



Physiological Symposium

9 April 2025,

ROOM T201 at 13.00 - 17.30

Kedleston Rd, Derby, DE22 1GB

DESCRIPTION OF THE SYMPOSIUM

The Physiological Symposium is a half-day event launched in May 2022 and is now proudly running for the fourth consecutive year.

The symposium, supported by the **Physiological Society** and the **University of Derby**, is designed to showcase the latest advancements in physiological research and promote physiology as an exciting and rewarding career path.

The event explores the Society's four key themes: Respiratory Physiology (RESP), Health and Well-Being (HW), Human Physiology (HP), and Teaching (TE) through expert-led talks and discussions.

With strong backing from the University of Derby and the School of Sport and Exercise Science, the symposium aims to engage a wide audience, including students, academics, and members of the public and encourage the exchange of ideas and perspectives.

Driven by the vision of two passionate lecturers, the event aspires to become a hub for networking, knowledge-sharing, and inclusive dialogue while inspiring future collaboration and research in physiology.



THE ORGANISERS



Dr Francesco V Ferraro,

University of Derby Lecturer in Sports Therapy and Rehabilitation.

f.ferraro@derby.ac.uk Twitter: fferraro5

Francesco graduated with a degree in Sports and Exercise from the University of Rome Foro Italico (Italy) in 2013, followed by an MSc in Sports for Prevention and Wellness from the University of Naples Parthenope (Italy) in 2015. He went on to complete a PhD in respiratory physiology and biomechanics at Bournemouth University in 2019.

Before joining the University of Derby, Francesco worked as a clinical trial manager and researcher with Nuffield Health, the NHS, and the Orthopaedic Research Institute in Bournemouth. He is currently involved in research projects at Derby focusing on physiology, Artificial Intelligence and pedagogical approaches in higher education.



Dr Callum Osler

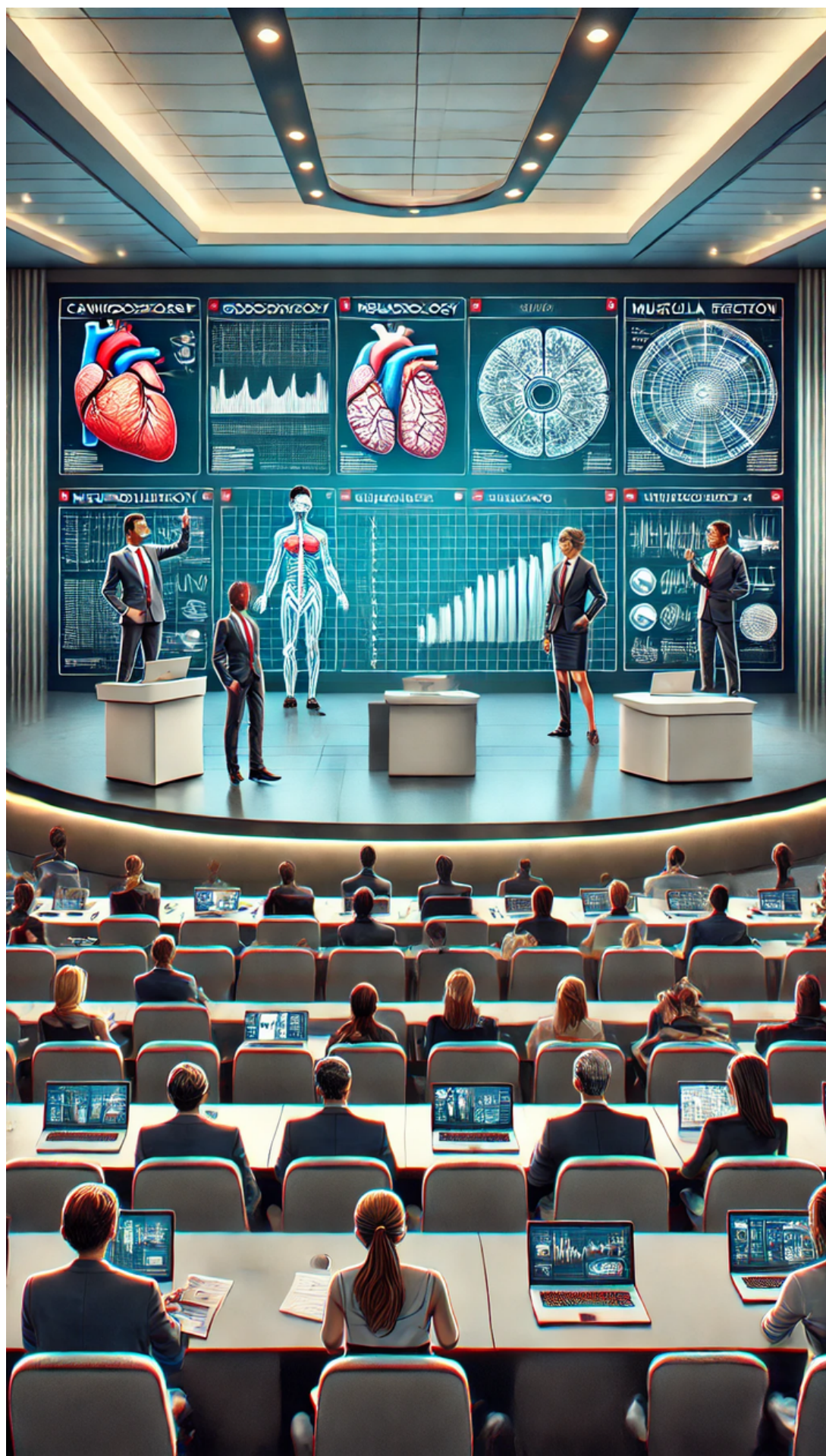
University of Derby, Senior Lecturer in Physiology

