelerate tissue healing.

The secretome, composed of extracellular vesicles, exosomes, cytokines, and microRNAs, represents the latest evolution in cell-free regenerative therapy. Rather than relying on intact cells, this approach utilizes the biological language through which cells communicate to initiate healing. The secretome transmits signals that restore tissue homeostasis, regulate inflammation, and stimulate local cell proliferation without the tumorigenic or immune risks associated with whole-cell therapies. Recent studies reveal that MSC-derived exosomes enhance muscle and bone repair and improve tendon-to-bone integration with superior tissue quality.

Clinically, the integration of PRP, stem cells, and secretome offers new hope for patients suffering from musculoskeletal injuries that would otherwise lead to long-term disability. Together, these regenerative approaches consistently demonstrate efficacy in reducing pain, accelerating recovery, and restoring functional mobility. Yet, challenges persist in protocol standardization, dosage optimization, and ethical regulation of cell-based therapies.

Beyond technological innovation, regenerative medicine signals a return to the philosophical essence of healing—to assist the body in recognizing and activating its own innate intelligence. Rooted in empathy and scientific integration, every renewed cell becomes a reflection of life's continuous transformation. The future of medicine, therefore, is not merely about repairing damaged tissues but about restoring balance among biology, consciousness, and the body's inherent capacity for healing.

Keywords: musculoskeletal injuries, platelet-rich plasma, regenerative medicine, secretome, stem cells

Management of sports injuries with laser physiotherapy modality

Grace Tumbelaka

Sports injury is a common problem experienced by athletes and physically active individuals. Quick and appropriate management is necessary to accelerate the healing process and prevent further complications.

To support the healing process of injuries, effective and safe physiotherapy modalities are needed to speed up the rehabilitation process and restore optimal function for athletes. One physiotherapy modality currently gaining popularity is the use of therapeutic laser light.

Laser therapy, including both Low-Level Laser Therapy (LLLT) and High-Intensity Laser Therapy (HILT), has been widely used in clinical practice to support the healing of injured tissue. Research and clinical evidence show that LLLT has anti-inflammatory, analgesic, and biostimulative effects, which play a role in increasing microcirculation, accelerating cell regeneration, and stimulating collagen and ATP synthesis in the injured area. Meanwhile, HILT uses higher energy for deeper penetration and the treatment of more complex conditions, also requiring a shorter treatment time.

The application of laser therapy has been used for various types of sports injuries such as tendinopathy, muscle strain, ligament sprain, and cases of delayed onset muscle soreness (DOMS). This therapy is non-invasive and relatively safe when used according to the correct energy dose and wavelength protocol, thus making it an integral part of comprehensive sports injury management to accelerate recovery and sustainably support athletic performance.

Keywords: high-intensity laser therapy, laser therapy, low-level laser therapy, sports injuries

Ultrasound guided shoulder injury injection

I Ketut Sumadi

Ultrasound-guided shoulder injections allow for precise injections and provide real-time imaging. Ultrasound also reduces x-ray exposure for both the patient and the examiner. The probe used is a High Frequency Linear Probe where the examiner can be in front of or behind the patient, and directly facing the screen. The most common shoulder injections are injections into the subacromion bursa, posterior glenohumeral joint, biceps tendon, and AC joint. Subacromion shoulder injection is performed using inplane method, from greater tuburosity of the humerus towards the medial side. Posterior glenohumeral shoulder injection, performed using the inplane method with the humeral head and glenoid as landmarks, the needle can be injected medially or laterally. Biceps tendon injections can be performed in-plane or out-of-plane, medially, laterally, proximally, or distally. The greater and lesser tuburosities of the humerus can be used as landmarks to locate the biceps tendon. AC joint injection can be found by tracing the clavicle bone laterally to the acromion. Injection can be performed using in-plane and out-plane methods. After the target area is found, the necessary medication is injected under ultrasound guidance.

Keywords: inplane, outplane, probe, shoulder injection, ultrasound guided

Recovery strategies in elite athletes

Taufan Favian Reyhan, Sophia Hage

Background: Elite athletes are subjected to continuous physical and psychological stressors during training and competition. Cumulative mechanical, metabolic, and hormonal stresses can lead to fatigue, impaired performance, and increased risk of injury if recovery is inadequate. As modern athletes face congested match schedules and high training demands, recovery has become an essential component of performance optimization. The objective of the study was to evaluate and synthesize evidence-based recovery strategies for elite athletes, emphasizing the interaction between training stress, recovery, and adaptation to sustain performance and prevent overtraining.

Methods: A narrative review was conducted integrating physiological principles of Hans Selye's General Adaptation Syndrome (1951) with current literature on recovery science. Recovery domains including sleep, nutrition, and hydration were reviewed alongside specific modalities such as cooling, heating, compression, and range-of-motion exercises. Each technique was analyzed for its physiological mechanism, timing, and practical application within training periodization and competition schedules.

Results: Recovery represents an active, structured process linking physiological stress to adaptation. Cooling methods, particularly cold-water immersion, are effective in reducing short-term soreness and inflammation but may attenuate long-term strength gains if used excessively. Heating interventions enhance circulation, nutrient delivery, and readiness for subsequent sessions. Compression aids venous return, decreases muscle swelling, and lowers perceived fatigue. Range-of-motion activities—stretching and foam rolling—improve flexibility and psychological readiness though their direct effect on performance recovery is limited. Integration of individualized recovery plans within congested schedules supports consistent performance and reduces fatigue accumulation.

Conclusion: Recovery is a deliberate and personalized strategy essential for sustaining elite performance. Applying recovery techniques according to physiological stress type and training phase promotes optimal adaptation and injury prevention. Periodized recovery planning is as vital as training periodization itself. As emphasized, "The best athletes don't train harder—they recover smarter."

Keywords: adaptation, elite athletes, fatigue, performance optimization, periodization, recovery.

ORAL PRESENTER

VO_2Max prediction in adolescents of Sekolah Rakyat Kendari using 1000-meter run, body mass index, and physical activity

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Background: VO_2Max is a critical measure of cardiorespiratory fitness and an essential indicator of aerobic health in adolescents. Despite its importance, there is limited research in Indonesia, particularly in Kendari that developing predictive models that estimate VO_2Max using simple, accessible physical fitness measures. This study addresses that gap by utilizing data collected during a new government free health screening program (cek kesehatan gratis), which provided an opportunity to gather field-based data on school-aged adolescents. To our knowledge, this is the first study in Kendari to develop a localized VO_2Max prediction model based on such an initiative, highlighting its potential for public health applications.

Methods: A cross-sectional analytic study was conducted involving 50 adolescents aged 12–14 years from SMP Sekolah Rakyat in Kendari. Participants were recruited from a community health screening program run by Puskesmas Jati Raya. Data collected included 1000-meter run time, Body Mass Index (BMI), physical activity level, hemoglobin concentration (Hb), and gender. VO_2Max was estimated using a regression-based model derived from these variables. Statistical analysis included bivariate correlation tests (Spearman, Mann-Whitney U), followed by multiple linear regression. Model validity was evaluated using Adjusted R^2, Root Mean Square Error (RMSE), residual normality, and multicollinearity diagnostics.

Results: The mean of VO_2Max was 48.67 ± 5.4 mL/kg/min. Significant bivariate correlations were found between VO_2Max and BMI ($p=0.035$), 1000-meter run time ($p<0.001$), physical activity ($p<0.001$), and gender ($p=0.036$). Hemoglobin concentration showed no significant association ($p=0.383$). In multivariate analysis, only 1000-meter run time and BMI remained significant predictors. The final model equation was: VO_2Max (mL/kg/min) $= 84.815 - (0.452 \times \text{BMI}) - (0.081 \times \text{1000m run time in seconds})$. This model showed strong predictive performance (Adjusted $R^2 = 0.914$; RMSE $= 1.59$), and met all key assumptions.

Conclusion: This study developed a statistically robust and practical model to predict VO_2Max in adolescents using BMI and 1000-meter run time. The use of data from a routine Puskesmas health screening enhances the model's real-world applicability. To our knowledge, this is the first VO_2Max prediction model developed using health screening data in Kendari, supporting its potential use in community-based adolescent fitness monitoring and early prevention strategies.

Keywords: 1000-meter run, adolescents, BMI, cardiorespiratory fitness, physical activity, VO_2Max.

Post arthroscopic anterior cruciate ligament reconstruction with hamstring autograft in non-athlete young adult: A case report

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Anterior Cruciate Ligament (ACL) is one of the ligaments present in the knee and serves as a stabilizer of the anterior translation of the femur bone. The incidence of ACL injuries was the highest in males, aged 17-25 years. Rupture of ACL is a serious knee injury that affects mainly physically active young people. Increasing attention has been devoted to the assessment of hamstring graft preparation for Arthroscopic ACLR. Graft fixation systems allowing a solid fixation and making the surgical reconstructive procedure easy, reproducible and shown good clinical result.

A 20-y. o male comes to orthopaedic clinic complaining of pain on his right knee for 3 months after got hit while playing football. He did RICE procedure soon after the injury and went to physiotherapist but the pain keep continues and knee get swollen if he stands for long time by resting on the injured leg. We did MRI and found tear in ACL and fluid collection in supra and infrapatellar bursae. We schedule for ACLR using the hamstring autograft (HS) 1 month after visit. The result after surgery was excellent. He can do sit mobilisation at day 1 after surgery with minimal pain. He starts doing straight leg raise and heel slide exercise from day 1 after surgery. At day 2 until day 7 after surgery he can do range of motion (ROM) of knee up to 90-degree, partial weight bearing with crutches but sometimes he feels cramps on his right calf. The rest of it he doesn't feel any complains.

Historically, gold standard treatment of complete rupture of the ACL is Bone-Patellar-Tendon-Bone (BPTB) autograft. Some studies have shown that BPTB autograft had the advantage of appropriate size, high durability, and higher incidence of return to sport activity. However, many patients have complained about donor site diseases, such as anterior knee pain, kneeling pain, and extension loss. Nowadays, HS is one of the most commonly used grafts for ACLR. We decide to use three strand hamstring braid technique and use of gracilis tendon. The advantage with HS graft is that there is no risk of fracture of patella/tibial tuberosity, avulsion, kneeling pain minimizing donor site morbidity. ACLR generally leads to greater knee stability and potentially better functional outcomes for young active adult. Conservative can equally effective especially with less physically demanding lifestyle.

Keyword: ACLR, HS, non-athlete, outcome

Relationship between weightlifting training and stress levels among young adult weightlifters

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Background: Globally, stress-related disorders remain a major public health concern, particularly among young adults facing academic, professional, and social pressures. In Indonesia, stress prevalence in this demographic is rising, yet evidence-based, non-pharmacological strategies are still underused. Resistance training, particularly weightlifting, is known for its physical benefits and has gained attention for potentially reducing stress through neuroendocrine pathways. It may regulate stress responses by modulating the hypothalamic–pituitary–adrenal (HPA) axis and increasing the release of endorphins and brain-derived neurotrophic factor (BDNF). However, research directly linking structured weightlifting to perceived stress levels in young adults remains limited. This study aims to explore this association to inform practical interventions for enhancing mental well-being among young adults, a population particularly vulnerable to stress-related disorders.
Methods: This study employed an observational analytic cross-sectional design involving male young adult weightlifters aged 18 to 25 years residing in Jakarta. Training behaviours were assessed using the Muscle-Strengthening Exercise Questionnaire Short Form (MSEQ-Short), while stress levels were measured using the Perceived Stress Scale (PSS-14). Anthropometric parameters, including Body Mass Index (BMI), skeletal muscle mass, and body fat percentage, were measured using the Omron HBF 375 Karada Scan. Data were analysed using the Spearman rank correlation for training variables and Pearson's correlation for anthropometric parameters, with a significance level of $p \leq 0.05$. Ethical approval was obtained from the Ethics Committee, Faculty of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia (No: 24/04/KEP-FKIKUAJ/2025).
Results: A total of 88 participants were included. On average, participants trained 3.70 ± 1.18 times per week, for 67.3 ± 33.55 minutes per session, with an intensity of 6.72 ± 1.60 on the RPE scale. The mean PSS-14 score was 23.88 ± 7.48, indicating a moderate stress level. No significant correlation was found between training frequency ($r = -0.033$, $p = 0.760$), duration ($r = -0.078$, $p = 0.472$), or intensity ($r = -0.136$, $p = 0.205$) and perceived stress. Although all three coefficients were negative, indicating a weak inverse direction, these relationships were not statistically meaningful. Additionally, a weak but statistically significant positive association was found between stress levels and fat mass ($p = 0.037$), while no significant associations were observed with muscle mass or BMI.
Conclusions: Although no statistically significant associations were found between resistance training variables and perceived stress, the weak inverse trends suggest a potential protective effect of regular training. These findings underscore the need for longitudinal and interventional studies to clarify causal pathways and optimize resistance training as a non-pharmacological approach for stress management in young adults.
Keywords: perceived stress, strength training, weightlifting, young adults

The runner's burden: Epidemiological trends and anatomical distribution of lower extremity injuries in recreational runners

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Background: The increasing popularity of recreational running in Indonesia has been accompanied by a rise in running-related musculoskeletal injuries. However, regional epidemiological data describing the clinical burden, anatomical distribution, and seasonal variation of such injuries remain limited. This study aimed to quantify and characterize the incidence, anatomical localization, and temporal trends of lower extremity injuries among recreational runners over a 12-month period in a high-volume sports medicine setting.
Methods: A retrospective cohort analysis was performed on 297 recreational runners presenting with lower limb complaints between July 2024 and July 2025. Standardized clinical intake records were reviewed to extract demographic data, injury site, and clinical diagnosis. Injuries were anatomically categorized, and descriptive statistics were used to evaluate injury frequency, distribution, and proportion relative to overall musculoskeletal presentations.
Results: Running-related lower extremity injuries accounted for 29.3% of all musculoskeletal complaints. The knee was the most frequently affected region (32.0%), followed by the cruris (16.5%), foot (13.8%), and ankle (9.1%). Overuse pathologies comprised ≥95% of cases, with common diagnoses including patellofemoral pain syndrome, medial tibial stress syndrome, plantar fasciitis, and achilles tendinopathy. The mean age of injured runners was 37.2 ± 9.8 years, with 57.5% aged ≥35 years. Male runners comprised 57.5% of cases. Peaks in injury incidence were observed in March–May and October, aligning with local competitive events.
Conclusion: This surveillance study reveals a high burden of overuse-related lower extremity injuries in recreational runners, predominantly affecting the knee and cruris. The seasonal clustering of cases around race periods suggests a need for proactive preventive interventions. Targeted pre-race screening and lower limb strengthening programs may help mitigate injury risk and support sustainable running participation.
Keywords: injury epidemiology, knee pain, lower extremity, overuse injury, recreational runners, running injuries

The silent killer in endurance sports: Uncovering the heat illness epidemic at Bandung Running Race

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Background: Exertional heat illness (EHI) poses a significant risk during endurance events in tropical climates. Despite moderate temperatures (16–20 °C WBGT), the PSRI2025 event (15,771 participants) reported concerning heat-related incidents. This study evaluates EHI patterns across race distances to inform targeted safety protocols.
Methods: This retrospective descriptive study analyzed medical records from the Running race held on July 19–20, 2025. All participants who experienced exertional heat illness (EHI) during or immediately after the race were included using a total sampling approach. Medical data were obtained from on-course aid stations, the main medical tent, and hospital referral records. Inclusion

criteria comprised registered participants diagnosed with EHI such as exercise-associated muscle cramps (EAMC), heat cramps, heat exhaustion, or heat stroke confirmed by medical personnel during or immediately after the event, while cases with incomplete documentation or unrelated medical conditions were excluded. Wet Bulb Globe Temperature (WBGT) was measured hourly at multiple checkpoints to monitor environmental thermal stress. Data were analyzed descriptively.

Results: A total of 15 heat-related cases were recorded among 7,488 runners in the 5K/10K events, yielding an EHI rate of 2.00 per 1,000 runners, with WBGT ranging from 16.9 to 20.0 °C. In contrast, the half marathon, with 8,283 runners, reported 114 heat-related cases (EHI rate: 13.76 per 1,000), including 9 cases of heat stroke and 4 hospitalizations. WBGT during the half marathon ranged from 17.8 to 20.1 °C. The incidence of EHI in the half marathon was 6.9 times higher than that in the shorter distance events, despite similar environmental conditions.

Conclusion: Prolonged exertion in tropical environments substantially increases the risk of EHI, even under moderate thermal stress. Half marathons in such settings necessitate enhanced preventive measures, including earlier start times, expanded medical support, and continuous WBGT monitoring. These findings support the need for climate-adaptive safety policies in tropical endurance events.

Keywords: endurance sports, exertional heat illness, runner safety, tropical climate, WBGT monitoring.

Injury surveillaince of Kuala Lumpur Tigers International Rugby 2025

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Background: Injury surveillance in rugby is well established, but medical encounter data for female players and children are limited. This study analysed injuries and illnesses among female and paediatric participants at the Kuala Lumpur Tigers International Rugby 2025 tournament.

Methods: A cross-sectional study was conducted over 22–23 February 2025 at Bukit Kiara Equestrian & Country Resort, Kuala Lumpur. All medical encounters were documented via an electronic report form using Google Forms based on the International Olympic Committee (IOC) injury and illness format for multi-sport event. Qualified medical personnel reported and diagnosed each case. Data specific to girls' touch rugby and children's categories were extracted for detailed analysis.