C.Osler@derby.ac.uk

Callum is actively involved in teaching, student supervision, and research within the School of Sport and Exercise Science. After completing his undergraduate studies, he earned a PhD from the University of Birmingham, focusing on the neuroscience of postural control. He remained at Birmingham for two additional years as a postdoctoral researcher before joining the University of Derby in 2013 to begin his first lecturing role.

Since then, Callum has taught extensively in exercise physiology at both undergraduate and postgraduate levels. His research centres on the neural control of human balance. A long-standing member of The Physiological Society, Callum first presented his research at the Society's 2009 symposium in Cardiff as a PhD student. He has served as a Society Representative for the University of Derby since 2017.

THE EVENT



STARTING TIME: 13.00

FIRST SESSION 13.00 - 14.00

Physiological Society Representative welcome and introduction

Mark Newman - University of Derby

Exploration of the force-velocity-power relationship

SECOND SESSION 14.00 - 14.45

Dr Joseph Welch - University of Birmingham

Adaptive Control of Exercise Hyperpnoea

COFFEE BREAK, NETWORKING AND POSTER PRESENTATION

14.45 - 15.30

THIRD SESSION 15.30 - 16.20

Physiological Society Representative Member talk

Dr Ainoa Roldán - University of Valencia

The Role of Respiratory Muscle Training in Enhancing Sports Performance

FOURTH SESSION 16.20 - 17.05

Samah Adam - University of Derby

Preferences and Barriers in Exercise Participation Among Individuals with Multiple Sclerosis: A Patient and Public Involvement (PPI) Qualitative Study

Conclusion

Mr Mark Newman - University of Derby

Exploration of the force-velocity-power relationship



Mark Newman is a Senior Lecturer at the University of Derby and Programme Lead for the Sport and Exercise Science and Strength, Conditioning and Rehabilitation undergraduate programmes. He has a background in Sports Therapy and Strength and Conditioning and is currently undertaking his PhD part time at Loughborough University. Prior to working in Higher Education, Mark previously worked for the Fire Service as a Fitness and Injury Rehabilitation Officer, managed exercise referral schemes in partnership with the NHS, and has worked in youth, men's, and women's football in both a Sports Therapist and Strength and Conditioning Coach capacity. He has published research related to post activation performance enhancement (PAPE), and the use of accentuated eccentric loading (AEL) as a pre-conditioning modality. His PhD research is focused on the Force-Power-Velocity relationship.

Dr Joseph Welch - University of Birmingham

Adaptive Control of Exercise Hyperpnoea



Dr Joseph Welch is an Assistant Professor in Respiratory Physiology and Neurobiology at the University of Birmingham. He completed his BSc and MRes in Sport and Exercise at the University of Derby before undertaking a PhD in Kinesiology at the University of British Columbia under the supervision of Professor Bill Sheel. Dr Welch completed postdoctoral training at the University of Florida Breathing Research and Therapeutics Centre working with Professor Gordon Mitchell and Dr Emily Fox. Dr Welch's doctoral research examined sex differences in diaphragmatic fatigue and the effects of diaphragm fatigue on exercise tolerance and sympathetic cardiovascular control. During postdoctoral training, Dr Welch studied the neural control of breathing, investigating the therapeutic potential and underlying mechanisms of intermittent hypoxia induced respiratory motor plasticity in healthy individuals and those living with chronic spinal cord injury. Dr Welch joined the University of Birmingham in 2022. His research focus is to understand how breathing: a) responds and adapts to physiological stressors such as exercise, disease and hypoxia; b) interacts with other body systems; and c) impacts human health and performance.