Results: A total of 168 teams from Malaysia, Singapore, Hong Kong, and Japan registered, comprising approximately 3,500 players and 8,000 spectators. Competition formats included Youth Rugby 10s (U6–U14) and 15-a-side (U15–U17). The total number of medical encounters was 260, with athletes accounting for 98.5%. The incidence of injury in athletes was 9.64 per 100 athletes. Female players had a significantly lower risk of new injuries than male athletes (RR = 0.35; 95% CI 0.22–0.58), corresponding to a 64.6% relative risk reduction. The absolute difference in injury incidence was −11.2 percentage points (95% CI −0.15 to −0.08). The U13 girls' touch division also has a notable incidence (20.0%), while the combined U15–U18 touch cohort is very low (0.7%). Based on children age category, most of the injury came from U14 category (n=56, 26.7%), rate 26.6 per 100 players, and account one-third of all injuries. There was a steady rise in injury incidence from U8 (1.9%) through U10 (12.4%), plateauing around 10–12% at U9 to U13. No injury reported from both U6 and U7. In term of severity of injury in this event, mild (n=38, 14.8%), moderate (n=24, 9.4%), and severe (n=5, 2.0%) were reported respectively. There were 15 cases (5.86%) was referred to the tertiary centre for further assessment. The incidence of illness in this event was 0.19 per 100 players. The illness involved four respiratory systems, and one allergic reaction, which classified no severity (immediate return to play).

Conclusion: This sports event was classified as a moderate medical encounter. The pronounced incidence at U14 likely reflects the transition to more structured, physical play and heavier contact scenarios. Although younger female cohorts showed increased vulnerability, their injury risk remained substantially lower than their male counterparts. Injury surveillance can act as data-driven insights to guide the development of evidence-based prevention programs.

Keywords: children, female, injury, illness, rugby, surveillance.

Efficacy of workplace resistance circuits for body composition in sedentary obese adults

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Background: Prolonged sitting and limited physical activity are common among office workers and often contribute to obesity and unhealthy body composition. Integrating exercise into the workplace can be an effective and realistic approach for this population. Resistance-based circuit training allows efficient engagement of multiple muscle groups within a short period. This study aimed to evaluate the effects of a 12-week supervised resistance-dominant circuit program on body composition in sedentary obese employees.

Methods: Thirty-two obese office workers (≥30 years; obesity grades 1–3) participated in a supervised program held twice weekly for 12 weeks (Dec 2024–Mar 2025). Each 60-minute session included a 10-minute warm-up (40–50% HRmax), a 40-minute circuit of 8–10 alternating upper- and lower-body stations (60 s work, 60 s rest, two rounds), and a 10-minute cool-down. Training intensity was progressively increased across three phases (weeks 1–4 light–moderate, 5–8 moderate, 9–12 moderate–high; target 50–70% HRmax). Body weight (BW), body fat %, muscle mass %, waist circumference (WC), and BMI were assessed monthly using bioelectrical impedance (Onemed 825). Data were analyzed with repeated-measures ANOVA ($\alpha = 0.05$) and partial eta squared (η^2) to estimate effect sizes.

Results: Adherence was challenging, with participation dropping from 32 to 7 by the end of the study. Among those who completed the program, significant and consistent improvements were found in BW ($p = 0.001$, $\eta^2 = 0.582$), BF ($p = 0.029$, $\eta^2 = 0.387$), MM ($p = 0.026$, $\eta^2 = 0.395$),
WC ($p = 0.007$, $\eta^2 = 0.509$), and BMI ($p = 0.008$, $\eta^2 = 0.500$), all showing large effect sizes ($\eta^2 >$
0.14).

Conclusion: The workplace-based resistance-dominant circuit program led to meaningful improvements in body composition among sedentary obese office workers who completed the training. However, the high dropout rate emphasizes the need for more flexible scheduling, stronger peer support, and simple progress tracking to improve adherence and long-term sustainability in real-world settings.
Keywords: body composition, circuit training, obesity, resistance training, sedentary lifestyle, workplace intervention

Physical activity and motor skills in Indonesian schoolchildren: Insights from a multicity study

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Background: Low physical activity remains common among Indonesian children; the 2023 Indonesian Health Survey reported 37.4% of people aged ≥10 years perform <150 minutes/week. Adequate activity is vital for motor development. This study examined the association between physical activity and motor skills in Indonesian schoolchildren and other contributing factors.
Method: A cross-sectional analysis of secondary data from a national child health and nutrition survey was conducted among 519 children aged 7–12 years from eleven major cities. Physical activity was assessed using the validated Physical Activity Questionnaire for Children (PAQ-C), classified into low, moderate, and high. Motor skills were measured with the Developmental Coordination Disorder Questionnaire (DCDQ, Indonesian version), comprising three domains: control during movement, fine motor/handwriting, and general coordination. Covariates included age, sex, socioeconomic status, parental education, body mass index, and nutritional status. Associations were tested using bivariate analysis and multiple linear regression.
Results: Overall, 64.2% reported moderate activity, 18.3% low, and 17.5% high. About 31.4% were indicated as suspected developmental coordination disorder. Higher physical activity correlated with better motor skills (B=2.874, p<0.001). Other predictors were older age (B=1.231, p<0.001), father's education (B=−0.807, p=0.019), and nutritional status (underweight negatively associated, B=−1.413, p=0.003). The final model explained 10.7% of motor-skill variance (R^2=0.107, p<0.001).
Conclusion: Physical activity is a key determinant of motor skills in Indonesian schoolchildren, alongside age, paternal education, and nutrition. With nearly one-third at risk of developmental coordination disorder, school- and family-based programs to enhance activity and nutrition are essential for stronger motor development and healthier future generations.
Keywords: developmental coordination disorder, growth and development, Indonesia, motor skills, physical activity, school-age children

Linking motivation to physical activity among hospital workers: A cross-sectional analysis

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Background: Regular physical activity supports cardiometabolic and mental health, yet many healthcare workers remain inactive due to demanding schedules. Beyond physical health, staying active helps reduce fatigue, relieve stress, and sustain well-being, crucial in high- pressure hospital environments. Motivation influences exercise behavior, but evidence from Indonesian hospital settings is scarce. Prior studies mainly focused on students or the general population, making this study among hospital workers both valuable and novel. It examined the relationship between motivational regulations, physical activity, and associated sociodemographic and occupational factors at Universitas Indonesia Hospital.
Methods: A cross-sectional study in 2024 involved 164 workers aged 21–52 years. Physical activity was measured using the International Physical Activity Questionnaire (IPAQ) and motivation with the Behavioral Regulation in Exercise Questionnaire-2 (BREQ-2). Sociodemographic and occupational data were analyzed using bivariate tests and multiple linear regression.
Results: Overall motivation was not significantly correlated with physical activity (p=0.254). Age, education, smoking, income, and shift work showed no associations. Years of service had a borderline relationship (p=0.045). Introjected regulation was a significant positive predictor (p<0.001), while longer work duration showed a trend (p=0.060). The model explained 11.4% of physical activity variance.
Conclusion: Among hospital workers, overall motivation was not linked to activity level, but introjected regulation, reflecting internalized obligation and self-worth, was a key driver. Workplace programs should nurture internal motives through goal setting, feedback, and peer support, integrating motivation into occupational health strategies that enhance both physical activity and staff well-being.
Keywords: BREQ-2, hospital workers, IPAQ, motivation, physical activity level

Gender-specific adaptations of postural alignment following supervised brisk walking in overweight hospital workers

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Background: Hospital employees often face long hours, irregular shifts, and psychosocial stress that contribute to overweight and postural problems such as forward head posture and hyperkyphosis. These issues can impair performance and increase musculoskeletal risk. While brisk walking is known for cardiometabolic benefits, evidence of its effect on posture and gender-specific responses remains limited. This study examined gender-related postural adaptations following supervised brisk walking among overweight hospital workers.
Methods: A quasi-experimental study at Universitas Indonesia Hospital involved 44 overweight employees (22 intervention, 22 control). The intervention group joined supervised brisk walking (5×/week, 45 minutes) for six weeks, while controls received lifestyle education. Postural alignment was assessed using the New York Posture Rating Scale (NYPRS) at baseline, week 3, and week 6. Multivariate regression identified predictors of postural change, including gender, age, BMI, job type, and shift pattern.
Results: Group-level posture scores showed no significant difference after six weeks (p=0.474). However, regression revealed a clear gender effect: females demonstrated greater improvement than males (B = –9.805; p=0.028). Mood was retained as a covariate (p=0.092) but was not significant. These results suggest that biological sex and psychosocial context may influence postural responsiveness to workplace exercise.
Conclusion: Supervised brisk walking was safe and feasible in a hospital workplace. Gender emerged as a key determinant of postural adaptation, with women showing more favorable alignment changes. Tailoring workplace exercise by gender and combining aerobic with core- stabilizing activities may enhance postural health and reduce musculoskeletal risks among overweight employees.
Keywords: brisk walking, gender differences, hospital workers, posture, workplace intervention

The hidden impact of physical activity on metabolic biomarkers in healthy young adults

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Background: Insulin resistance (IR) is a key driver of metabolic syndrome and type 2 diabetes. In sports medicine, physical activity (PA) is a core preventive measure. Yet, its metabolic effects in young healthy adults remain unclear. Beyond glucose regulation, PA may also influence biomarkers such as irisin and body composition indices like the fat-to-muscle ratio (FMR). This study examined the association of PA with IR, FMR, and irisin in young adults.
Methods: A cross-sectional study involved 241 university students aged 18–25 years (104 males, 137 females). PA was measured using the Global Physical Activity Questionnaire (GPAQ) in MET-minutes/week, and IR was determined with HOMA-IR. Body composition was assessed using bioelectrical impedance analysis to calculate FMR, while serum irisin in 28 participants was measured with ELISA. Correlations were analyzed using Spearman's test with sex-stratified subgroups.
Results: PA showed no direct correlation with IR ($p = 0.290$). Higher PA levels were associated with lower FMR ($r = –0.194$, $p = 0.003$), reflecting improved body composition. Among females, PA correlated with irisin levels ($r = 0.669$, $p = 0.009$). FMR correlated positively with IR ($r = 0.342$, $p < 0.001$), indicating its role as an early metabolic risk predictor.
Conclusion: Although PA was not directly linked to IR in this young cohort, it consistently improved body composition, which was associated with IR. These findings emphasize the multidimensional benefits of PA and the value of sex-specific, composition-based strategies in sports medicine. PA remains vital in protecting metabolic health, even before overt disturbances appear.
Keywords: fat-to-muscle ratio, insulin resistance, irisin, physical activity, young adults

Intrinsic motivation outweighs daily steps in predicting hospital staff work outcomes

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Background: Hospital workers face demanding schedules and heavy workloads that can restrict physical activity and affect motivation, two factors believed to influence work performance. This study examined the relative contribution of daily steps and motivational factors to work outcomes.
Methods: A cross-sectional study was conducted among 112 Universitas Indonesia Hospital employees (aged 21–47 years) in 2024. Sociodemographic data, BMI, daily steps (Google Fit), and motivation dimensions (Relative Autonomy Index) were assessed. Work performance was measured using the Indonesian version of the Individual Work Performance Questionnaire (IWPQ). Correlation and regression analyses were performed.
Results: Most participants were female (77.7%), young adults (median age 28 years), with normal BMI (44.6%), and classified as sedentary or inactive. Overall work performance was generally moderate (45.5%). Daily steps were not significantly associated with overall performance (p=0.279, r=–0.103)

but were linked to counterproductive work behavior (p<0.05). Motivation showed a strong association with performance (p<0.001), particularly intrinsic regulation (p=0.019), with identified regulation showing a positive trend (p=0.084). Intrinsic motivation emerged as the most consistent predictor of higher performance.

Conclusion: Most participants were female (77.7%), young adults (median age 28 years), with normal BMI (44.6%), and classified as sedentary or inactive. Overall work performance was generally moderate (45.5%). Daily steps were not significantly associated with overall performance (p=0.279, r=–0.103) but were linked to counterproductive work behavior (p<0.05). Motivation showed a strong association with performance (p<0.001), particularly intrinsic regulation (p=0.019), with identified regulation showing a positive trend (p=0.084). Intrinsic motivation emerged as the most consistent predictor of higher performance.

Keywords: daily steps, hospital employees, intrinsic motivation, performance, physical activity

The effects of combined balance and resistance training on reducing postural sway and fall risk in older adults

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Background: Falls due to unexpected injuries are the second leading cause of death worldwide. In Indonesia, the prevalence of falls among older adults aged ≥65 years is approximately 30% and continues to increase with advancing age. A major contributing factor is the decline in muscle strength and the increase in postural sway associated with aging. Exercise interventions have been shown to reduce the risk of falls, particularly when delivered as multicomponent programs. A combination of balance and resistance training has greater benefits than single-type exercise, it can reduce postural sway and improve muscle strength in older adults. The objective of this study was to investigate the effect of combined balance and resistance training on postural sway and fall risk in older adults.

Methods: This study was a quasi-experimental design with pre-test and post-test. The subjects were 44 older adults (18 male and 26 female) aged 60–83 years residing at Budi Dharma and Budi Luhur Nursing Home in Yogyakarta. The subjects were divided into an intervention group and a control group. The intervention group received a combination of balance and resistance exercises for 8 weeks. Postural sway was measured using a posturometer, while fall risk was assessed using the Timed Up and Go (TUG) test. Data analysis was performed using SPSS version 22.

Results: There was a significant difference in the delta values (post-test minus pre-test) of posturometer scores between the intervention group (2.26 ± 1.36) and the control group (-0.95 ± 1.02), with a significance value of $p = 0.000$ ($p < 0.05$). The effect size calculated using the Mann-Whitney r formula was $r = 0.82$, indicating a large effect of combined balance and resistance training in reducing postural sway in the intervention group. In addition, there was a significant difference in the delta values of TUG between the intervention group (-0.92 ± 3.01) and the control group (1.28 ± 2.37), with a significance value of $p = 0.019$ ($p < 0.05$). The corresponding effect size was $r = 0.35$, representing moderate effect in reducing fall risk in the intervention group.

Conclusion: Eight weeks of combined balance and resistance training significantly reduced postural sway and fall risk in older adults.

Keyword: balance training, fall risk, older adults, postural sway, resistance training.

Hormonal responses to the dance intervention: A systematic review

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Background: Dance has been shown to affect hormones regulation. Studies have reported that moderate-intensity dance interventions can modulate key hormones, leading to improved endocrine balance, reflecting the complex interaction between physical activity and hormonal regulation. The aim of this study is to systematically review the effects of dancing on hormones in humans, as reported in studies.

Methods: A systematic literature search was conducted using PubMed, Cochrane Central, and Scopus until September 19th, 2025. Inclusion criteria were clinical studies with dance only interventions in the adolescent to elderly population, pre- and post-intervention hormonal level measurements, published in English, and randomized controlled trial design. The Revised Cochrane risk-of-bias tool for randomized trials (RoB 2) was used to assess the risk of bias in the selected studies. Results are presented in narrative and tabular form, according to PRISMA guidelines.

Results: Of 618 articles, 11 were eligible for systematic review (802 subjects). The risk of bias assessment indicated that five studies were classified as high

risk of bias, four studies as moderate, and two as low risk. The studies examined cortisol, insulin, dopamine, growth hormone (GH), serotonin, and irisin before and after (between 3 weeks and 8 months) dance interventions. Two studies reported a significant decrease in salivary cortisol after (12 weeks and 4 months) interventions, although one of the studies noted no further decrease after 8 months of intervention. Single studies on dopamine, cortisol awakening response (CAR) and total cortisol output (AUCg) reported significant decreases, while no changes were observed in cortisol reactivity (AUCi) and insulin levels. In contrast, GH was increased after dance interventions. Results for serotonin, diurnal cortisol slope, and irisin were inconclusive, with varying findings reported across studies.

Conclusion: The dance intervention demonstrated potential effects on hormonal levels, particularly decreasing cortisol levels. However, studies on irisin and serotonin showed conflicting results. Further research is needed to validate the variable effects of dancing on hormonal regulation.

Keywords: cortisol, dance, dopamine, growth hormone, irisin, serotonin.

Combination of exercise and probiotics enhances muscle-bone crosstalk and promotes fracture healing in dexamethasone-treated mice

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Background: Hip fractures, especially when accompanied by sarcopenia, represent a major global health concern due to their high morbidity and mortality. Dexamethasone (Dex), a glucocorticoid widely used in clinical settings, can induce sarcopenia and impair fracture healing. This study aimed to investigate whether preserving muscle health both prior to and during the fracture healing can promote optimal healing through enhanced muscle-bone crosstalk. In particular, we examined whether the combination of progressive resistance exercise (PRE) and Lactobacillus reuteri supplementation could mitigate Dex-induced sarcopenia and improve fracture healing outcomes.

Methods: Forty 10-week-old male C57BL/6 mice were randomly assigned into four groups: N: healthy controls, D: Dex-treated (25 mg/kg, intraperitoneally, every other day), DE: Dex + PRE, DEP: Dex + PRE + L. reuteri (1.5×108 CFU/day, oral gavage). Total duration of the study was 8 weeks, included a 3-week Dex induction period (Week 0–3) followed by a 5-week fracture healing period (Week 3–8). A closed unilateral femoral fracture was induced in all mice at Week 3. During the healing period, Dex administration was reduced to three times per week. PRE was introduced via ladder-based training beginning with familiarization in Week 1, while L. reuteri supplementation began at Week 0. Mice were sacrificed at 3 and 5 weeks post-fracture for tissue collection and analysis.

Results: PRE alone attenuated sarcopenia during the induction period. However, the combined intervention produced more pronounced benefits, including: preservation of grip strength and gastrocnemius muscle mass (especially in the fractured limb), suppression of pro-inflammatory markers (intramuscular TNF-α mRNA) and serum myostatin levels, also enhanced running performance during the fracture healing period. Moreover, μCT imaging, genes expression in the fracture site, and systemic bone turnover markers revealed improved callus quality and bone homeostasis in the combined intervention group. These superior effects were potentially through the favorable shifts in gut microbiota composition associated with improved muscle health.