Dr Ainoa Roldán - University of Valencia

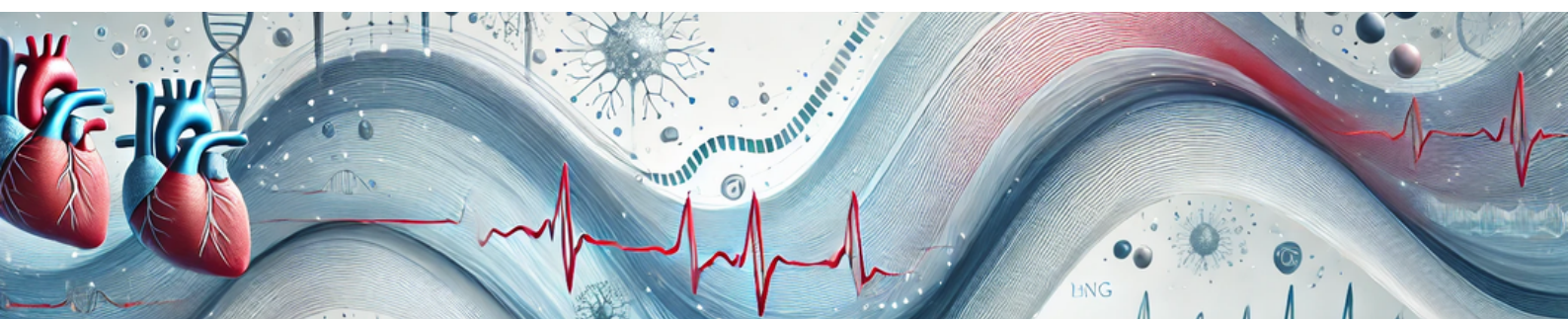
The Role of Respiratory Muscle Training in Enhancing Sports Performance



Physical Activity and Sports graduate from the University of Valencia (SPA) in 2011, with an MSc in Physiology (2016) and MSc in Research and Intervention in Physical Activity and Sports Sciences (2023) from University of Valencia (SPA). Completed her PhD in 2019 in Physical Activity and Sports Sciences. She is currently working as a Lecturer in physical training and supervised several final degree projects and has co-tutored some final master's projects. She is a member of the UIRFIDE research group. She has several publications in prestigious journals and has participated in different national and international conferences. Dr Roldán research focuses on inspiratory muscle training applied to the field of healthy older adults and performance.

Abstract

Respiratory muscle training (RMT) has emerged as an effective method for enhancing athletic performance by increasing diaphragmatic strength and endurance, reducing dyspnea, and optimizing ventilatory efficiency. Traditionally, its use has been focused on cyclical sports, where it has been associated with reduced metabolic fatigue, improved respiratory efficiency, and greater effort tolerance. More recently, RMT has been incorporated into intermittent sports, demonstrating benefits such as improved intermittent sprint tolerance, reduced recovery time, and enhanced postural stability and ventilatory control during explosive movements. Furthermore, it has been linked to improvements in lung capacity and aerobic endurance, both critical for sustained high-intensity performance. Despite these advantages, research on RMT protocols and progression remains limited, emphasizing the need for further studies to refine its application. Optimizing training variables—such as load, volume, and exercise type—could maximize the benefits of RMT, not only in competition but also in post-exertion recovery at short, medium, and long-term scales. Integrating RMT into an athlete's training regimen could serve as a valuable complement to conventional physical conditioning, further enhancing performance and resilience.



Samah Adam - University of Derby

Preferences and Barriers in Exercise Participation Among Individuals with Multiple Sclerosis: A Patient and Public Involvement (PPI) Qualitative Study



My name is Samah Adam, and I am a final-year undergraduate student in Sports Therapy and Rehabilitation at the University of Derby. I was born and raised in Sudan in a tennis-loving family, where my father inspired my passion for sports, exercise, and human movement. I have experience working with patients with multiple sclerosis, helping them improve mobility and quality of life through exercise-based therapy. I have also worked with stroke patients in the late stages of rehabilitation, supporting their recovery through targeted exercises. These experiences have deepened my interest in understanding how the human body functions and how movement can be used as a tool for rehabilitation and long-term well-being. I am particularly passionate about injury prevention, rehabilitation, and the role of exercise in healthcare. My goal is to continue exploring how physical activity can improve lives and contribute to better recovery outcomes.

Abstract

Background: Exercise plays a key role in managing symptoms and enhancing the quality of life for individuals with Multiple Sclerosis (MS). However, engagement in physical activity remains low despite growing evidence of its benefits. Limited research on patient experiences and the absence of structured frameworks makes it difficult to integrate exercise into rehabilitation strategies.

Objective: To utilise Patient and Public Involvement (PPI) to explore exercise preferences and barriers among individuals with MS.

Study design: Qualitative, cross-sectional study using PPI.

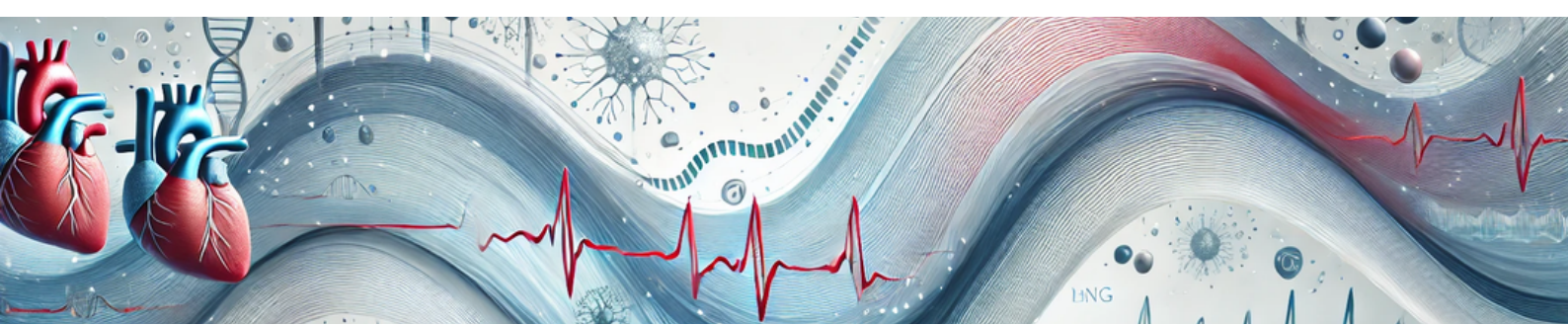
Setting: Conducted in a physiotherapy clinic in Leicester, where all questionnaires were completed in structured interview during patient visit to the clinic.