Conclusion: These findings suggest that progressive resistance exercise worked synergistically with L. reuteri supplementation to better preserve muscle health by modulating gut-muscle axis, thereby promoting optimal fracture healing through enhanced muscle-bone crosstalk.

Keywords: dexamethasone-induced sarcopenia, fracture healing, muscle-bone crosstalk, probiotics, progressive resistance exercise.

The effectiveness of pillow concept technology footwear in reducing lower extremity pain and fatigue

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Background: Lower extremity pain and fatigue are prevalent musculoskeletal complaints that impair mobility, balance, and quality of life. Conventional treatments often provide incomplete relief, highlighting the need for innovative approaches. Footwear with pillow concept technology (PCT), designed to attenuate ground impact through an insole-based vibration absorption system, offers a potential complementary intervention. This study evaluated the clinical effectiveness of PCT footwear in reducing lower extremity pain and fatigue.

Methods: A randomized, double-blind, parallel-group trial was conducted between April and May 2025 (ISRCTN10672939). A total of 163 adults aged 25-60 years with persistent leg or foot pain were screened, and 132 were randomized to PCT footwear (n=69) or usual footwear (n=63). Participants wore assigned footwear for ≥150 minutes per week over four weeks. Outcomes included pain intensity (Visual Analogue Scale, dolorimeter), functional balance (single leg stance, functional reach), and foot health (Foot Health Status Questionnaire), assessed at baseline, week 2, and week 4. A two-way mixed ANOVA evaluated within-subject (time), between-subject (group), and interaction effects.

Results: Analysis showed a consistent benefit of PCT footwear across several domains. Pain intensity decreased significantly over time ($F=15.65$, $p<0.001$), with the PCT group improving more rapidly and to a greater extent than controls (time × group: $F=5.34$, $p=0.006$). VAS scores declined from 6.2 ± 1.5 at baseline to 2.2 ± 1.0 by week 4 in PCT users, compared with only a modest decrease

in controls (6.0 ± 1.6 to 5.4 ± 1.4). A similar pattern emerged for dolorimeter thresholds, where a significant interaction (F=18.21, p<0.001) indicated a sustained 15% improvement in the PCT group, while controls experienced a temporary mid-test flare before partial recovery. Balance outcomes diverged: static stance revealed only a group effect (F=5.50, p=0.021), indicating consistently better performance in the PCT group, whereas dynamic reach performance improved over time (F=18.08, p<0.001) with a significant interaction (F=4.69, p=0.010). Notably, only the PCT group achieved clinically relevant gains (+6.4 cm, p=0.004). Foot health scores did not differ overall by time (p=0.817) or group (p=0.101), yet the interaction was significant (F=5.05, p=0.007), with PCT participants reporting progressive and sustained improvements (18% at week 2, 28% at week 4).

Conclusion: PCT footwear significantly reduces lower extremity pain, enhances both static and dynamic stability, and improves foot health perception, with high user acceptability. These results support its role as a practical adjunct for chronic lower extremity discomfort and provide a basis for further development in at-risk populations.

Keywords: balance, fatigue, foot health, pain, pillow concept technology, randomized controlled trial.

POSTER PRESENTER

Assocation of gender, age, and cardiovascular risk factors with cardiorespiratory fitness in post percutaneous coronary intervention patients

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Background: Cardiorespiratory fitness (CRF), most accurately assessed through maximal oxygen uptake (VO_2Max), is a strong independent predictors of cardiovascular and all-cause mortality. Among patients who have undergone Percutaneous Coronary Intervention (PCI), maintaining optimal CRF is essential to prevent recurrent cardiovascular events and enhance long-term recovery. However, post-PCI patients often experience reduced exercise tolerance due to age-related decline, residual myocardial dysfunction, and cumulative cardiovascular risk factors such as smoking, hypertension, obesity, and diabetes mellitus. Despite it's importance, evidence on how these factors collectively relate to VO_2Max in post-PCI patients in Indonesia remains limited. This study aimed to analyze the associations between demographic, clinical, and lifestyle variables, including age, gender, hypertension, smoking, diabetes, sedentary behavior, body mass index (BMI), beta-blocker use, and left ventricular ejection fraction (LVEF) and VO_2Max among post-PCI patients.

Methods: A cross-sectional, observational analytic study was conducted from March to July 2025 at the Cardiac Center of Dr. Wahidin Sudirohusodo Hospital Makassar. 65 post-PCI patients with complete VO_2Max data were included through purposive sampling. VO_2Max was measured using the modified Bruce treadmill protocol, while clinical and lifestyle variables were obtained from medical records and standardized questionnaires. Independent t-tests were used for bivariate comparisons, and multiple linear regression was applied to identify independent associations with VO_2Max.

Results: The multivariate regression model including all covariates was statistically significant ($F(9,55) = 2.656$, $p = 0.012$; adjusted $R^2 = 0.189$). After adjusting for potential confounders, age showed a significant negative association with VO_2Max ($\beta = -0.317$, $B = -0.353$, $p = 0.024$, 95% CI [−0.66, −0.05]), while female gender tended to have lower VO_2Max than males ($\beta = -0.264$, $B = -7.54$, $p = 0.083$, 95% CI [−16.1, 0.98]). Other covariates, including BMI, hypertension, diabetes, smoking history, sedentary lifestyle, beta-blocker use, and LVEF, did not demonstrate significant associations. A stepwise regression model retained age and gender as significant factors ($F(2,62) = 8.299$, $p = 0.001$; adjusted $R^2 = 0.186$), indicating that increasing age and female sex were associated with lower VO_2Max.

Conclusion: In this cohort of post-PCI patients, age and gender were the primary determinants of cardiorespiratory fitness, while traditional cardiovascular risk factors lost statistical significance after adjustment for confounders. These findings underscore the need for individualized cardiac rehabilitation programs that account for biological aging and sex differences when tailoring exercise prescriptions to enhance functional capacity and prevent secondary cardiovascular events.

Keywords: age, cardiorespiratory fitness, gender, post-pci, vo_2max.

Exploring the recovery effects of creatine monohydrate for recreational athletes: A systematic review

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Background: In today's demanding environment, recreational athletes frequently strive to improve their sports and exercise performance. Alongside essential training, adequate recovery also plays a crucial role in enhancing performance, preventing overtraining, and avoiding injury. Creatine Monohydrate (CrM) is a widely recognized ergogenic aid for strength enhancement and has been shown to be safe for long-term consumption across various age groups. Beyond its established role in strength, CrM also demonstrates potential for enhancing recovery; however, specific outcomes vary across studies in the literature. Therefore, this study aims to explore the potential recovery effects of CrM in healthy individuals.
Methods: Data extraction and synthesis were performed according to the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines. A detailed search was performed in PubMed, Scopus, EBSCO, and Cochrane Library using the Boolean terms and synonyms: "creatine monohydrate" and ("recovery" OR "recondition" OR "restoration" OR "replenish". No publication date restrictions were applied. Only Randomized Controlled Trials (RCTs) comparing CrM administration with a placebo were included. The PEDro scale was used as the critical appraisal tool to assess the risk of bias. Participant calibre ranged from recreationally active to elite athletes
Results: A total of 233 articles were initially identified across four databases Pubmed, Scopus, EBSCO, and Cochrane. After removing 92 duplicates and 133 articles that met the exclusion criteria, eight RCTs ultimately met the eligibility criteria for in-depth analysis. A total of 196 subjects were included in this review. These studies utilized various CrM administration methods and doses of CrM, as well as indicators to assess the recovery effect. Compared to placebo, five of the eight (5/8) studies showed positive recovery outcomes. The indicators measured were total sleep, range of motion, maximal voluntary contraction, muscle stiffness, muscle soreness, and muscle fatigue after exercise-induced muscle damage (EIMD). However, two of the eight (2/8) studies revealed no significant differences in Heart Rate Variability (HRV) values, the Hooper index, and blood lactate concentration.
Conclusion: CrM supplementation showed positive potential for recovery, with the majority of findings indicating significant improvements in subjective and performance indicators. Nevertheless, CrM's positive effect was not universal and did not significantly impact certain physiological variables like HRV and blood lactate.
Keywords: creatine, dietary supplementation, ergogenic aid, recovery, recreational athlete.

Supported teachers, active students: Understanding physical activity characteristics and perceptions in school teachers

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Background: With declining physical activity (PA) participation in Indonesia, teachers are crucial in educating and promoting physical activity. Despite government programs, there are limited research in exploring perceptions and barriers in educating physical activity (PA) in schools, with rare studies regarding PA knowledge and participation from teachers. This study was aimed to understand the PA knowledge, participation, education behavior, and perceptions in school teachers, including its factors and barriers.
Methods: This research was an analytical cross-sectional study towards 47 teachers from elementary to high schools in Panggungrejo District, Pasuruan City obtained through purposive sampling. Data collected through a Google Form questionnaire covered demographics, PA knowledge, participation, education behavior, and 5-degree likert scales measuring perceptions of its education. Descriptive data were presented as mean and standard deviation or frequencies and percentages, while statistical analysis comprised of odds ratio (OR) and paired t-test or Wilcoxon signed-rank test for mean difference.
Results: Regarding PA knowledge, 18 teachers (38.30%) did not know the WHO-recommended PA duration and frequency for adults and children. From the other 29, 6 were able to identify it all correctly. Regarding PA participation, 31 teachers (65.96%) did PA <150 minutes/week, with the two most reported barriers being time constraint (28.00%) and laziness (24.00%). Walking (49.12%) and aerobic exercise (31.58%) were the two most reported exercises. Elementary school teachers had higher odds of reporting barriers in PA participation than other teachers (OR=6.00, 95% CI=1.06-33.96, p=0.04). For PA education behavior, 41 teachers (87.23%) reported having a history of sharing stories of, motivating to do, and educating the benefits of PA. The biggest barrier in PA education was student disinterest or lack of motivation (26.09%). Elementary school teachers had lower odds of reporting barriers in PA education than other teachers (OR=0.15, 95% CI=0.04-0.57, p=0.01). For PA perceptions, its questionnaire has a high reliability and validity (α=0.841; r≥0.595). Teachers felt that the curriculum and facilities were less facilitating yet more supportive in educating PA importance (curriculum=3.57±0.83 vs 3.66±0.73, p=0.648; facilities=3.49±0.86 vs 3.72±0.88, p=0.025). Health professionals were deemed very needed in providing additional education in PA importance (4.04±0.81).
Conclusion: Frequent PA education in schools were marred with teachers underequipped in being an accurate educator and a healthy role model for the students. Establishing PA-friendly curriculum, improving school facilities, addressing barriers suffered by teachers, and integrating health professionals would be key in creating a comprehensive PA education strategy.
Keywords: barriers, health promotion, physical education, sedentary behavior

Sedentary no more: Why traditional games should lead indonesia's fitness push

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Background: Indonesia is experiencing a decrease in physical activity and sports participation. Prior studies have shown the benefits of traditional games as an innovation, but lacking in time differences, subgroups, and factor correlations analyses. This study was aimed to understand the effect running and traditional games combination towards endurance and agility as a part of physical fitness.
Methods: This research was an analytical prospective longitudinal study encompassing 5th and 6th grade students from Kandangsapi 1 Elementary School that were included through purposive sampling. Interventions given

consisted of two 600-meter run and two 30-minutes traditional games (*bentengan* and *gobak sodor*), separated by one day each. Evaluation using one group pretest-posttest was used, with a 600-meter run for endurance test and 4x10-meter shuttle run get ball for agility test as a part of the Indonesian Physical Fitness Test that has a validity and reliability of 0.884-0.897 and 0.911-0.942. Instructions were given to the students to avoid bias due to lack of experience. Two medical personnels and one physical education teacher was present to safeguard the students. Descriptive data were presented using frequency and percentage or mean and standard deviation. Statistical analysis comprised of mean difference test using Mann-Whitney, Wilcoxon signed-rank, or t-test, and correlation test using Pearson or Spearman test.

Results: From 34 participants, 6 were dropped out due to absence during pretest and/or posttest. All students were experienced in running and *bentengan*, but only 47.06% had prior experience in *gobak sodor*. Primary outcome of the research was the significant decrease in the endurance test duration (-16.94±14.27, p=0.000, d=0.902) and a marginally significant decrease in the agility test duration (-1.11±2.85, p=0.090, d=0.451). Regarding interpretation classification, there was a slight insignificant improvement in endurance (0.036±0.429, p=0.655, d=0.290) and a significant improvement in agility (0.464±0.962, p=0.018, d=0.582). The time decrease remained significant for the endurance test in males (p=0.001, d=1.445) and females (p=0.017, d=0.728) but became insignificant for the agility test in males (p=0.177, d=0.467) and females (p=0.233, d=0.609), while the interpretation classification improvements were all insignificant in both sexes (p>0.05, d=0.501-0.731). For secondary outcomes, present during interventions were negatively correlated with the time difference of the endurance (r=-0.443, p=0.018) and the agility test (r=-0.378, p=0.047). Age, BMI, and BMI-for-age z-score were not significantly correlated with the time difference of both tests (p>0.05).

Conclusion: The combined exercises gave a significant result for increasing endurance yet inconclusive for increasing agility.

Keywords: agility, endurance, physical education

Challenges after isolated posterior cruciate ligament reconstruction in a tactical athlete: A case report

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Background: Isolated posterior cruciate ligament (PCL) injuries are uncommon (<3%) and often underdiagnosed due to subtle presentation. Early diagnosis and appropriate management are essential to prevent chronic instability and degenerative changes. Conservative treatment is generally effective for Grade I–II injuries, while surgical reconstruction is indicated for Grade III or high-demand individuals.

Case Report: A 28-year-old Indonesian military tactical athlete presented with left knee pain and instability after a high-impact sports injury. Examination revealed a Grade II posterior drawer with positive sag and quadriceps active tests, indicating an isolated PCL tear. Due to the patient's high physical demands and reduced functional capacity for tactical duties, surgical reconstruction was indicated. Limited diagnostic access in a remote setting caused a seven-week delay before surgery. Postoperatively, rehabilitation followed a structured, criteria-based, phase-specific protocol emphasizing graft protection, progressive loading, and quadriceps activation. Adjunct modalities included strengthening, extracorporeal shock wave therapy, platelet-rich plasma (PRP) injections, dry needling, and acupuncture. Crutches and knee brace were discontinued at 12 weeks. The Lysholm Knee Score improved from 51 preoperatively to 85 at 24 weeks. The patient achieved full, pain-free function and successfully completed loaded marching and tactical drills, returning to active military duty at six months postoperatively. Written informed consent was obtained from the patient for publication.

Results: Managing isolated PCL injuries in tactical personnel presents unique challenges due to the demand for early and complete functional recovery. Despite delayed surgical intervention, adherence to structured, criteria-based rehabilitation facilitated a safe and progressive return to activity. The use of objective, phase-specific criteria ensured graft protection and guided recovery milestones. Adjunct modalities further supported muscle strength, proprioception, and functional endurance.

Conclusion: In military settings, applying structured, criteria-based rehabilitation is crucial for optimal postoperative outcomes. Even with delayed reconstruction, individualized rehabilitation enabled full functional recovery and early return to duty. Early diagnosis, timely surgery, and performance-based rehabilitation are key to success in isolated PCL injuries.

Keywords: criteria-based rehabilitation, delayed reconstruction, lysholm score, posterior cruciate ligament, return to sport, tactical athlete

Biomarkers of stress fractures injuries in Indonesian military personnel

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Background: Stress fractures occur when repetitive mechanical loads surpass the bone's capacity for adaptation, a common consequence of rigorous military training. These injuries compromise operational effectiveness by increasing healthcare costs, delaying recovery, and reducing active duty availability. In Indonesia, current military health screenings lack early detection protocols for musculoskeletal injuries. This study investigates the potential role of biomarkers and imaging modalities in enhancing the early diagnosis and prevention of stress fractures in military personnel.

Methods: A targeted literature review was conducted to identify relevant biomarkers and diagnostic tools associated with stress fracture risk. Molecular biomarkers such as vitamin D, C- terminal telopeptide of type I collagen (CTX-1), and procollagen type 1 N-terminal propeptide (PINP) were examined alongside physiological risk factors like low BMI, altered biomechanics, and energy deficiency. Imaging techniques—including MRI, X-ray, and musculoskeletal ultrasound (MSK US)—were evaluated for feasibility and diagnostic performance within military settings.

Results: Vitamin D deficiency was consistently linked with higher stress fracture risk (MD: −2.44 ng/mL; 95% CI: −4.05 to −0.84). CTX-1 and PINP were elevated in cases of increased bone turnover, indicating active bone remodeling and heightened fracture risk. MRI provided high sensitivity for early detection but was less accessible. MSK US emerged as a promising, affordable tool for visualizing periosteal reactions and subcutaneous edema. Physiological

contributors, including low BMI and inadequate energy availability, further compounded susceptibility to injury.
Conclusion: The integration of vitamin D, CTX-1, and PINP biomarkers with practical imaging modalities such as MSK US could substantially improve early stress fracture detection and management in Indonesian military populations. Although biochemical testing presents logistical challenges, MSK ultrasound offers a viable, field-adaptable alternative. Routine vitamin D screening in high-risk cohorts (e.g., female personnel, new recruits) and localized epidemiological studies are recommended to refine national prevention protocols and maintain operational readiness.
Keywords: biomarker, early detection, military population, stress fracture

Longevity exercise: Reframing physical activity through the lens of healthy aging

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Background: The global aging population presents a growing challenge for healthcare systems, with increasing prevalence of frailty, sarcopenia, and age-related chronic diseases. In response, the physical activity paradigm is evolving from general fitness toward structured interventions that target the biological mechanisms of aging. The emerging concept of "longevity exercise" emphasizes the intentional use of physical activity to modulate the hallmarks of aging and key processes, including mitochondrial dysfunction, immune senescence, and cardiorespiratory decline, thereby promoting healthy aging and extending healthspan.
Methods: This narrative literature review synthesizes current research on exercise modalities relevant to healthy aging, including cardiorespiratory-based training, resistance exercise, and functional movement. Databases such as PubMed and Scopus were screened for key studies from 2000 to 2025, focusing on interventions with outcomes related to physical performance, metabolic function, cognitive health, and biological aging markers. Conceptual frameworks from geroscience and longevity medicine were applied to interpret findings.
Results: Accumulating evidence supports that structured exercise can modulate multiple aging domains, positioning it as a frontline, non-pharmacological strategy for healthspan optimization.
Conclusion: This review advocates a reframing of physical activity from general health promotion to a precision tool for aging intervention. Integrating longevity principles into sports and clinical practice may transform how we train, treat, and age, offering a proactive, systems-based approach to preserving function, independence, and quality of life across the lifespan.
Keywords: exercise prescription, geroscience, healthspan optimization, healthy aging, longevity exercise.

Designing a longevity exercise protocol: A geroscience-informed intervention for healthy longevity

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Background: While exercise is widely recognized for improving physical performance and preventing chronic disease, its role in modulating the biological mechanisms of aging is now gaining momentum. The field of geroscience connects physical activity with key aging processes, including mitochondrial dysfunction, systemic inflammation, metabolic dysregulation, and cardiorespiratory decline. This paper presents a conceptual framework for a longevity exercise protocol, specifically designed to target these mechanisms and optimize healthspan.
Methods: This conceptual model integrates current evidence from translational geroscience and exercise physiology to inform a structured, multi-modal intervention. The protocol combines aerobic training, resistance exercise, high-intensity interval training (HIIT), and balance training personalized to individual frailty phenotypes and biological aging markers. Targeted metrics include VO_2max, gait speed, grip strength, muscle strength, muscle mass, timed-up-and-go (TUG), standing balance test, and other aging-related indicators. Key design features include progressive loading, periodization, circadian-aligned training windows, and longitudinal functional performance tracking. Literature from 2000 to 2025 was reviewed via PubMed and Scopus to identify validated components relevant to protocol development.
Results: A geroscience-informed exercise protocol offers a novel, systems-level approach to physical activity, shifting the goal from general fitness to targeted aging modulation.
Conclusion: This model provides a conceptual foundation for future interventional studies and clinical applications that aim to enhance physiological resilience, functional independence, and overall healthspan. Its integration into sports, rehabilitation, and preventive health settings may position exercise as a precision medicine tool for healthy longevity.
Keywords: biological aging, exercise prescription, functional aging biomarkers, geroscience.

FIFA 11+ Injury Prevention in Indonesian Youth Football: Implementation Challenges and Evidence from the Literature

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Background: Football is the world's most widely played sport, with youth

players representing more than half of all registered athletes. In Indonesia, youth football continues to grow rapidly, yet injury rates remain high due to limited preventive strategies, poor infrastructure, and insufficient coach education. The FIFA 11+ program, a structured injury prevention warm-up routine, has been proven globally to reduce lower extremity injuries by 30%–72%. Despite its effectiveness, implementation in Indonesia remains suboptimal. Addressing this issue requires a deeper understanding of the barriers and context-specific strategies to promote broader adoption among young Indonesian players.

Method: A structured literature review was conducted using Consensus, an academic search platform integrating databases such as Semantic Scholar and PubMed. The review, performed between June and July 2025, using 19 targeted search queries grouped into seven thematic clusters on FIFA 11+, injury prevention, youth football, Indonesia, and implementation barriers. From 890 initial articles, a total of 27 studies were selected after screening based on relevance, methodological quality, and alignment with the Indonesian context. All included studies were further appraised for quality using the Joanna Briggs Institute (JBI) Critical Appraisal Tools, and only studies with low to moderate risk of bias were synthesized. Screening was performed independently by two reviewers, with disagreements resolved by consensus and documented in a PRISMA-style flow diagram.

Results: The review identified that youth football injuries in Indonesia predominantly consist of bruises (38%), sprains (29%), and lower limb injuries—especially to the knees and ankles. Notably, 63% of injuries occur in the second half of matches, indicating fatigue as a contributing factor. Global evidence consistently demonstrates that FIFA 11+ effectively reduces lower-extremity injury incidence through structured strength, balance, and plyometric exercises. However, Indonesian implementation faces barriers such as limited financial resources, insufficient coach training, inadequate facilities, and cultural norms like "playing through pain." Awareness of injury prevention among coaches, athletes, and parents remains low, particularly in rural areas.

Conclusions: FIFA 11+ remains globally effective in preventing youth football injuries, yet its success in Indonesia requires context-driven strategies that overcome financial, educational, and cultural barriers. Sustainable implementation demands multi-sectoral collaboration. Future research should focus on high-quality Indonesia-based evaluations to verify the effectiveness and long-term sustainability of FIFA 11+ implementation within local youth football contexts.

Keywords: FIFA 11+, Implementation Barriers, Indonesia, Injury Prevention, Youth Football.

The value of bone scintigraphy and single photon emission computed tomography/ computed tomography in evaluating sports-related musculoskeletal injuries: A narrative literature review

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Background: Musculoskeletal injuries frequently affect athletes and individuals engaged in physical activity. Prompt and accurate diagnosis is crucial, not only to prevent complications but also to enable a safe and efficient return to activity. In sports medicine, early detection of injuries plays a key role in guiding appropriate treatment. Bone scintigraphy (BS) and hybrid Single Photon Emission Computed Tomography/Computed Tomography (SPECT/CT) imaging have become valuable tools in this context, as they can reveal functional and metabolic changes before structural damage appears on conventional imaging. Method: This narrative literature review analyzed peer-reviewed studies published from 2013 to 2024, focusing on the clinical application of BS and SPECT/CT in diagnosing and evaluating sports-related musculoskeletal injuries. A total of 35 articles, covering approximately 314 patient cases, were included. Relevant literature was identified through systematic searches using keywords such as bone scintigraphy, SPECT/CT, nuclear medicine, and sports injury. Studies were selected based on their focus on diagnostic performance, clinical utility, and the evaluative contribution of these imaging modalities in athletic populations.

Results: The review indicated that BS, particularly when combined with SPECT/CT, enhances diagnostic accuracy and allows precise localization of lesions. These techniques are especially effective in detecting stress fractures, enthesopathies, and subtle or multifocal injuries that may not be visible with conventional imaging methods. Bone scintigraphy shows 95% sensitivity and 97% specificity for fractures within 48 hours of injury, with sensitivity rising to 100% if performed after 72 hours. In addition, SPECT-CT provides incremental benefits over MRI in identifying pain sources in foot and ankle injuries. In a cohort of 37 patients (18 women, 19 men), MRI achieved sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of 82%, 31%, 74%, and 42%, respectively, whereas SPECT-CT demonstrated 84%, 60%, 84%, and 60%. SPECT-CT outperformed MRI in detecting bony pathologies, including fractures, osteomyelitis, and osteochondral lesions. In the context of sports medicine, SPECT/CT adds significant value by integrating anatomical and functional data, supporting risk assessment and monitoring of healing progress. This makes it a practical tool for clinical decision-making, especially in elite athletes where rapid and reliable information is crucial.

Conclusion: BS and SPECT/CT offer substantial advantages in evaluating sports-related musculoskeletal injuries. Their ability to detect early physiological changes improves diagnostic accuracy, informs personalized treatment planning, shortens recovery time, and reduces the risk of reinjury, establishing them as essential imaging modalities in modern sports medicine.

Keywords: bone scintigraphy, nuclear medicine, SPECT/CT, sports injury, stress fracture

Conservative management for lateral elbow injury in paddle athletes: an evidence-based case report

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Background: Paddle is a rapidly growing racket sport in Indonesia, and recent trends show a rising incidence of elbow injuries, especially lateral epicondylitis. This condition not only disrupts athletic performance but also poses a challenge for effective, sustainable recovery. Despite its prevalence, the optimal conservative management for paddle athletes aiming for rapid and sustained return to play remains unclear.

Case Illustration: A 32-year-old male recreational paddle athlete presented with persistent lateral elbow pain following an intensive tournament. Clinical assessment confirmed lateral epicondylitis, a diagnosis now increasingly observed in paddle players. Initial rest and analgesics provided limited

improvement. He subsequently received a structured program including eccentric strengthening, progressive loading, manual therapy, and counterforce bracing. After 10 weeks, pain and function improved significantly, allowing return to paddle with no recurrence at three months.

Method: A comprehensive literature search was conducted in PubMed, Cochrane, and EBSCOhost (2015–2025) for systematic reviews, meta-analyses, and randomized controlled trials on conservative management of lateral epicondylitis in racket sport athletes. Critical appraisal focused on pain, function, return to sport, and recurrence prevention.

Results: High-quality evidence from racket sports consistently shows that exercise-based therapy, especially eccentric strengthening, is superior to passive modalities and corticosteroid injections for long-term outcomes. Multimodal approaches (exercise plus manual therapy) further improve pain and function. Bracing and taping provide short-term relief, while corticosteroid injection may increase relapse risk. These recommendations are extrapolated to paddle athletes, given similar biomechanical stresses and injury patterns.

Conclusions: Conservative management with structured exercise and manual therapy remains the most effective strategy for lateral elbow injury, and current racket sport evidence supports its application for paddle athletes. Early, individualized rehabilitation enables timely return to sport and reduces recurrence risk as paddle participation surges.

Keywords: athlete, conservative management, elbow injury, exercise therapy, lateral epicondylitis, paddle

Fragmented QRS complex in athletes' electrocardiogram: Physiological adaptation or pathological sign? a scoping review

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Background: Fragmented QRS (fQRS) complex, characterized by notching/slurring in the QRS complex, has been linked with myocardial fibrosis and sudden cardiac death (SCD) in cardiomyopathies. While fQRS is a recognized arrhythmogenic marker in hypertrophic cardiomyopathy, it is currently not included in the International Criteria for ECG interpretation in athletes.

Method: This review was done according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guideline. A search was conducted across PubMed, ScienceDirect, and Google Scholar to identify relevant studies reporting fQRS in athletes across all age groups and sports discipline.

Results: A total of 7 studies were included in the final review, revealing higher prevalence of fQRS in older age groups, with the highest prevalence occurring in lead V1, ranging from 13.6%-50% across studies. The occurrence of fQRS in at least one lead ranged from 7.7% to 50% across studies, while the presence of fQRS in ≥2 contiguous leads ranged from 0.5% to 32% across studies. Some studies reported that up to 10% of athletes with fQRS in ≥2 contiguous leads were found to have other ECG abnormalities that warrant further investigation, whereas only 1-5% athletes with fQRS in a single lead showed other ECG abnormalities. No adverse cardiac events were observed in either athletes with fQRS in a single lead or athletes with fQRS in ≥2 contiguous leads during the follow-up period. Cardiac magnetic resonance imaging was only done scarcely in a few studies, with no abnormalities found.

Conclusions: Current data suggests that the occurrence of fQRS in athletes is likely benign. However, the co-occurrence of fQRS with other abnormal ECG findings should warrant further investigation, especially for fQRS in ≥2 contiguous leads. A longer follow-up duration is needed to ascertain the possibilities of adverse events occurring in athletes.

Keywords: athlete, electrocardiogram, fragmented QRS, preparticipation screening

High-intensity interval training versus moderate-intensity continuous training for VO2 max in overweight and obese adults: A meta-analysis

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Background: The global prevalence of overweight and obesity continues to rise, increasing the risk of cardiovascular diseases. Maximal oxygen uptake (VO2 max) is a powerful predictor of cardiorespiratory fitness and all-cause mortality. While exercise is a cornerstone of obesity management, the optimal training modality for improving VO2 max remains under discussion. This systematic review and meta-analysis aims to synthesize the evidence on the effectiveness of High-Intensity Interval Training (HIIT) compared to Moderate-Intensity Continuous Training (MICT) or no-exercise controls on VO2 max in overweight and obese adults.

Method: A systematic review and meta-analysis was conducted following PRISMA guidelines. A comprehensive literature search was performed on PubMed, Cochrane Library, and Google Scholar for original research published up to June 2025. Inclusion criteria were: (1) randomized controlled trials; (2) population of overweight or obese adults (BMI ≥ 25 kg/m^2); (3) intervention using a structured HIIT protocol; (4) comparison with MICT or a non-exercising control group; (5) outcome measure including change in VO2 max (ml/kg/min). The Cochrane Risk of Bias tool (RoB 2) was used for quality assessment. A random-effects model meta-analysis was performed using RevMan to calculate the pooled standardized mean difference (SMD).

Results: A total of eleven studies, including one conducted in Indonesia, met the inclusion criteria, providing data from 450 participants. The overall risk of bias across studies was assessed as low to moderate. The primary meta-analysis revealed a statistically significant and robust effect, demonstrating that HIIT led to a substantially greater improvement in VO2 max compared to comparison groups (SMD = 0.72; 95% CI [0.51, 0.93]; $p < 0.0001$). This standardized mean difference represents a moderate to large effect size, highlighting a clinically meaningful benefit. Subgroup analyses confirmed this superiority, showing HIIT was more effective than both MICT and non-exercise controls. The moderate heterogeneity observed ($I^2 = 41\%$) indicates some variability in the magnitude of the effect across studies, likely reflecting differences in training protocols and participant populations, yet the direction of the effect remained consistently in favor of HIIT.

Conclusions: HIIT is a more effective training modality than MICT for improving cardiorespiratory fitness in overweight and obese populations. These findings provide strong evidence for sports medicine specialists to prescribe HIIT as a time-efficient and potent clinical tool for enhancing VO2 max, thereby potentially reducing long-term cardiovascular risk in this population.

Keywords: exercise medicine, HIIT, meta-analysis, MICT, obesity, VO2 max

The relationship between physical activity and stress levels among undergraduate medical students of the Faculty of Medicine, Prof. DR. HAMKA Muhammadiyah University

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Background: Medical education is widely acknowledged academic program, associated with elevated stress levels among students. Multiple factors may contribute to the onset of stress in medical students. Engaging in physical activity represents a viable strategy to prevent and mitigate stress.

Methods: This study used an observational analytic approach with a cross-sectional design. The population of this study, were medical students from year 2 – 4. Sampling technique utilized was total sampling, involving a total of 190 respondents. Primary data were collected through the administration of the International Physical Activity Questionnaire (IPAQ) to assess physical activity levels and the Perceived Stress Scale (PSS-10) to measure stress levels. The data were analyzed using the chi-square test.

Results: The analysis revealed a significant association between physical activity levels and stress levels among medical students (p-value 0.031, 95% CI = 1.063 – 4.785). Students with higher levels of physical activity demonstrated significantly lower stress levels compared to those with lower physical activity levels, indicating an inverse relationship between the two variables.

Conclusion: This study demonstrates a significant inverse relationship between physical activity and stress levels among undergraduate medical students, where higher physical activity correlates with lower stress. These findings highlight the potential of physical activity as an effective stress management strategy, warranting its integration into medical education programs to support student well-being.

Keywords: IPAQ, Medical Students, Physical Activity, PSS-10, Stress Level

The effect of an eight-week resistance training program on lipid profile among new members in KGym Ilham Pontianak

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Background: Dyslipidemia is a major risk factor for cardiovascular disease, which accounts for 17.3 million deaths annually worldwide. In Indonesia, the 2018 RISKESDAS reported prevalences of high total cholesterol (28.8%), LDL (37.3%), triglycerides (27.9%), and low HDL (24.3%). In Pontianak, West Kalimantan, prevalence rates are even higher among patients with hypertension. Non-pharmacological approaches such as exercise are recommended to improve lipid profiles. Resistance training has been shown to reduce LDL by 8–15%, triglycerides by 10–23.7%, and increase HDL by 5–10%, yet evidence in local populations remains limited.

Objective: To evaluate the effect of an eight-week resistance training program on lipid profile in new members of KGym Ilham, Pontianak.

Methods: This experimental study used a pre-post design with 14 purposively sampled subjects. The program involved moderate-to-high intensity resistance training targeting upper, lower, and core muscle groups over eight weeks. Fasting blood samples were analyzed for triglycerides, LDL, HDL, and total cholesterol before and after intervention. Cofounding factors (Physical activity, BMI, Diet, Sleep, and Stress) were not controlled.

Results: Triglyceride levels decreased significantly ($p = 0.001$), from 117.9 $\pm$ 58.03 mg/dL to 86.0 $\pm$ 55.07 mg/dL, representing a 27% reduction. Total cholesterol decreased by 27%, LDL 5,78%, and HDL by 4,42%.

Conclusion: Eight weeks of resistance training improved lipid profile, with a significant reduction in triglyceride levels. Further research with larger samples and controlled confounding factors is recommended.

Keywords: Cardiovascular disease, Dyslipidaemia, Lipid Profile, Resistance Training

The impact of low vitamin D levels on physical outcomes following anterior cruciate ligament injury in adolescents and adults: A systematic review

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Background: Vitamin D plays a crucial role in bone metabolism and muscle function, which are essential for recovery from musculoskeletal injuries. This systematic review aims to evaluate the impact of low vitamin D levels on physical outcomes following anterior cruciate ligament (ACL) injury in adolescents and adults.

Method: A systematic literature search was conducted on PubMed, Scopus, ScienceDirect, Cochrane, and Europe PMC up to August 18th, 2025 with combined terms related to "Anterior Cruciate Ligament," "Vitamin D," and "physical outcomes". The inclusion criteria were publications between 2015-2025, available full text in English, studies evaluating association between low vitamin D level with physical outcome after ACL injury with cohort, case control, or cross-sectional designs. Articles were evaluated by two independent reviewers. Risk of bias was assessed using the Joanna Briggs Institute appraisal tools. Data characteristics were extracted and synthesized.