Participants: 18 participants (15 patients, 1 sports therapist, 2 physiotherapists; 7 females, 11 males; age 51 ± 15 years) diagnosed with MS for at least one year.

Method: Participants completed a 10-question questionnaire in a single session. Data were analysed using thematic analysis.

Results: Four themes identified: (1) exercise preferences, (2) barriers to participation, (3) exercise goals, and (4) impact of social support.

Conclusions: Participants preferred machine-based exercises, particularly stationary cycling and BWSTT. However, fatigue, lack of motivation, and limited education about exercise options were major barriers. Most participants exercised only in clinical settings. Highlighting these preferences and challenges helps form exercise programs to enhance engagement for individuals with MS.



Posters



Dr Suman Sheraz - Riphah International University

Facilitators and Barriers to Multifactorial Inspiratory Muscle Training in Patients with Diabetes Mellitus: A Qualitative Perspective



I am Dr. Suman Sheraz, PT, I am a PhD scholar currently working as Assistant Professor in Riphah International University. I have done my graduation (BSPT) as Gold medalist / Best Graduate of Session 2008, then PP-DPT, certification in Outcome-based Education (COBE), Women Health Physical therapy (BCWHT) and did Post Graduate Diploma in Professional Ethics and Teaching Methodology (PGD-PE & TM).

I started my work career with Shifa International Hospital, Armed Forces Institute of Cardiology (AFIC) and since 2014 I have been working with Riphah International University as an Assistant Professor. In Riphah, I am teaching at both undergraduate and master's level and working as Incharge Master of Physical therapy (Cardiopulmonary Physical Therapy) MSPT- CPPT.

Abstract

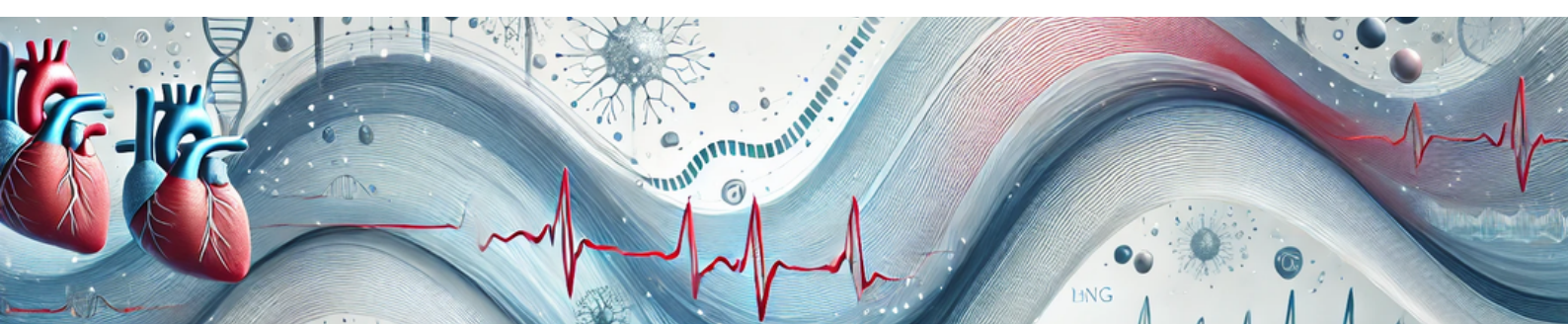
Background: Diabetes Mellitus (DM) is a growing global health concern, necessitating comprehensive training strategies to manage complications and improve patient well-being. A home-based multifactorial training program integrating Inspiratory Muscle Training (IMT), the Otago exercise plan, and aerobic exercises aligned with ACSM guidelines has shown promise in enhancing balance, physical function, and respiratory endurance. However, patient adherence and engagement depend on various facilitators and barriers.

Objective: This study explores the facilitators and barriers to implementing multifactorial IMT in individuals with DM, based on patient experiences.

Methods: A qualitative study was conducted at Riphah Rehabilitation Center, Railway General Hospital, Pakistan. Semi-structured interviews were used to gather insights from patients who underwent the multifactorial training with IMT along with Otago Exercise Program. Data were thematically analyzed to identify key factors influencing participation and adherence.

Results: Facilitators included perceived improvements in physical function, enhanced breathing capacity, ease of performing home-based exercises, and increased motivation due to structured guidance. Social support from family and healthcare providers further reinforced adherence. Conversely, barriers comprised initial discomfort with IMT, lack of awareness about its benefits, difficulties in maintaining routine adherence, and limited access to training equipment. Psychological factors, including fear of breathlessness and frustration with slow progress, also impacted engagement.

Conclusion: While multifactorial IMT offers significant benefits in DM management, addressing patient concerns through education, structured support, and accessibility improvements can enhance adherence. Tailoring interventions to individual needs may optimize outcomes and encourage long-term participation in training programs.



PhD Santolo Ciccarelli - University of Naples Parthenope

FAD-Tastic Learning: The Educational Experience of a Group of Southern Italian Students Between Body, Play, and Learning



Specialized in innovative teaching methodologies that, through the gamification, favor an experiential teaching approach.

Santolo, during his career, has directed and collaborated on numerous research projects in Italy, the United Kingdom, and Colombia. These studies involved the administration of "Functional Advanced Didactics" (FAD), an experimental teaching method designed for primary school students that combines physical exercise with conventional academic subjects, moving educational activities from the school classrooms to the institute's gymnasium.

Furthermore, Dr. Ciccarelli has conceived, thanks to a synergy between the University of Naples (Italy), the Universidad Tecnológica de Bolívar de Cartagena de Indias (Colombia), and the University of Derby (UK), the device "TRIP a-Bike," an innovative support designed for foreign language teaching based on artificial intelligence that, through the principles of embodied cognition theory, provides an immersive learning experience. Such a tool, in addition to providing educational support to students who need to learn a new language, also aims to promote the development of executive functions. By virtue of the benefits that both physical exercise and the use of artificial intelligence can bring in this regard.

Finally, Santolo is participating together with Dr. Francesco Paolo Salemme and Dr. Francesco V. Ferraro in the development of the device "Collaborate and Think" (CaT), a gamified educational support consisting of a board game integrated with artificial intelligence. Imagined to promote the teaching of civic education among primary and secondary school students.

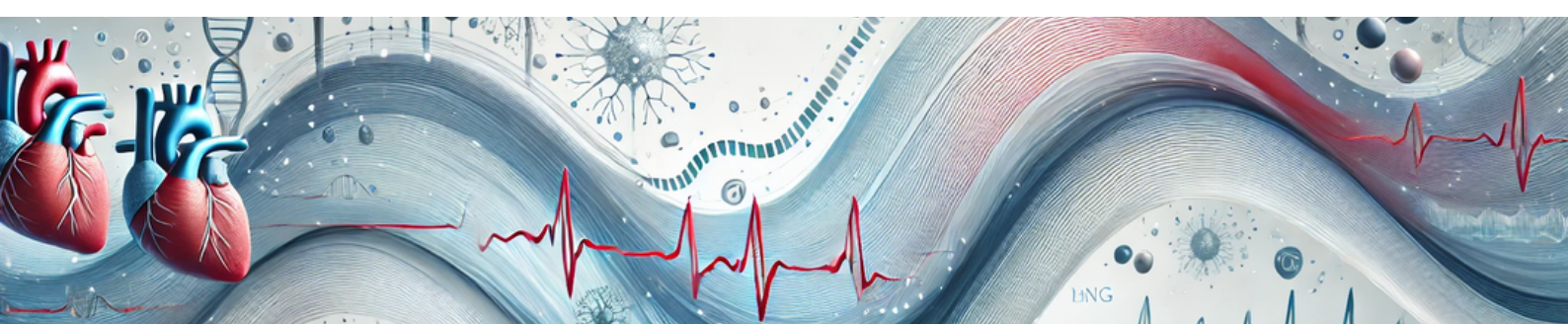
Abstract

The study explores the effect of a multidisciplinary teaching method called Functional Advanced Didactics (FAD) that integrates physical exercise with conventional school subjects. This approach is inspired by the principles of embodied cognition theory, according to which learning is mediated by the body and its perceptual system. Furthermore, FAD refers to the gamification methodology, as it integrates game design elements within a structured context such as the school environment.

To investigate the effectiveness of this method, a study was conducted in the province of Naples, Italy, which involved 40 students attending the first and second grades of primary school. The study, which focused on teaching the English language, lasted 15 weeks with one intervention per week lasting 1 hour in place of the regular classes.

At the end of the research intervention, questionnaires designed by the authors were administered, aimed at investigating the effect of FAD on English language learning, cognitive abilities, and socio-relational skills of the interviewees.

The results emerged at the end of the study highlighted correlations that underscore positive effects on learning, team building, problem solving, and concentration ability.



L6 Student Robel Mehabtoma - University of Derby

Can Artificial Intelligence help detect postural impairments?