Results: Five studies involving a total of 328,237 participants aged 17.8 to 58.4 years were included. All studies assessed as low risk of bias. The majority of studies reported that vitamin D deficiency is associated with a higher risk of primary ACL rupture, revision after ACL reconstruction, quadriceps muscle atrophy, impaired quadriceps function, and a greater incidence of knee osteoarthritis following ACL injury. However, evidence regarding functional outcomes remained inconsistent.

Conclusions: Current evidence suggests that low vitamin D levels may be

associated with worse musculoskeletal outcomes following an ACL injury, such as an increased risk of re-injury, muscle loss, functional decline, and the development of knee osteoarthritis. While acknowledging the limitations of the small number of studies and variability in design and outcome measures, these findings highlight the potential of vitamin D supplementation as a perioperative strategy. Future research is needed on determining optimal vitamin D dosage and timing to maximize benefits and improve physical outcomes following ACL injury and reconstruction.

Keywords: anterior cruciate ligament (ACL), anterior cruciate ligament injury, anterior cruciate ligament reconstruction (ACLR), physical outcome, vitamin D level, vitamin D

Impact of intermittent fasting on endurance and ankle injury risk in runners: a systematic review

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Background: Intermittent fasting (IF), particularly time restricted eating (TRE), is increasingly popular among middle-to long-distance runners as a method for weight control and metabolic improvement. Evidence shows IF reduces fat mass without impairing endurance performances. However, most studies are from temperate climates, while tropical conditions may exacerbate dehydration, neuromuscular fatigue, and postural instability. These circumstances may raise the risk of ankle sprains, which are one of the most prevalent musculoskeletal aliments among 5K-10K runners.

Method: This systematic literature review followed PRISMA 2020 guidelines, including RCTs, crossovers trials, cohort studies and systematic reviews evaluating the effects of intermittent fasting (IF), particularly time-restricted eating (TRE) in endurance performance (5K-10K runners or comparable endurance athletes). Studies eligible if they examined ankle injury risk factors, hot/humid environments, or outcomes on hydration, thermoregulations, and neuromuscular control. Searches in PubMed, Scopus and Web of Science extracted data on participants, interventions, environments, and performance outcomes. Risk of bias was assessed with RoB-2 and ROBINS-I. Findings were narratively summarized, with meta-analysis planned where outcome homogeneity allowed.

Results: From 37 identified studies, 15 met inclusion criteria. RCTs and crossover trials showed that intermittent fasting, particularly time-restricted eating (TRE), reduced body fat while preserving VO_2max, running economy, and endurance performance in 5K-10K runners and comparable athletes. Systematic reviews supported neutral to modest benefits. However, studies in hot or humid environments indicated greater risks of dehydration, neuromuscular fatigue, and ankle instability. Fatigue impaired proprioception, and inadequate recovery as major risk factors, potentially worsened under fasting in tropical climates. Overall, IF is safe and beneficial for endurance runners, but caution is advised in heat-stressed environments.

Conclusions: Intermittent fasting specifically time-restricted eating, reduces fat mass without compromising endurance performance in amateur 5K-10K runners. Yet, tropical climates may heighten risks of dehydration, neuromuscular fatigue, and ankle injury. These findings underscore the need personalized strategies, strict hydration, and injury monitoring. Clinically, these findings serve as a foundation for more tailored sports nutrition guiding sport nutrition practices to balance IF's metabolic benefits with athlete safety.

Keywords: runners, ankle injury, intermittent fasting, sports medicine, training load, time-restricted eating.

Effect of injury history, body composition, and physical tests on duel performance in professional footballers

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Background: In modern professional football, duel success is a crucial determinant of individual and team performance, as it directly impacts ball possession and tactical execution. Previous research highlights the importance of physical fitness and body composition in athletic performance; however, duel outcomes may be influenced not only by aerobic capacity and muscular strength but also by an athlete's injury history. The Yo-Yo Intermittent Recovery Test is commonly used to evaluate aerobic endurance, while the Nordic Hamstring test provides insights into hamstring strength and injury risk. In addition, body composition metrics such as InBody score, body fat percentage, and anthropometric measures contribute to overall physical readiness. Despite this, limited studies have examined the integration of these physical parameters together with injury history to predict duel success in professional football players. This study aims to analyze the influence of physical test results, body composition, and injury history on duel performance in professional footballers.

Method: We performed a retrospective analysis of sixteen professional football players with complete datasets. The small sample size (n=16) is acknowledged as a limitation, but we emphasize the analysis data remain integrated and informative. Data comprised: Yo-Yo test (distance covered, VO_2 Max), body composition (InBody score, % body fat, body weight, height), Nordic Hamstring metrics (maximum force, torque, impulse, imbalance), and match performance statistics (minutes played, duels per 90 minutes, duels won %). Injury history was categorized into anterior cruciate ligament (ACL), ankle, adductor, and meniscus injuries, and coded as dummy variables. Statistical analyses included descriptive analysis, Pearson correlation, and multivariate linear regression to evaluate predictors of duel success.

Results: Descriptive findings showed that the players' average VO_2 Max was 54.4 ml/kg/min, mean In Body score was 85.6, and average duel success rate was 50.1%. Pearson correlation revealed weak and inconsistent associations between physical test results and duel success ($r < 0.30$, $p > 0.05$). Regression analysis using physical tests alone yielded a low predictive value ($R^2 = 0.17$). However, when injury history was included, model explanatory power increased substantially ($R^2 = 0.695$). Notably, players with a history of ankle injury exhibited a significantly lower duel success rate, averaging a 10% decrease compared to non-injured peers ($\beta = -10.08$, $p = 0.032$). ACL, adductor, and meniscus injuries did not show significant independent effects.

Conclusions: This study demonstrates that while physical fitness tests (VO_2

Max, InBody score, Nordic Hamstring force) are essential components of athletic profiling, they are not strong predictors of duel performance in professional footballers. Instead, injury history especially ankle injuries emerges as a critical determinant of duel outcomes. While the findings must be interpreted cautiously given small sample, they underscore the practical importance of integrating historical of injury into performance. Preventive and rehabilitative programs targeting ankle stability and functional strength should be prioritized to preserve competitive performance and minimize performance decline following injury. Future studies with larger samples and positional analysis are recommended to refine predictive models of duel success in football.
Keywords: history injury, body composition, duel performance, football, Nordic Hamstring, VO_2 Max

The impact of padel equipment on injury incidence among padel players

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Background: Padel has rapidly become one of the fastest-growing racket sports worldwide, with more than 25 million players across 90 countries by 2023. Its popularity is also expanding in Asia, including Indonesia, yet scientific evidence on injury mechanisms remains scarce. Musculoskeletal injuries are highly prevalent among padel players, commonly affecting the ankle–foot, elbow–forearm, and shoulder, with tendons and muscles most frequently involved. However, how footwear and racket characteristics influence these injuries is poorly understood. This scoping review highlights current evidence on padel equipment and injury risk, offering new insights for practice and safety.
Methods: A scoping review was performed using the Arksey and O'Malley framework (2005) and reported in accordance with PRISMA-ScR. Searches of PubMed, Scopus, and Google Scholar up to June 2025 employed the keywords *padel, injury, equipment, footwear,* and *racket*. Eligible studies included amateur or professional players with explicit assessment of equipment factors related to injury incidence. Non-English publications, protocols, and studies without injury outcomes were excluded.
Results: From 143 records, three studies met the inclusion criteria. One study (n=350) found padel-specific shoes increased musculoskeletal injury risk 1.8-fold compared with conventional sports shoes. Another (n=216) reported herringbone soles were significantly associated with severe tendon and ligament injuries compared with omni or mixed soles (p=0.023–0.031). Regarding rackets, a large study (n=950) showed Power or Diamond shapes increased elbow and forearm strain, leading to epicondylitis and overload, whereas Control and Versatile rackets reduced biomechanical stress. Rackets weighing more than 350 g were also linked with higher injury incidence (p=0.029). Overall, injury rates in padel were approximately three injuries per 1,000 training hours and eight per 1,000 match hours, slightly higher than in tennis.
Conclusion: The available evidence suggests that padel-specific footwear with herringbone soles and heavier Power-type rackets elevate injury risk, while Control-oriented rackets and mixed-sole footwear appear protective. These findings emphasize the need for clinicians to consider equipment factors in injury prevention, and for manufacturers and policymakers to develop evidence-based guidelines balancing performance and safety. This review adds novel insights on padel equipment and injury risk, highlighting the need for further study.
Keywords: equipment, injuries, padel, racket weight, sole pattern, sports medicine, sports safety

Resistance training during ramadan and its effect on glucose regulation: A scoping review

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Background: Ramadan fasting, practiced by more than one billion Muslims worldwide, induces distinct metabolic adaptations due to prolonged daily abstinence from food and fluids. While aerobic exercise during Ramadan is well studied, the role of resistance training (RT) remains underexplored. Considering RT's influence on glucose metabolism, understanding its effects under fasting conditions is essential for safe and effective exercise prescription. This scoping review summarized current evidence on how RT during Ramadan affects glucose regulation in healthy adults.
Methods: Following PRISMA-ScR and PCC (Population: healthy adults ≥18 years; Concept: glucose regulation; Context: Ramadan or Ramadan-like fasting ≥12 h/day), PubMed, Scopus, and Cochrane were searched up to June 2025. Eligible experimental studies (RCTs or quasi- experimental) assessed RT with glucose-related outcomes. From initial screening, six studies met inclusion criteria.
Results: RT during Ramadan was safe and did not alter fasting glucose. Longer interventions (>8 weeks) improved insulin sensitivity, particularly when performed post-iftar. Evening sessions enhanced lean mass, strength, and hormonal balance, whereas fasted training increased cortisol responses. Lipid outcomes were mixed, with frequent HDL improvement and stable LDL. Optimal programs used moderate-to-high intensity (60–85% 1RM), 3–4 times weekly for 60–90 minutes.
Conclusion: Resistance training during Ramadan is safe and may enhance glucose stability and metabolic flexibility. Sessions performed 2–3 hours after iftar appear most beneficial. Broader trials are needed to refine culturally relevant exercise guidelines.

Keywords: fasting, glucose regulation, ramadan, resistance training, time-restricted eating

Optimizing recovery from ankle sprain in adolescent athletes: Insights from a scoping review of multicomponent exercise

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Background: Ankle sprain is the most frequent injury among adolescent athletes, especially in high-impact sports such as soccer and basketball. If not managed properly, it can progress to chronic ankle instability (CAI), restricting participation and predisposing to long-term dysfunction. Adolescents are particularly vulnerable due to musculoskeletal immaturity and early sport specialization. Despite its high prevalence, evidence on structured post-injury exercise programs tailored for this age group remains limited. This scoping review maps and evaluates multicomponent exercise interventions that support recovery and prevent re-injury in adolescent athletes.
Methods: The review followed PRISMA-ScR guidelines and the PICO framework. Literature searches were conducted in PubMed, Scopus, ScienceDirect, and Cochrane, supplemented by manual searches. Eligible studies within the last 10 years included adolescent athletes with ankle sprain who underwent exercise-based rehabilitation. Extracted data covered intervention type, duration, frequency, and outcomes.
Results: Seven studies (randomized controlled trials and experimental research) met inclusion criteria. Effective interventions typically combined neuromuscular, balance/proprioceptive, and strength training. NMT protocols such as core stabilization and single-leg stance improved proprioception and reduced recurrence. Balance training using unstable platforms enhanced somatosensory control, while strengthening ankle and hip musculature improved postural control and range of motion. Adherence, supervision, and psychological readiness including motivation, confidence, and mood were key to rehabilitation success.
Conclusion: Multicomponent exercise integrating neuromuscular, balance, and strength elements effectively restores ankle function and reduces re-injury risk in adolescent athletes. Incorporating structured supervision and strategies to enhance adherence and psychological readiness ensures safer return-to-sport and supports long-term athletic development
Keywords: adolescent athlete, ankle rehabilitation, ankle sprain, neuromuscular training, physical exercise

Nutritional interventions to enhance cognitive performance in athletes: Insights from current evidence and paths for future directions

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Background: Cognitive performance is a vital component of athletic success, influencing how athletes make decisions, sustain attention, and respond under pressure. While nutritional interventions are established in physical optimization, their role in cognitive enhancement remains fragmented. Synthesizing this evidence is critical for advancing practical, sport-specific strategies.
Methods: A scoping review was conducted using the PCC framework and PRISMA-ScR guidelines. Literature searches across PubMed, Scopus, and Cochrane (2015–2025) identified studies involving athletes aged ≥18 years that examined nutritional interventions and cognitive outcomes. Of 356 records screened, six studies fulfilled the inclusion criteria, comprising randomized controlled trials, observational studies, and reviews.
Results: Interventions explored creatine, caffeine, L-theanine, theacrine, beetroot juice, and their combinations. Creatine enhanced visual reaction time, and caffeine consistently improved attentional control and psychomotor speed. The synergy of caffeine–L-theanine reduced errors under stress, while caffeine–theacrine sustained cognitive benefits during prolonged exertion. Beetroot juice at moderate doses improved executive function in Stroop tasks. Yet, results varied by dosage, timing, sport type, and individual differences. Key research gaps include limited evidence on long-term effects, underrepresentation of female athletes, and the lack of sport-specific cognitive assessments.
Conclusion: Nutritional interventions hold promising but domain-specific benefits for athletes' cognitive performance. Personalized supplementation strategies may offer the greatest impact, though robust, gender-inclusive, and longitudinal studies remain essential to inform actionable guidelines in sports practice.
Keywords: athletes, cognition, nutrition, performance, supplements

Multi-ingredient pre-workouts for high-intensity performance: Evidence and gaps

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Background: Pre-workout supplements are widely used by athletes and recreational exercisers in high-intensity training. Common formulations contain caffeine, creatine, beta-alanine, and nitric-oxide precursors to improve focus, power, and fatigue resistance. Their growing popularity among young fitness enthusiasts raises concerns about real-world effectiveness and safety. Yet, evidence remains inconsistent across ingredients, exercise modalities, and participant characteristics, warranting clearer synthesis.

Methods: Using a PICO framework, we conducted a narrative review informed by systematic searches in PubMed, Scopus, and ScienceDirect. Eligible English-language trials examined single- or multi-ingredient pre-workout supplementation and its effects on performance or acute metabolic responses during high-intensity exercise (e.g., cycling, Wingate, CrossFit-type workouts).
Results: Multi-ingredient pre-workout supplements (MIPS) were generally associated with small-to-moderate improvements in training volume, anaerobic power, fatigue tolerance, and vascular function. For single ingredients, caffeine improved short-term power and perceived exertion; beta-alanine supported repeated-sprint tolerance; creatine enhanced high-intensity capacity and, with training, lean mass. Outcomes varied by dose, timing, training status, and modality. Some studies indicated sex-specific differences, highlighting nutrient-timing relevance. Adverse events were rare, though long-term safety and standardized outcome reporting remain limited. Even modest improvements may yield meaningful daily training gains.
Conclusion: Pre-workout supplementation, particularly MIPS, can modestly enhance high- intensity performance, though effects depend on formulation and context. This review identifies underexplored gaps, sex-specific responses, timing strategies, and long-term safety, critical to advance scientific and practical applications. Addressing these gaps will strengthen evidence and guide athletes, coaches, and clinicians in optimizing pre-workout supplementation use.
Keywords: anaerobic power, high-intensity exercise, performance, pre-workout, supplementation

Aquatic exercise for children with attention-deficit/hyperactive disorder: Cognitive, behavioral, and fitness outcomes

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Background: Attention-deficit/hyperactivity disorder (ADHD) is a common neurodevelopmental condition in childhood. Behavioural therapy and medication remain standard treatments, though both may have side effects and limited long-term impact. Exercise has emerged as a safe adjunct therapy, and aquatic activities offer unique sensory stimulation supporting emotional regulation and engagement. This review summarises randomised controlled trials (RCTs) investigating swimming-based programmes and their effects on cognition, behaviour, and physical fitness in children with ADHD.
Methods: A systematic search was conducted in PubMed, Scopus, Taylor & Francis Online, and Google Scholar for studies published in the past decade (English/Indonesian). Eligible studies were RCTs involving children aged 6–17 years with ADHD, comparing swimming or aquatic exercise with usual care or non-aquatic activities. Outcomes included cognition, behaviour/social function, and fitness. Studies with psychiatric comorbidities or non-RCT designs were excluded. Data were narratively synthesised.
Results: Five RCTs met inclusion criteria. Interventions swimming or water-aerobic sessions two to three times weekly for 2–12 weeks consistently reduced hyperactivity and impulsivity while improving attention and inhibitory control. Reported gains included better mood, lower stress, enhanced social interaction, and improved academic performance. Physical fitness increased, particularly aerobic capacity (VO2max). Cognitive flexibility, coordination, and depression scores improved, although studies were limited by small samples, protocol heterogeneity, and minimal blinding.
Conclusion: Swimming-based exercise is a promising adjunct to conventional ADHD management, showing benefits in behavioural, cognitive, and fitness domains. Further large- scale RCTs with standardised outcomes are needed to confirm long-term effects and guide implementation in educational and clinical settings.
Keywords: ADHD, aquatic exercise, children, cognitive function, social behavior, swimming.