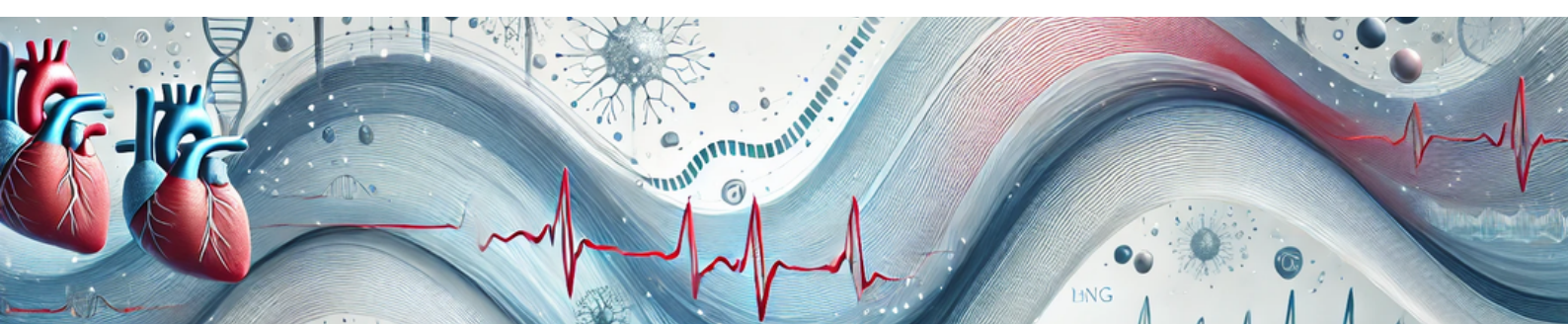
Robel Mehabtoma is an aspiring Sports Therapy and Rehabilitation student at the University of Derby. Born in Eritrea, East Africa, and coming to the UK at the age of 6 years old, Robel has always been passionate about the connection of sports and healthcare. With a deep love for sport and a strong desire to help others recover and perform at their best, Robel was drawn to the field of sports therapy. This passion stems from a lifelong appreciation of movement, performance, and the science behind injury prevention and rehabilitation. Through academic studies and hands-on experience, Robel is dedicated to developing the skills necessary to support athletes and individuals in achieving optimal physical health. Beyond the classroom, Robel is committed to continuous learning and professional growth through external placements, with the goal of making a meaningful impact in the field of sports therapy. By combining knowledge of human anatomy, rehabilitation techniques, and a holistic approach to recovery, Robel aims to contribute to the advancement of sports rehabilitation and injury management.

Abstract

Introduction: The sports medicine world is in a constant state of evolution, embracing new technologies that transform how athletes perform and recover. Artificial intelligence (AI) stands out as a cutting-edge innovation with the potential to transform sports therapy. This study explores AI applications in sports therapy, specifically in detecting impairments in posture. Traditional postural assessments often rely on subjective evaluations, leading to inconsistencies and limitations. AI's ability to process vast data and recognise complex postural patterns presents a promising solution, offering a more precise and data-driven approach to sports therapy.

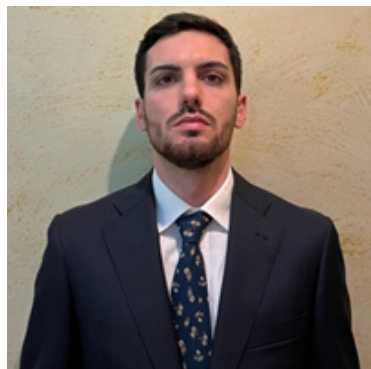
Methods: This study uses postural analysis photography from multiple angles (frontal, lateral, and posterior) with a postural grid. Facial features are blurred for privacy and anonymity, and data is securely stored in the University of Derby (UoD) database. A custom AI-driven model will be trained and tested with this data to support further research. Participants (18+ with no musculoskeletal conditions) provided informed consent. Data collection adheres to UoD's ethical guidelines, GDPR (2016), and the Data Protection Act (2018). Data is recorded on paper before secure digitisation, and withdrawal is allowed up to two weeks post-study. Each participant attends a single 10–20-minute session at UoD (Kedleston campus) and receives posture feedback.

Conclusion: Data collection for this study is ongoing, with preliminary findings set to be presented at upcoming symposium. These results will contribute to advancing AI applications in sports therapy, enhancing postural assessment methodologies, and improving overall patient care.



Francesco Paolo Salemme - University of Macerata

Collaborate and Think (CaT): Promoting active citizenship through the integration of a board game and artificial intelligence



Francesco Paolo Salemme is a PhD candidate registered in both the Italian register of pedagogists and educators. He is currently pursuing the "Teaching & Learning Sciences: Inclusion, Technologies, Educational Research and Evaluation" program at the University of Macerata.

During his academic career, Francesco has earned two master's degrees with honors, one in "Design of Educational Services, Training, Media Education and Technologies for Inclusion in Formal and Non-formal Contexts" (LM50) from the University of Naples "Parthenope" and the other in "Sport Management and Motor Activities" (LM-47) from the "Pegaso" Telematic University.

His research focuses on innovative teaching, with particular emphasis on technologies and gamified teaching practices. In this regard, Salemme has created 'Collaborate and Think' (CaT), an interdisciplinary teaching aid that combines an unplugged gamified device with a generative artificial intelligence system. This support, consistent with the principles of social constructivism, was designed to promote the teaching of civic education among primary and secondary school students through an interactive board game.

Finally, Francesco has participated, together with Dr. Santolo Ciccarelli and Dr. Francesco V Ferraro, in the experimentation of "Functional Advanced Didactics" (FAD), an experimental teaching method based on the principles of embodied cognition theory and gamification methodology aimed at primary school pupils. This method integrates physical exercise with conventional teaching disciplines to promote an educational path within otherwise underutilized spaces such as the school gymnasium.

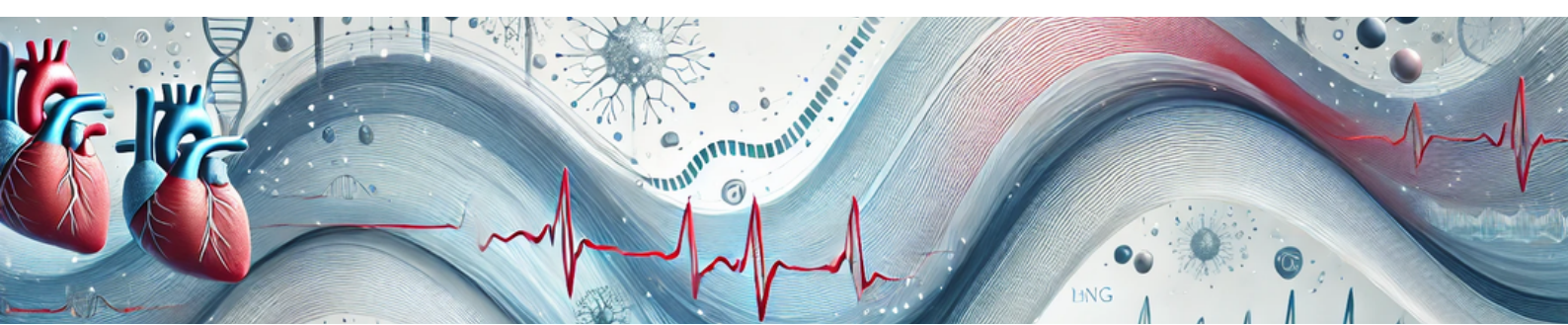
Abstract

In recent years, the Italian educational system has been facing complex challenges regarding the teaching of civic values, the promotion of tolerance, and inclusion among students. This occurs in a social context characterized by cultural diversity and rapid technological transformations. In this sense, a mixed approach that integrates artificial intelligence (AI) with unplugged play devices could open up new educational scenarios capable of improving both student engagement and educational practices.

In this regard, the educational support "Collaborate and Think" (CaT), which is based on the principles of social constructivism (a methodology that emphasizes collaboration among learners) and the methodology of gamification, which introduces game techniques into contexts unrelated to play itself in order to promote student motivation. This tool aims to encourage the teaching of civic education among students aged between eight and fourteen years.

Such a device that combines a board game with the voice assistant ChatGPT extends over an interactive board composed of 46 different stations, which contain educational tricks aimed at promoting civic sense.

To test its effectiveness, the research team wants to undertake a study aimed at measuring, through a mixed approach, the teaching of civic values, social relational skills, and the degree of inclusivity of the participating students.



Neshat Mansouryar - University of Derby

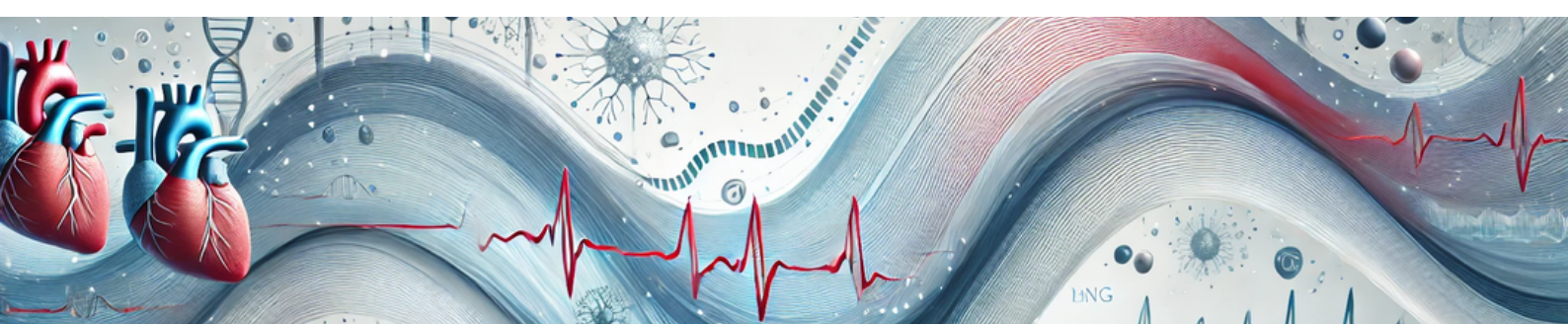
Does blood restriction training improve the respiratory system: a systematic review



My name is Neshat Mansouryar, and I hold a bachelor's degree in Physical education and Sports Science from my home country. Currently, I am pursuing a master's degree in Clinical Exercise at the University of Derby. Throughout my academic journey, I have completed various relevant courses, including postural assessment and corrective exercise in sports injuries. With over two years of experience as a corrective exercise specialist, I have honed my skills in working with individuals of all ages suffering from a range of disabilities and disorders, aiming to enhance their quality of life and overall health. Additionally, I have a robust background as a personal trainer, backed by certifications such as Certified Personal Trainer and International Fitness Trainer, all recognized by EREPS. I am committed to continuous learning and have attended conferences and courses on topics like EMS (Electric Muscle Stimulation) methods and core exercises to stay updated in the field.