The success of diabetes exercise implementation among residents of Penjaringan Subdistrict

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Background: Diabetes Mellitus (DM) is a chronic disease with a high prevalence that requires continuous management. Physical activity such as health exercise has been proven effective in controlling blood glucose levels, improving fitness, and preventing complications. DM exercise is one of the community health interventions aimed at improving patients' quality of life. The objective of this study was to evaluate the success of DM exercise implementation among residents of Penjaringan Subdistrict based on participation rate, patients' perception, obstacles encountered, perceived benefits, and the role of community health cadres.
Methods: The evaluation involved 19 DM patients through interviews and questionnaires with patients and cadres in RW 6, RW 8, RW 12, and RW 15, Penjaringan Subdistrict, North Jakarta. The exercise was conducted in each RW area with a frequency of once a week for one month, with each session lasting 30–45 minutes. Data were analyzed descriptively to illustrate participation levels, perceptions, obstacles, benefits, and cadre involvement in the program.
Results: Out of 19 DM patients, 11 patients (68.8%) in RW 6, 6 patients (28.6%) in RW 8, and 9 patients (64.3%) in RW 15 regularly participated in the exercise, while RW 12 refused evaluation. Patients' perception of exercise importance varied, with the highest in RW 15 (100%) and the lowest in RW 8 (42.9%). Main obstacles included unsuitable schedules, physical limitations, and low motivation. Nevertheless, patients reported benefits such as reduced physical complaints, improved fitness, increased knowledge of healthy movements, and social advantages. In terms of implementation, some cadres did not fully understand their tasks and their involvement was limited.
Conclusion: The success of DM exercise implementation in Penjaringan Subdistrict has not been optimal, as indicated by low patient participation and limited cadre involvement. However, this program has provided tangible

benefits for patients who participated regularly. Improvements are required through flexible scheduling, enhanced education, and strengthening cadre roles to ensure more effective and sustainable outcomes.
Keywords: evaluation, diabetes mellitus, health exercise, Penjaringan

Artificial intelligence in sports medicine: A scoping review on emerging applications for load monitoring and injury risk prediction

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Background: Musculoskeletal injuries are a leading cause of performance decline among athletes, recreational exercisers, and tactical professionals. Conventional workload metrics, such as the acute:chronic workload ratio (ACWR), show limited predictive accuracy. The rise of wearable sensors and biomechanical monitoring enables artificial intelligence (AI) to integrate GPS, heart rate variability, sleep, and motion data into individualized injury risk models. Unlike previous reviews focused on rehabilitation, this review maps AI applications in physically active populations, highlighting current evidence and persisting gaps.
Methods: Following PRISMA-ScR guidelines, PubMed, Scopus, Web of Science, SPORTDiscus, and IEEE Xplore were searched for studies on AI or machine learning in load monitoring or injury prediction. Fifteen studies met inclusion criteria involving athletes, exercisers, and tactical cohorts. Extracted data included study design, AI model, input variables, and performance metrics. Data were analyzed thematically to identify methodological patterns and outcome variability.
Results: AI models yielded promising yet variable outcomes. In soccer, workload-based machine learning improved injury forecasting, identifying ~50% of injuries with fewer false alarms than ACWR. Wearables showed high validity: WHOOP reached 89% sleep-staging agreement, Oura Ring 90.6% REM accuracy with >94% reliability, and Theia3D <10° joint- angle error. Force-plate analytics (Sparta Science) generated individualized "Movement Signatures" linked to injury risk. Challenges persist in inconsistent injury definitions, limited inclusivity, and algorithm transparency.
Conclusion: AI-driven wearable and biomechanical technologies show potential to enhance injury prediction and load monitoring, with AUROCs near 0.80 and wearable accuracies >85%. Wider validation, transparency, and inclusivity are key to advancing proactive, preventive sports medicine practice.
Keywords: artificial intelligence, exercise, injury prediction, load monitoring, machine learning, wearables

Genetic insights into moderate-to-vigorous physical activity and autoimmune disease risk: A mendelian randomization analysis

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Background: Autoimmune disorders are increasingly common, leading to lifelong disability and high healthcare costs. Although physical activity is thought to be protective, most supporting evidence comes from observational studies prone to bias. Few genetic studies have examined whether physical activity causally affects autoimmune risk. Using Mendelian randomization (MR), which applies genetic variants as natural experiments, this study assessed whether genetically predicted moderate-to-vigorous physical activity (MVPA) influences autoimmune disease risk and systemic inflammation.
Methods: Genetic instruments for MVPA were derived from genome-wide significant SNPs in dataset ebi-a-GCST006097. Outcome data for multiple sclerosis (n = 47,429), rheumatoid arthritis (n = 58,284), systemic lupus erythematosus (n = 14,267), and circulating C-reactive protein (CRP) (n = 204,402) were obtained from the IEU OpenGWAS repository. Analyses used TwoSampleMR in R, applying inverse-variance weighted (IVW) as the main method and MR Egger, weighted median, weighted mode, and simple mode for sensitivity testing.
Results: Higher genetically predicted MVPA reduced odds of multiple sclerosis (OR = 0.27, p = 0.0167) and lupus (OR = 3.57 × 10−9, p = 0.0174) and lowered CRP (p = 0.0372), suggesting anti-inflammatory effects. Conversely, MVPA slightly increased rheumatoid arthritis risk (OR = 1.032, p = 0.00619). This pattern highlights disease-specific immune responses to physical activity.
Conclusion: MVPA may protect against multiple sclerosis, lupus, and systemic inflammation but modestly raise rheumatoid arthritis risk. These findings support disease-specific exercise recommendations and further mechanistic studies.
Keywords: autoimmune diseases, moderate to vigorous physical activity, multiple sclerosis, rheumatoid arthritis, systemic lupus erythematosus

Supervised schroth exercise improve clinical outcomes in adolescent swimmers with idiopathic scoliosis: A case illustration

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Background: Adolescent Idiopathic Scoliosis (AIS) affects 2–3% of adolescents and may lead to pain, postural imbalance, and reduced athletic performance. In competitive swimmers, repetitive asymmetric movements and high biomechanical demands can further aggravate scoliosis progression. Structured, scoliosis-specific exercise programs have been shown to improve musculoskeletal function and quality of life. This case illustrates the application of supervised Schroth exercises in a young swimmer with AIS.
Case description: A 16-year-old female national swimmer experienced recurrent left shoulder pain and right lumbar discomfort, particularly during intensive training sessions. Two years earlier, she had been diagnosed with AIS (thoracolumbar Cobb angle 13°, lumbar Cobb angle 11°) and initially benefited from supervised scoliosis-specific therapy. After relocating, she discontinued structured sessions and relied on self-directed stretching, which failed to control her symptoms and affected swimming performance. On re-evaluation, mild thoracolumbar and lumbar scoliosis were confirmed. A tailored program focusing on supervised Schroth exercises, core stabilization, and proprioceptive neuromuscular facilitation (PNF) was initiated. Evidence from recent clinical studies supports Schroth exercises as effective in reducing Cobb angle, improving spinal mobility, and enhancing functional outcomes in adolescents with scoliosis.
Results: Evidence from recent clinical studies supports Schroth exercises as effective in reducing Cobb angle, improving spinal mobility, and enhancing functional outcomes in adolescents with scoliosis.
Conclusion: Supervised scoliosis-specific training, particularly Schroth exercises, proved beneficial in preventing curve progression, reducing pain, and maintaining performance in swimmers with AIS. Early recognition and structured, athlete-centered management are essential to optimize clinical outcomes and support continued competitive participation.
Keywords: adolescent idiopathic scoliosis, scoliosis-specific exercise, swimmer, swimming athletes.

Exercise Induced Bronchoconstriction - an exercise therapy paradox?

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Background: Exercise-induced bronchoconstriction (EIB), characterized by transient airway narrowing during/after physical exertion, affects both asthmatic (EIBa) and non-asthmatic individuals (EIBwa). This condition may impair exercise tolerance, leading to activity avoidance which may impact quality of life. Paradoxically, structured exercise acts as a therapeutic intervention. This literature review synthesizes evidence on exercise's role in EIB management and establishes evidence-based recommendations.
Methods: A systematic literature search was conducted on August 24th, 2025, using PubMed, Cochrane Central, Scopus, and manual sources (2015–2025), employing the PICO framework. Inclusion criteria include clinical studies on EIB patients undergoing physical exercise interventions, with outcomes including symptom control, inflammatory biomarkers, cardiopulmonary fitness, and quality of life. Exclusion criteria include studies with pharmacological interventions, or studies with languages other than English or Indonesia. The risk of bias of the selected studies was assessed using Cochrane The Risk of Bias 2 (RoB 2) tool and Risk Of Bias In Non-Randomized Studies - of Interventions (ROBINS-I).
Results: Initially, 315 studies were identified across the databases, and 7 articles were relevant to the clinical question (n=535 participants, ages 7-59), with 6 of the studies implementing a randomized controlled trial design. Only EIBa studies were included, while no EIBwa study was eligible for inclusion. Two studies were classified as high risk of bias, while the others as moderate risk. All studies showed a significant effect on cardiorespiratory fitness parameters, particularly Vo2max. No significant improvement was found on FEV1, which is a parameter observed in EIB. Effects on inflammatory biomarkers showed inconclusive results. Six studies demonstrated positive effects on asthma control and quality of life. No study reported negative effects from physical exercise.
Conclusions: Structured exercise (3 sessions/week, moderate intensity, 35–50 minutes/session, ≥3 months) is recommended for EIB management, particularly in EIBa. Protocols may include aerobic, HIIT, or combined training to improve cardiorespiratory fitness and quality of life. Further research should address EIBwa-specific guidelines.
Keywords: Exercise-induced bronchoconstriction, exercise, recommendation.

Effectiveness of stair exercise programs in community-dwelling healthy older adults: A systematic review

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Background: One of the main health issues in older adults is falls. In Indonesia, 67.1% of older adults experience falls, which may lead to fractures, head trauma, and functional decline. Stair exercise is a practical, low-cost activity commonly available in daily environments that can improve strength, balance, and mobility. However, evidence regarding its effectiveness in healthy community-dwelling older adults remains scattered. This review aims to map the current findings on stair exercise interventions in this population.
Methods: A systematic search was conducted following PRISMA guidelines for articles published from inception until August 14, 2025 using PubMed, Cochrane Library, and Scopus. Inclusion criteria were articles published in English or Indonesian with full-text availability, healthy adults aged ≥60 years with minimal or controlled comorbidities, study design of RCTs, quasi-RCTs, or pilot trials, interventions with stair exercise programs, outcomes including at least one health- related or skill-related physical fitness component. Studies with combined interventions were excluded from this research. Risk of bias was assessed using the Cochrane Risk of Bias tool. Data were extracted from the included studies; subjects' demography, type of intervention, comparator, frequency, duration, intensity, and outcomes focusing on health-related or skill-related physical activity benefits.

Results: A total of 499 articles were retrieved from the three databases of which 255 studies undergone screening after removal of duplicates. Four studies (n = 1570) comprising of 2 RCTs, 1 quasi-RCT, 1 pilot RCT were included. Risk of bias was low in one study, unclear in one, and high in two, mainly due to quasi-randomization, attrition, and small samples. Stair climbing with heel or forefoot contact improved functional mobility and postural efficiency. Descending stair walking has superior benefits on bone mineral density, insulin sensitivity, lipid profile, and knee extensor strength compared with ascending. A two-step strategy reduced resting heart rate, enhanced endurance, and improved balance versus one-step. Weighted stair climbing increased lower limb power and functional performance.

Conclusion: Stair exercise is an effective and feasible intervention to improve mobility, balance, metabolic health, and muscle power in older adults. It may be prescribed two to three times per week, at moderate intensity, for 20–45 minutes, using varied modalities tailored to functional goals. Stair exercise could be used as a potential community-based strategy for fall prevention and healthy aging.

Keywords: older adults, physical function, stair exercise

Medical case incidents in spectators at international vs. local football events in 2025 in Jakarta

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Background: Both athletes and spectators may sustain medical problems during athletic activities, such as football games. Nevertheless, thorough information about medical incidents involving football spectators remains unavailable in Indonesia. Therefore, the aim of this study is to determine and identify the number of medical cases among football fans attending both local and international games in Jakarta in 2025, as well as find out the incident rate for both groups.

Methods: This research is a retrospective descriptive study with purposive sampling. The Regional Crisis and Health Emergency Centre (PK3D), DKI Jakarta Health Office, recorded the medical records of spectators, from which the data was collected. Both domestic and international football games played in Jakarta between January and August of 2025 were included in the dataset. The calculated incident rate, which represented the percentage of medical incidents relative to the audience size in each match, the number of medical cases, and the total number of spectators, was among the data collected.

Results: A total of six football games—two international and four domestics—were documented during the study period. Local matches had an average of 7 medical cases over four events, whereas international matches had an average of 52 cases over two events. The average number of spectators for local matches was 35,000, and the average number in international matches was 80,000. International matches had an incidence rate 65 per 100.000, while local matches had an incidence rate 21,5 per 100.000 of.

Conclusion: International football matches had a greater overall number of medical incidents among spectators than local ones, which was consistent with the greater crowd size. Future sports events may experience mass medical incidents; thus, event planners and health authorities must ensure that there are sufficient medical facilities, skilled staff, and efficient coordination systems. Our research is constrained by purposive sampling and the limit of data sample we have, which may limit generalization. Even though we have limited data, we must prepare for mass medical incidents based on this data and require further research with a larger sample size.

Keywords: Football, Medical cases, PK3D, Spectators

Wearable technology and aging: the role of wrist-worn devices in enhancing physical activity and fitness

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Background: A sedentary lifestyle and declining mobility are major challenges among the elderly, leading to functional decline and increased risk of chronic disease. Wearable technology,
particularly wrist-worn devices, has emerged as a promising tool to encourage active behavior. Yet, evidence on their actual effectiveness and feasibility in older adults remains fragmented and requires systematic synthesis.

Methods: This scoping review examined literature from PubMed, Scopus, and Science Direct, focusing on adults aged 60 years and above. Inclusion criteria covered studies assessing physical
activity or fitness outcomes using wrist-worn devices, published in English, with full-text access, and no year limitation. Extracted data were summarized to identify device features, intervention designs, and outcomes.

Results: Eleven studies met inclusion criteria, mostly randomized controlled trials. Wearable devices were typically integrated within behavioral strategies such as goal setting, feedback, reminders, and remote coaching. Devices featuring step tracking, activity monitoring, and real time feedback, when applied for at least 8 weeks, improved daily step counts, moderate-to-vigorous activity, and functional outcomes (e.g., sit-to-stand, gait speed). Common barriers included usability issues, limited digital literacy, declining adherence, and socioeconomic gaps.

Conclusion: Wrist-worn wearable devices show promising potential to promote active living and enhance fitness among older adults. Their impact is most significant when combined with supportive behavioral approaches rather than used alone. For Indonesia, implementation should ensure affordability, usability, and cultural relevance. Further studies are needed to assess sustainability, feasibility, and cost-effectiveness for integration into public health programs.

Keywords: aging, fitness tracker, physical activity, self-monitoring, wearable technology

Move to Improve: The Role of Dance in Age-Related Physiological Alterations

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Background: Chronological age has often been used to define life stages, yet individuals of the same age may experience different biological conditions. With global life expectancy increasing to nearly 80 years, aging brings both achievements in health and challenges in elderly care. Aging defined as gradual process affecting cellular, organ, and systemic functions, leading to declines in multiple body systems. However, aging can follow different trajectories, emphasizing that functional decline is not inevitable. Physical activity is a key determinant of successful aging, helping to preserve body function and quality of life. Dance, as a unique form of physical activity, integrates movement, rhythm, and social interaction, offering both physical and psychological benefits. This study examines the impact of dance on body function alterations associated with aging.

Methods: This study was conducted through a comprehensive search of the Cochrane Library, PubMed, and Google Scholar databases, followed by critical appraisal, analysis, and synthesis of the evidence to formulate conclusion.

Results: Dance interventions positively influence cognitive function, balance, and mobility in older adults. Ballroom dance and square dance were most effective for cognitive outcomes, tango and folkdance improved balance, while tango and self-created dance enhanced mobility. A 12- week intervention comparing general fitness exercises with dance-based programs demonstrated improvements in functional fitness and anthropometric parameters, with dance showing additional benefits such as mood enhancement and reduced anxiety. Overall, dance interventions were found to be effective in improving muscle strength, endurance, balance, and cardiovascular fitness. Dance significantly improve VO2peak in older adults compared with inactive controls. Dance enhances endorphin and dopamine secretion and reduces stress by lowering cortisol levels, supporting its role as a complementary approach for emotional regulation and hormonal balance. Senam Poco-poco, rooted in Indonesian culture, significantly improved executive function and neuroplasticity in several brain regions. The intervention also reduced HbA1c, LDL, triglycerides, and oxidative stress markers, supporting its role in both metabolic and cognitive health.

Conclusions: Dance, as a holistic physical activity, supports successful aging by enhancing physical fitness, metabolic health, cognitive function, and mental well-being. Future research should focus on standardized FITT parameters and safety guidelines to optimize frequency, intensity, time, and type of dance exercises tailored to older adults' capabilities and health status, ensuring both efficacy and safety in this population.

Keywords: Aging, age-related physiological changes, dance.

Prevotella copri and physical performance: evidence, mechanisms, and gaps in sports science

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Background: Prevotella copri has recently been recognized as a potential modulator of athletic performance through its involvement in carbohydrate metabolism, short-chain fatty acid (SCFA) production, and energy regulation. However, evidence linking P. copri to exercise-induced adaptations remains inconsistent.

Method: A systematic review was conducted according to PRISMA 2020 guidelines using Scopus, PubMed, and ScienceDirect databases for studies published between 2016 and 2025. The search terms were "Prevotella copri" AND "exercise." Eligible studies examined associations between P. copri abundance and physical or physiological performance outcomes. Methodological quality was assessed using the Newcastle–Ottawa Scale and the Cochrane Risk of Bias tool.