Abstract

Blood Flow Restriction (BFR) training is a growing technique for improving respiratory muscle function and athletic performance by applying external pressure to induce a hypoxic environment. This method promotes physiological adaptations without necessitating high-intensity training loads. While traditionally used for limb muscle strengthening, BFR is now being explored for respiratory muscle enhancement to boost endurance and recovery. This systematic review examines the effectiveness of BFR training in improving respiratory muscle strength and aerobic performance. A comprehensive literature search from 2013 to 2024, guided by the PICO framework, identified ten relevant studies ($n = 200$, ages 19–30) assessing VO_2max , cardiovascular adaptations, and respiratory muscle performance. Findings suggest that low-intensity BFR training (20–40% 1RM) significantly enhances aerobic endurance, oxygen uptake kinetics, and cardiovascular function, making it a promising alternative to high-intensity training. Compared to conventional approaches like HIIT and resistance training, BFR offers comparable physiological benefits while reducing mechanical stress. Furthermore, BFR shows potential for sport-specific training and rehabilitation, improving endurance and agility with lower exertion. These results highlight BFR as a safe, versatile, and effective strategy for optimising respiratory muscle conditioning and overall athletic performance.



Elizabeth Foster - University of Derby

Breath, Balance, and Belonging: A Holistic Approach to Preventing Falls in Later Life



Liz is a Senior Lecturer in Dance at the University of Derby where has developed and delivered various dance programmes at undergraduate and post-graduate level including the new BA offer; Dance and Movement for Wellbeing. Research activity has included the effects of dance on those experiencing dementia as well as recent work on developing an inclusive and creative ballet practice.

After training in ballet and contemporary dance, and a career as a dancer, Liz completed an MA in Dance|Movement Psychotherapy at Trinity Laban.

For over 35 years she has worked in the dance industry. Roles have included Lead Dance Artist at the Royal Ballet, where she has devised and delivered education projects including accompanying the Royal Ballet on tour, exploring repertoire with many different groups, creating work in Hong Kong, Madrid, Japan, Taiwan, the USA and Australia.

Liz has worked extensively with adults in movement projects, encouraging participants to step beyond their perceived notions of self and ability. These groups have ranged from elite dancers to those who've never danced before, from adults with various challenges to those who are simply interested in creative exploration. Liz knows firsthand the transformative potential of dance and movement, and the positive impact it can have on all of us, strengthening bonds in groups and releasing the creative potential of individuals.

Alice Marshall (Vale) - University of Derby

Breath, Balance, and Belonging: A Holistic Approach to Preventing Falls in Later Life



Alice Marshall (Vale) is a Senior Lecturer and Programme Leader for Dance at the University of Derby. As Artistic Director of Adaire to Dance, she creates accessible contemporary works that engage new audiences. Her collaborations with Illuminos produce visually striking performances that spark dialogue on social issues. Alice's research explores dance's accessibility and impact, contributing to academic discussions with Routledge credentials. Blending choreography, pedagogy, and advocacy, she uses dance as a tool for meaningful change, inspiring and educating through her innovative practice

Dr Francesco V Ferraro - University of Derby

Breath, Balance, and Belonging: A Holistic Approach to Preventing Falls in Later Life



Dr. Ferraro, a trained physiologist and biomechanics expert, joins the University of Derby. Combining clinical and academic experience, he researches how exercise and rehabilitation impact physiology and movement. His work, from muscle training to robotic surgery, uses scientific methods to solve real-world problems. He fosters international collaborations with projects funded by the UK and EU

Abstract

Falls remain one of the most significant health risks for older adults worldwide. Each year, more than 684,000 people lose their lives due to falls, with over 80% of these individuals coming from low socio-economic backgrounds [1]. People aged 60 and above represent the most affected group, with approximately 37.3 million fall-related incidents requiring medical attention reported annually [2]. In the UK alone, the National Institute for Health and Care Excellence (NICE) estimates that falls cost the NHS over £2.3 billion annually [3]. Building on our previous findings that show the positive effects of multimodal interventions on balance and functional movement in adults over 65 [4], we sought to address a key gap: the need for accessible, socially engaging programmes that older adults can participate in from home or within their community. To this end, we combined expertise from the School of Arts, Sport and Exercise, and Biomedical Science departments to co-design a novel intervention. This programme integrates dance-based movement with respiratory muscle training, providing both physical and social benefits for participants aged 60 and over. Within a few short weeks, we recruited over 30 older adults to join the initiative. Weekly sessions are now underway at the University of Derby's Sports Hall and Dance Studio, delivering meaningful health and social outcomes in the local community. As the project continues to grow, we aim to contribute to national best practices in fall prevention through publication and knowledge sharing. Preliminary results from this intervention will be presented at the upcoming conference.