Results: From 734 retrieved articles, nine met the inclusion criteria. The findings suggest that P. copri abundance is associated with enhanced glucose tolerance, bile acid–FXR signaling, and SCFA-mediated energy metabolism in animal and metabolic models. In athletes, a higher abundance of P. copri and a lower Bacteroides:Prevotella ratio correlated with improved VO_2max, glycogen storage, and endurance capacity. Nonetheless, heterogeneity in study design, dietary background, and exercise protocols limited meta-analytic synthesis. Most included studies demonstrated low to moderate methodological quality.

Conclusions: Prevotella copri appears to play a promising role in modulating energy metabolism and endurance performance, yet current evidence is fragmented. Future longitudinal and multi-omics studies are required to clarify its causal mechanisms and to explore microbiota-targeted interventions for optimizing athletic performance.

Keywords: athletic performance, endurance, exercise, gut microbiota, Prevotella copri, Sport nutrition and metabolism

Exercise-based rehabilitation as a current evidence in ankle injury management: a literature review

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Background: Ankle injuries, particularly acute lateral ankle sprains (LAS) and chronic ankle instability (CAI), are among the most common musculoskeletal conditions in both the general population and athletes. These injuries cause pain, functional impairment, and frequently lead to proprioceptive deficits, impaired neuromuscular control, and balance dysfunction. Such impairments

directly contribute to high recurrence rates and long-term complications, including post-traumatic osteoarthritis. Recent studies also highlight the role of psychological factors, such as kinesiophobia, which may delay return to sport. While exercise-based rehabilitation has been widely recognized as the cornerstone of ankle injury management, the literature remains fragmented regarding which specific exercise components yield the most consistent outcomes (e.g., balance, proprioceptive, strengthening, or combined approaches) Furthermore, although emerging technologies such as wearable devices and biofeedback systems show promise, their integration into standard clinical practice is still limited. Similarly, the psychosocial dimensions of rehabilitation have not been consistently incorporated into treatment protocols. These gaps highlight the need for a comprehensive synthesis of recent evidence (2020–2025) to clarify best practices, evaluate emerging trends, and provide guidance for optimizing ankle injury rehabilitation.

Methods: A comprehensive literature search was conducted in PubMed, Scopus, and Google Scholar for studies published between 2020 and 2025. The search strategy used a combination of keywords and Boolean operators: "ankle injury" OR "ankle sprain" OR "lateral ankle sprain" OR "chronic ankle instability" AND "rehabilitation" OR "exercise therapy" OR "balance training" OR "neuromuscular training" OR "strengthening" OR "proprioception" AND "return to sport" OR "functional recovery". The initial search yielded 139 articles. After applying the inclusion and exclusion criteria, focusing on randomized controlled trials (RCTs), cohort studies, case-control studies, and clinical trials investigating conservative rehabilitation, 6 studies were finally included in this review.

Results: Exercise-based rehabilitation consistently demonstrated superiority over conventional immobilization, by enhancing neuromuscular control, improving functional outcomes, and reducing the risk of re-injury. Programs integrating balance and proprioceptive training with plyometric exercises showed greater improvements in joint position sense, stabilization, and neuromuscular activation compared to plyometric training alone. Strengthening interventions were equally important, significantly improving muscle strength, dynamic balance, and functional scores. Importantly, the combination of balance and strengthening programs not only improved physical performance but also reduced kinesiophobia, thereby facilitating psychological readiness for return to sport. Patient adherence to rehabilitation protocols remained a critical determinant of recovery success. Beyond conventional training, technology-assisted rehabilitation, including wearable sensors, motion analysis, and real-time biofeedback, demonstrated promising potential in enhancing monitoring, patient engagement, and personalization of therapy. When conservative management was insufficient, minimally invasive surgical approaches provided faster return-to-sport outcomes compared to traditional open procedures.

Conclusion: Exercise-based rehabilitation should be considered a primary approach in the management of ankle injuries, with particular emphasis on proprioception and balance training, neuromuscular control, and progressive strengthening. Integrating psychological support is also important to address potential barriers, such as kinesiophobia, that may delay return to sport. Future research is encouraged to explore the integration of technology-assisted interventions, such as wearable devices, biofeedback systems, and motion analysis, within individualized rehabilitation frameworks. Such approaches may help optimize functional recovery, reduce recurrence, and promote long-term joint health.

Keywords: chronic ankle instability, exercise rehabilitation, lateral ankle sprain, psychological readiness, sport medicine, technology-assisted rehabilitation

High physical activity, persistent burnout: Lessons from university administrative workers

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Background: Emotional exhaustion (EE), the core of burnout, is increasingly recognized among
university administrative staff often overlooked in occupational health research. Although physical activity (PA) may reduce stress, its protective role against EE remains uncertain in non-academic employees. This study examined the association between PA and EE while identifying workplace factors influencing EE

Methods: A cross-sectional study involved 108 administrative staff at the Faculty of Medicine, Universitas Indonesia. EE was assessed using the Maslach Burnout Inventory (MBI) and PA with the Global Physical Activity Questionnaire (GPAQ), expressed in MET-minutes/week and categorized by WHO guidelines. Correlation tests and multivariable regression were performed, adjusting for sociodemographic and occupational variables.

Results: Of 108 participants, 40.8% experienced moderate to high EE. Most (73.1%) met WHO PA recommendations, with a median of 1560 (IQR 4300) MET-min/week. Yet, PA showed no significant correlation with EE ($r = 0.044$, $p = 0.629$), nor with domain-specific PA or sedentary time. Regression identified younger age ($\beta = -0.259$, $p = 0.036$), work unit ($p = 0.006$), health problems ($p = 0.019$), salary satisfaction ($p < 0.001$), and colleague relations ($p < 0.001$) as predictors, explaining 40.1% of EE variance. Job satisfaction correlated negatively with EE ($r = -0.426$, $p < 0.001$).

Conclusion: Among university administrative staff, PA was not linked to EE despite high WHO compliance. EE was mainly shaped by workplace and psychosocial factors, salary satisfaction, work unit, colleague relations, age, and health. Organizational improvements beyond PA promotion are essential to reduce emotional exhaustion.

Keywords: administrative staff, burnout, emotional exhaustion, job satisfaction, physical activity

Running power vs heart rate: Which parameter defines the future of endurance training in runner?

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Background: The pursuit of enhanced endurance performance has long relied on heart rate as the primary training parameter. However, with the advancement of wearable technology, running power has emerged as an alternative metric reflecting real-time mechanical efficiency and energy cost. While heart rate is widely accessible, its accuracy diminishes in variable terrains and extreme conditions, such as trail or ultra-running. This review addresses the gap by comparing the reliability and applicability of both parameters, highlighting their role in
shaping the future of endurance training.
Methods: A narrative review was conducted by synthesizing current literature on running power and heart rate. The selected studies included physiological assessments, limitations of each metric, and case illustrations from endurance and ultra-endurance events. Emphasis was placed on terrain adaptability and each parameter's ability to provide actionable insights for individualized training.
Results: Heart rate remains a valuable long-standing measure, yet it is affected by hydration, fatigue, and environmental stressors. In contrast, running power offers more stable data across variable conditions and reflects direct mechanical output, although it requires calibration and may be influenced by running biomechanics. Evidence suggests integrating both parameters provides a more comprehensive monitoring system, improving load management, reducing overtraining risk, and enhancing adaptation across environments.
Conclusion: A hybrid model combining running power and heart rate represents a promising paradigm for endurance training, particularly in trail and ultra-endurance athletes. With the rapid evolution of wearable devices, future applications may enable seamless integration of both metrics into personalized training platforms, redefining endurance performance monitoring.
Keywords: athletic performance, endurance training, heart rate, performance metrics, running power

Determinants of cardiorespiratory fitness in indonesian school-age children: a cross-sectional analysis from urban and rural settings

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Background: Cardiorespiratory fitness (CRF) is a key health marker in children, predicting future cardiometabolic outcomes. Despite rapid urbanization and growing sedentary lifestyles, evidence on CRF determinants in Indonesian children remains scarce. This study examined demographic, anthropometric, and environmental factors affecting CRF among school-aged children in urban and rural settings.
Methods: A cross-sectional study involved 103 children aged 7–11 years from North Jakarta (high pollution) and Kotamobagu (low pollution). Predicted CRF (VO_2max) was obtained from field fitness assessments in a national child health survey. Independent variables were age, sex, physical activity, and Body Mass Index (BMI). Air quality data from the Ministry of Environment and Forestry categorized pollution exposure. Bivariate and multiple regression analyses identified CRF predictors.
Results: Significant associations were found for age ($p<0.001$), sex ($p=0.016$), BMI ($p=0.012$), and physical activity ($p=0.022$). No significant relationship emerged between air pollution and CRF ($p=0.984$), possibly due to limited variation. Regression showed age and BMI as the strongest independent predictors ($p<0.001$). Older age correlated with better CRF, while higher BMI predicted lower VO_2max.
Conclusion: Age and BMI were primary determinants of CRF among Indonesian school-aged children, with additional contributions from sex and physical activity. These findings highlight the need for early interventions targeting healthy weight and active lifestyles to improve fitness and reduce future cardiometabolic risks. Broader multi-site studies are recommended to clarify environmental effects.
Keywords: body mass index, cardiorespiratory fitness, growth and development, school-age children, VO_2max

The tropical paradox: Physical activity and vitamin D status in Indonesian schoolchildren

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Background: Vitamin D deficiency is a global health issue in children, influencing bone growth, immune regulation, and long-term well-being. Surprisingly, it remains prevalent in tropical countries like Indonesia, despite abundant sunlight. At the same time, declining physical activity among children raises additional concerns. While studies in adults show a link between physical activity and vitamin D through metabolic and sunlight exposure pathways, evidence in children remains limited. This study investigates the relationship between physical activity and vitamin D status among Indonesian school-aged children.
Methods: This cross-sectional analysis used secondary data from a representative national survey on child health and nutrition in Indonesia. Participants were 7–12 years old, excluding those with medical or physical conditions restricting activity. Physical activity was measured using the validated Physical Activity Questionnaire for Children (PAQ-C), and vitamin

D status was classified as sufficient or deficient based on serum biomarkers. Associations were analyzed using Chi-square tests ($p<0.05$).

Results: Seventy-six children (46.1% boys; 53.9% girls) participated. Vitamin D sufficiency was observed in 52.6% of participants, while 47.4% were deficient. Most (76.3%) met recommended physical activity levels. Chi-square analysis showed a significant association between higher physical activity and vitamin D sufficiency ($p<0.05$).

Conclusion: Despite abundant sunlight, vitamin D deficiency persists among Indonesian children. Physical activity is significantly associated with vitamin D sufficiency, emphasizing its role as a modifiable factor supporting children's nutritional and metabolic health. These findings strengthen the evidence for integrating physical activity promotion into public health efforts addressing childhood vitamin D deficiency in tropical settings.

Keywords: children, deficiency, nutrition, physical activity, vitamin D.

Tiny sparks, big impact: Device-measured vilpa and cancer risk

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Background: Vigorous Intermittent Lifestyle Physical Activity (VILPA) involves short, vigorous efforts within daily routines such as stair climbing or brisk walking. Accelerometer-based studies show that a few minutes of VILPA per day can lower cancer incidence and mortality, redefining minimal effective doses of activity. This is relevant for Indonesia, where over one-third of adults remain inactive despite common incidental movement. This review maps current evidence on VILPA and cancer outcomes, emphasizing feasibility and research gaps.

Methods: A scoping review was conducted using the PCC framework and PRISMA-ScR guidelines. Searches of PubMed, Scopus, and Web of Science (to August 2025) identified 1,642 records; 12 studies met inclusion criteria after screening. These comprised six cohort studies, three methodological validations, and three feasibility trials. Data were synthesized descriptively by study design, exposure, and outcomes.

Results: Across cohorts, 3–5 minutes/day of VILPA was associated with 17–32% lower cancer incidence and mortality. Micro-bouts (<1 min) offered comparable benefits. Feasibility trials, including MovSnax, showed that smartphone prompts increased VILPA and engagement. High smartphone use and urban density make Indonesia ideal for adoption. Evidence remains limited by UK Biobank dependence and few randomized trials in diverse populations.

Conclusion: Device-measured VILPA, requiring only minutes daily, is consistently associated with lower cancer risk. It offers a feasible, scalable strategy to improve population health, particularly in Indonesia where structured exercise adherence is low. Further community-based trials integrating digital tracking are needed to confirm long-term efficacy and cost-effectiveness.

Keywords: accelerometry, cancer prevention, microbouts, VILPA, wearables

Linking Physical Activity to Mental Health: Association with Stress Levels in Medical Students at Universitas Pendidikan Indonesia

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Background: Medical students often face demanding academic schedules and psychological pressures that may reduce their engagement in physical activity, potentially worsening mental health outcomes. Physical activity is known to improve both physical and mental well-being by reducing symptoms of depression, anxiety, and stress. Given that the Faculty of Medicine at Universitas Pendidikan Indonesia (UPI) is newly established with a limited number of students, this study aimed to explore the relationship between physical activity and mental health, particularly stress levels, among all current students.

Methods: This study used a cross-sectional total population design, including all 84 medical students from the Faculty of Medicine, UPI — representing the entire existing population from two cohorts. Physical activity was measured using the Global Physical Activity Questionnaire (GPAQ), and mental health was assessed using the Depression, Anxiety, and Stress Scale–21 (DASS-21). Bivariate analyses (Chi-square and Pearson tests) were first conducted to evaluate associations between physical activity levels and each mental health domain (depression, anxiety, and stress). Subsequently, multivariate logistic regressionwas performed to adjust for potential confounders, including gender and semester. Statistical significance was defined as $p< 0.05$.

Results: Of 84 students, 47 (56%) met the WHO-recommended level of physical activity. Bivariate analysis revealed a significant association between physical activity and stress ($\chi^2 = 6.668$, df = 2, $p = 0.036$), with a significant linear trend ($p = 0.011$), indicating that higher physical activity corresponded to lower stress levels. No significant associations were found between physical activity and depression ($p = 0.061$) or anxiety ($p = 0.107$). In the multivariate logistic regression, after controlling for gender and semester, students with sufficient physical activity had lower odds of experiencing stress (OR = 0.34, 95% CI: 0.08–1.35, $p = 0.126$). However, this association was not statistically significant. Female students (OR = 3.34, $p = 0.012$) and those in higher semesters (OR = 1.71, $p = 0.027$) were significantly more likely to experience stress.

Conclusion: There is a significant inverse association between physical activity and stress among medical students at Universitas Pendidikan Indonesia. Students who engaged in sufficient physical activity were less likely to experience stress in the bivariate analysis. Although this relationship was

not statistically significant after controlling for gender and semester in the multivariate model, the consistent negative trend suggests that maintaining regular physical activity may help reduce stress and support better mental well-being among medical students.

Keyword: mental health status, physical activity level, sports medicine curriculum, stress

Health issues in four different outdoor sports competitions in Indonesia: A descriptive study

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Introduction: Hot weather is believed to increase health risks during outdoor sports competitions. However, few studies have specifically investigated the impact of high temperatures on health problems in tropical countries. This study aims to explore health issues occurring during outdoor sports competitions in Indonesia.

Material and Methods: A cross-sectional study was conducted from August 2023 to July 2024, involving four running races, four land vehicle races (three motorcycles and one car race), and two soccer competitions. Weather conditions were monitored using the Wet Bulb Globe Temperature (WBGT) index, and health incidents were recorded among participants who required medical assistance. WBGT readings during all events ranged from 25.3°C to 28.8°C.

Results: A total of 209 health incidents were reported, including 104 injuries and 105 illness-related cases. The highest number of health issues occurred during running events (151 cases), followed by motorcycle/car races (41 cases) and soccer competitions (17 cases). Illnesses mostly occur in running competitions (96 out of 105 cases). Injuries also mostly occurred in running competitions, but in smaller proportions (55 out of 104 cases). Injuries in motorcycle/car racing are more numerous in type and kind. Weather-related health problems mostly occur in running sports (84 out of 92 cases).

Conclusion: The findings indicate a considerable incidence of health issues during outdoor sports competitions in hot weather conditions in Indonesia with weather-related health problems occurring mostly in running competition.

Keywords: Heat-related health issues; outdoor competition; sports type; sports injury; WBGT

Dry-land hypertrophy boosts biomechanical strength indices without predicting swimming outcomes in young swimmers

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Background: Dry-land hypertrophy training is increasingly promoted to support swimmers' c onditioning and injury prevention. Yet, whether short-term biomechanical gains translate intoreal performance outcomes remains uncertain, particularly in collegiate swimmers in Indonesia. This study evaluated the effects of a 4-week dry-land hypertrophy program on muscle strength and shoulder stability, and their relationship with swimming performance.

Methods: A quasi-experimental pre–post design was conducted among 20 collegiate swimmers aged 17–22 years in Jakarta. Participants underwent supervised dry-land hypertrophy training twice weekly for four weeks, including bench press, squat, push-ups, pull-ups, and plyometric drills (60–80% 1-RM, 3–5 sets). Outcome measures were upper- and lower-body strength, shoulder stability (external–internal rotation ratio), body composition, and 50 m freestyle time. Paired t-test, Wilcoxon, and multivariate regression were applied ($p<0.05$).

Results: Significant gains occurred in upper- and lower-body strength, shoulder stability, and body composition (increasing muscle mass, decreasing body fat). Swimming time improved modestly (–1.24 s; $p<0.001$), but these biomechanical gains did not correlate with performance (all $p>0.05$). Regression showed sex, age, and anthropometry explained only 10.9% of variance.

Conclusion: Significant gains occurred in upper- and lower-body strength, shoulder stability, and body composition (increasing muscle mass, decreasing body fat). Swimming time improved modestly (–1.24 s; $p<0.001$), but these biomechanical gains did not correlate with performance (all $p>0.05$). Regression showed sex, age, and anthropometry explained only 10.9% of variance.

Keywords: collegiate swimmers, dry-land hypertrophy, muscle strength, shoulder stability, swimming performance

Magnesium supplementation in athletes for recovery and delayed-onset muscle soreness: A systematic review of randomized trials

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Background: Delayed-onset muscle soreness (DOMS) is a common consequence of eccentric or unaccustomed exercise and may interfere with training continuity. Magnesium (Mg), essential for energy metabolism and neuromuscular function, is widely used in sports recovery, but trial evidence remains inconsistent. This study aims to systematically review randomized controlled trials (RCTs) of Mg-only supplementation in athletes and active adults, with DOMS as the primary outcome, and exercise recovery, performance, and biomarkers as secondary outcomes.
Methods: This review adhered to PRISMA 2020 guidelines and was registered in PROSPERO (CRD420251145487). Six databases (PubMed, Scopus, PsycINFO, CENTRAL, SPORTDiscus, ClinicalTrials.gov) were searched through August to September 2025. Eligible studies were RCTs testing oral or topical Mg-only supplementation against placebo/no Mg. Risk of bias was assessed with RoB-2 and certainty with GRADE.
Results: Forty records were identified; after screening and exclusions, five RCTs were included. Two small oral Mg trials (350–500 mg/day, 7–10 days) showed modest reductions in DOMS, with one reporting lower IL-6. A topical Mg gel trial found no effect. Two performance-focused studies were inconsistent: one reported acute strength improvements, while another observed modestly impaired cycling performance. Across trials, sample sizes were small (n = 9–35) and heterogeneous, limiting pooling. No serious adverse events were reported.
Conclusions: Oral Mg supplementation may modestly reduce DOMS following eccentric exercise, but evidence for performance or biomarker outcomes remains inconsistent. Topical Mg appears ineffective. Larger, well-designed RCTs are needed to confirm magnesium's role in sports recovery.
Keywords: Magnesium supplementation, Athletes, Active adults, Delayed-onset muscle soreness (DOMS), Randomized controlled trials.

Effectiveness of lever sign test and Lachman test in diagnosing acute anterior cruciate ligament injury

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Background: Anterior Cruciate Ligament (ACL) injuries are common among adolescents and adults engaged in sports, typically caused by sudden stops, changes in direction, or awkward landings. Early diagnosis is often challenging due to swelling, pain, and hemarthrosis, which obscure clinical assessment. Prompt and accurate diagnosis is crucial to initiate timely treatment and prevent long-term consequences such as post-traumatic osteoarthritis and decreased quality of life. This study examines the effectiveness of the Lachman and Lever Sign tests in diagnosing acute ACL injuries.
Methods: An Evidence-Based Case Report (EBCR) approach was applied using the PICO framework to answer a diagnostic clinical question. A systematic literature review was conducted on October 14–15, 2023, using PubMed, Scopus, Embase, and Cochrane databases, in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The search strategy combined keywords related to anterior cruciate ligament, Lachman test, and Lever Sign test. Inclusion criteria comprised original studies involving adults or athletes with acute ACL injury who had not undergone radiologic imaging, published in English or Indonesian. Exclusion criteria included patients with chronic ACL injury, those who had prior radiologic assessments, and studies not written in English or Indonesian. Two reviewers independently assessed the methodological quality and risk of bias using the Oxford Centre for Evidence-Based Medicine (CEBM) critical appraisal tool for systematic reviews.
Results: Two systematic reviews were included. Tanaka et al. (2022) reported that the Lever Sign and Lachman tests demonstrated significant diagnostic performance with sensitivity of 0.82 and 0.79, and specificity of 0.88 and 0.91 respectively. Sokal et al. (2022) found similar findings with sensitivity of 83% and 81%, and specificity of 91% and 85% for Lever Sign and Lachman tests respectively.
Conclusions: Both Lever Sign and Lachman tests show significant sensitivity and specificity in diagnosing acute ACL injuries, with the Lever Sign test demonstrating slightly superior accuracy. These physical exams are applicable in acute settings, especially when radiologic imaging is not immediately available.
Keywords: ACL injury, anterior cruciate ligament, diagnosis, Lachman test, Lever Sign test, physical examination

Injury and medical management profile of athletes in East Java Provincial Games 2025

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Background: Sports injuries remain a major challenge in multi-sport events, particularly in disciplines with high physical contact. Accurate surveillance is crucial to safeguard athlete health, optimize performance, and ensure smooth competition. This study aimed to describe the injury and medical management profile during the East Java Provincial Games (Porprov Jatim) 2025, with emphasis on burden of cases and critical appraisal of data limitations.
Method: A retrospective descriptive study was conducted using medical records collected by the KONI East Java Medical Team. Data included number of medical cases, on-site management, and referrals to higher-level facilities. Cases were categorized by sport and type (contact vs. non-contact). Absolute case counts were analyzed; however, incidence per athlete could not be calculated due to absence of denominator data (athlete numbers per sport). Referral rates were presented with 95% confidence intervals (CI).
Results: A total of 465 medical cases were recorded. Of these, 431 cases (92.7%) were managed on-site, while 34 cases (7.3%; 95% CI: 4.9–9.7) required referral. The highest absolute numbers came from Chess (75 cases; 16.1%), Football (44; 9.5%), Futsal (43; 9.2%), and Boxing (40; 8.6%). Referral rates were highest in Futsal (25.6%; 95% CI: 12.9–38.3) and Football (22.7%; 95% CI: 9.6–35.8). While contact sports contributed many acute injuries (sprains, contusions, lacerations), non-contact sports such as Chess and E-sports also generated notable medical cases related to fatigue, musculoskeletal discomfort, and stress-related complaints.
Conclusions: The medical burden during Porprov Jatim 2025 varied substantially across sports. Reporting only absolute case counts risks bias, as relative risks between sports cannot be compared without denominator data. Limitations of this study include reliance on secondary KONI documentation, possible under-reporting, and absence of athlete numbers per sport, which restricted incidence analysis. Future surveillance should adopt prospective systems with complete athlete exposure data to allow valid calculation of incidence and more robust risk comparisons.
Keywords: Sports injury, injury surveillance, East Java Provincial Games, medical management, athlete health

Medical burden across contact and non-contact sports: Evidence from East Java provincial games 2025

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Background: While sports injuries are typically associated with contact disciplines such as football, futsal, and boxing, experiences from the East Java Provincial Games (Porprov Jatim) 2025 revealed a significant medical burden also among non-contact sports, including chess and e-sport. This study aimed to compare medical case characteristics between contact and non-contact sports and to discuss their implications for comprehensive health service planning in multi-sport events.
Methods: A retrospective descriptive study was conducted using secondary data from the KONI East Java Medical Team during Porprov Jatim 2025. Data included the number and type of cases, on-site management, and referrals to higher-level healthcare facilities. Sports were categorized into contact and non-contact groups. Due to unavailable athlete population data, incidence rates per 1,000 athletes or exposure time could not be calculated; therefore, results reflect absolute case burdens rather than risk-based comparisons.
Results: A total of 465 medical cases were documented, with 431 (92.7%) managed on-site and 34 (7.3%) referred. Contact sports accounted for 127 cases (27.3%), dominated by acute traumatic injuries such as sprains, contusions, and lacerations. The highest referral rates were observed in futsal (25.6%) and football (22.7%). Non-contact sports also contributed notably: chess produced 75 cases (16.1%), primarily fatigue, tension-type headache, and postural discomfort, while e-sport athletes reported eye strain, mental fatigue, and stress-related symptoms.
Conclusion: The medical burden during Porprov Jatim 2025 demonstrated that both contact and non-contact sports generate substantial healthcare demands. While trauma predominated in contact disciplines, endurance, posture, and mental fatigue were key issues in non-contact events. However, the absence of athlete exposure data limits interpretation of relative risk. Future research should integrate incidence-based analyses (per 1,000 athletes or per competition hour) and risk stratification to provide more valid comparisons. Comprehensive, sport-specific medical preparedness remains crucial for future multi-sport events.
Keywords: contact sports, East Java Provincial Games, injury surveillance, medical burden, non-contact sports, sports injury

Dynamic ultrasound assessment of ligament micro-laxity in a marathon-induced lateral ankle sprain: an evidence-based case report

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Background: Lateral ankle sprain (LAS) is common in endurance athletes, yet subtle lateral ligament micro-laxity can be missed by routine tests and static imaging. Dynamic (stress) ultrasound visualizes ligament behavior under load and may refine prognosis and return-to-sport (RTS) decisions. We report a marathon-related LAS in which dynamic ultrasound identified clinically occult laxity and synthesize contemporary evidence on its diagnostic and prognostic value.
Case Illustration: A 34-year-old male marathon runner sustained a left inversion injury at mile 18. Initial examination suggested Grade II LAS; radiographs were normal and conservative care was instituted. At 6 weeks, pain had largely resolved but he reported "giving-way" on uneven ground. Dynamic ultrasound during an anterior-drawer maneuver showed a continuous but wavy ATFL with ~1.5 mm side-to-side talofibular gapping (abnormal), consistent with micro-laxity; CFL appeared intact. Management was adapted: extended proprioceptive/plyometric training, functional bracing, and delayed RTS. At 4 months, symptoms resolved and stress-US gapping decreased to ~0.5 mm; he resumed marathon training by 5 months. No re-sprain occurred at 1-year follow-up.
Method: An evidence-based synthesis (2015–2025) identified 7 studies (diagnostic accuracy, cohort, and one meta-analysis) on dynamic/stress ultrasound in LAS. Study quality was appraised with worksheet from Centre for Evidence-Based Medicine, University of Oxford.
Results: Meta-analytic data show high diagnostic accuracy for ATFL tears by ultrasound (sensitivity 0.97 [95% CI 0.89–0.99], specificity 0.93 [0.84–0.97]). Stress-sonographic talofibular gapping demonstrated strong discrimination for mechanical instability (AUC ≈ 0.92), with an ~1.1 mm threshold yielding specificity ≈ 94% (sensitivity ≈ 73%). A retrospective cohort linked greater ultrasound-graded severity (complete ATFL±CFL tear) to worse 1-year FAOS outcomes. Heterogeneity arose from injury phase (acute pain/swelling limits stress testing), operator technique, and stress protocols; diagnostic performance was generally higher in subacute/chronic settings. The case outcome aligned with the evidence: ultrasound-detected micro-laxity informed pacing of rehabilitation and safe RTS.
Conclusions: Dynamic ultrasound detected clinically occult ATFL micro-laxity and directly informed management in a marathon runner. Appraised evidence supports stress sonography as a practical, radiation-free adjunct that improves diagnostic precision and may stratify risk of chronic instability or recurrence, particularly when performed in the subacute phase.
Keywords: Ankle sprain; Dynamic ultrasound; Micro-laxity; Prognosis; Return to sport; Stress sonography.

Reliability of sensor-based balance system in assessing stability indices in healthy adults

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Background: Postural stability, measured as overall stability index (OSI), medial-lateral stability index (MLSI) and anterior-posterior stability index

(APSI), is the ability of a person to maintain centre of gravity of the body over the base of support. The gold standard to measure stability indices is using Biodex balance system (BBS). Sensor-based balance system (SBS) is a portable balance board, with assessment software, developed and made locally to measure stability indices. It is affordable, user friendly and easy to operate. We aimed to compare SBS with BBS in assessing the stability indexes in healthy adults.

Methods: A two-phased cross-sectional study. We recruited 26 healthy adults for phase 1 and 25 for phase 2 aged 18 to 65 years old with independent gaits and normal walking patterns. In phase 1, stability indices were measured twice; one with the SBS and the other using BBS. In phase 2, we removed the sensor of SBS and placed it on the BBS structure and compared the stability indices of both SBS and BBS in a single setting.

Results: In phase 1, there was no correlation and agreement between SBS and BBS in measuring OSI, APSI and MLSI. Phase 2 showed good correlation scores for OSI (0.978), APSI (0.961) and MLSI (0.959) between SBS and BBS. However, Bland Altman Analysis only showed agreement for APSI but not for OSI and MLSI.

Conclusion: SBS is not reliable in assessing stability indexes for adults. Further research and development are required to improve and upgrade the SBS.

Keywords: balance system, reliability, sensor-based system (SBS), stability indices.

Blood flow restriction training in cardiovascular disease: A scoping review of safety, efficacy, and clinical applications

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Background: Cardiovascular disease (CVD) patients often cannot tolerate conventional high-intensity cardiac rehabilitation (60-80% maximal capacity). Blood flow restriction (BFR) training, combining low-load exercise (20-40%) with partial vascular occlusion, offers a promising alternative. However, safety concerns and fragmented evidence limit clinical adoption in CVD populations. This study aims to systematically map evidence on BFR training safety, efficacy, and clinical applications in patients with cardiovascular disease.

Methods: Following PRISMA-ScR guidelines, we conducted comprehensive searches in Scopus and PubMed databases from inception to October 2024. Search strategies combined: (1) BFR-related terms ("blood flow restriction" OR "KAATSU" OR "occlusion training") AND (2) cardiovascular terms (cardiovascular disease, hypertension, heart failure, cardiac rehabilitation). Two independent reviewers screened 200 identified records. We included all study designs examining BFR in adults (≥18 years) with CVD or cardiovascular risk factors. Data extraction encompasses study characteristics, patient demographics, CVD types, BFR protocols, safety outcomes (adverse events, hemodynamic responses), and efficacy outcomes (functional capacity, quality of life).

Results: Preliminary screening identified studies across diverse CVD populations including hypertension, chronic kidney disease, heart failure, and exercise-induced hypertension. BFR protocols varied substantially (cuff pressure: 40-220 mmHg; duration: 2-16 weeks; frequency: 2-4 sessions/week). Initial findings suggest no serious adverse events reported in stable CVD patients. Efficacy data demonstrate improvements in functional capacity (6-minute walk distance: +30-50 meters), blood pressure control, and quality of life. Hemodynamic studies show transient reductions in cardiac output during BFR with immediate recovery post-occlusion, indicating cardiovascular system adaptability.

Conclusion: Preliminary evidence suggests BFR training may be safe and effective for selected CVD populations when applied with appropriate monitoring and individualized protocols. This scoping review will provide the first comprehensive evidence map to inform clinical practice guidelines and identify critical research gaps for BFR integration into cardiac rehabilitation programs.

Keywords: blood flow restriction, cardiac rehabilitation, cardiovascular disease, kaatsu, safety, scoping review

Injury incidence, risk factors, and prevention during CrossFit®: A systematic review

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Background: CrossFit® a branded fitness regimen incorporating functional movements performed at high intensity, has rapidly evolved into a competitive sport. Though appealing for performance gains, these environments may elevate risk of musculoskeletal injury, especially during competitions where volume, intensity, and technical execution vary. Currently, no comprehensive synthesis exists on the epidemiology of injuries and associated preventive measures in competitive CrossFit settings. This review aims to fill that gap.

Objective: To systematically synthesize evidence on injury incidence, risk factors, and prevention strategies among CrossFit participants—particularly focusing on competitive settings.

Methods: A literature search was conducted using PubMed, Scopus, Web of Science, and SPORTDiscus for studies published between 2020 and 2025. Included were systematic reviews, prospective cohort studies, and pilot intervention trials that reported injury prevalence or examined prevention programs in CrossFit competition or training contexts. Eligible studies will be screened, assessed for risk of bias, and synthesized via narrative methods, adhering to PRISMA guidelines.

Results: This review included 12 studies involving CrossFit athletes from various countries. Injury incidence ranged widely, with reported prevalence/incidence rates between 13.1%and 78%, and injury incidence rates from 0.04 to 5.3 injuries per 1000 hours of training/competition. Shoulder (approximately 20–32%) and lumbar spine/back (15–28%) were consistently the most common injury sites across all studies, followed by knees and wrists. Key factors linked to injuries included poor training progression, inadequate warm-up, bad technique, and participation in complex movements like Olympic lifts. Injury prevention methods included warm-ups, proper coaching, scaled training loads, and protective equipment, though evidence for some strategies was limited. Proper training planning and progression were emphasized to reduce injury risk.

Conclusion: Injuries are common in competitive CrossFit, with the shoulder and lower back most frequently affected. Modifiable factors such as training progression, warm-up quality, and technique play a significant role in injury risk. While various prevention strategies show promise, high-quality evidence is limited. Emphasizing proper training planning, technique coaching, and individualized load management may help reduce injury rates in CrossFit competitions. Further research is needed to establish effective, evidence-based prevention programs tailored to this high-intensity sport.

Keywords: CrossFit, Injury, Prevention, Risk Factor, Sports Injury

Biomechanical differences in recovery, drive, and finish phases between injured and non-injured rowing athletes

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The prevalence of injuries among rowing athletes based on previous analysis findings serves as an important foundation for conducting this research. The aim of this study was to analyze the differences in rowing kinematics in each phase of the rowing stroke recovery, drive, and finish phase between rowing athletes with and without a history of injury. The method used was quantitative descriptive with a causal-comparative design. Data were collected through video recordings of rowing motion kinematics using an ergometer for 100 meters. Data were analyzed using descriptive tests, normality tests, homogeneity tests, and comparison tests of independent samples t-tests and Mann-Whitney U tests. The study population consisted of 21 Indonesia National Team rowing athletes using a total sampling technique. This study was conducted by observing and analyzing rowing movements on an ergometer during training without any intervention through two-dimensional video recordings using Kinovea software. The results showed no statistically significant differences between the two groups. However, descriptive analysis revealed differences in the average angles of each phase between injured and uninjured athletes. These findings recommend that coaches and athletes continue to focus on improving rowing technique to minimize injury risk and maintain optimal performance.

Keywords: injury, kinematics, kinovea, rowing

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