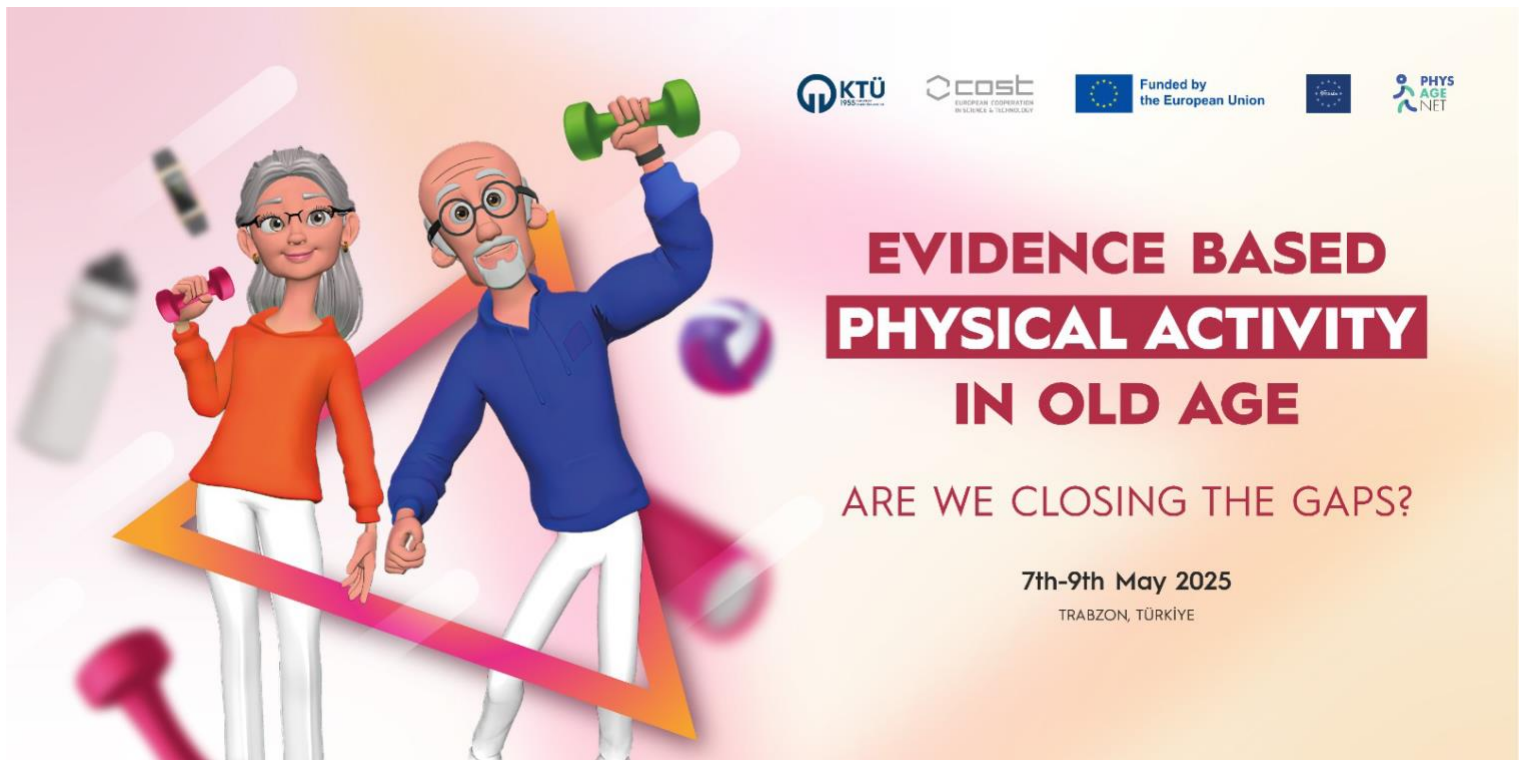




BOOK OF ABSTRACTS

PhysAgeNet & EGRAPA CONFERENCE 2025



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Editors:

Sabine Steidel, Ellen Bentlage, Michael Brach, Yael Netz, Arzu Erden Güner



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COST (European Cooperation in Science and Technology) is a funding agency for research and innovation networks. Our Actions help connect research initiatives across Europe and enables scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation.

Welcome Greetings:

The European Group for Research on Aging and Physical Activity (EGRAPA) is delighted to welcome all of you to the PhysAgeNet & EGRAPA Conference 2025, themed "Evidence-based physical activity in advanced age - are we closing the gaps?"

Almost four years ago, we signed a Memorandum of Understanding (MoU) with the COST Action, committing to advancing evidence-based physical activity in old age. Our aim has been to address critical gaps in research and practice that hinder the effective implementation of training guidelines for older adults. These gaps include:

- Insufficient consolidated research for designing tailored, effective, and feasible exercise programs;
- Exclusion of disabled, low-income, and socially isolated older adults from studies and interventions;
- A lack of long-term studies in real-world settings;
- Limited use of technology to assess, deliver, and improve programs for older populations.

Closing these gaps is a long journey—but now is the time to reflect on our progress.

EGRAPA warmly welcomes you to the PhysAgeNet & EGRAPA Conference 2025, themed: “Evidence-based physical activity in advanced age – are we closing the gaps?”

Yael Netz, President.

Organising Committee:

Head: Dr. Ellen Bentlage –PhysAgeNet Grant Holder Manager, *University of Münster, Germany*

- Assoc. Prof. Arzu Erden Güner (Local Organiser) – *Karadeniz Technical University, Türkiye*
- Prof. Dr. Yael Netz (EGRAPA President) – *The Levinsky-Wingate Academic College, Israel*
- Prof. Dr. Michael Brach (PhysAgeNet Chair) – *University of Münster, Germany*
- Ms Sabine Steidel (PhysAgeNet Management) – *University of Münster, Germany*
- Prof. Dr. Uğur Cavlak – *Biruni University, Türkiye*
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- M.Sc. PT İlke Kara Öz – *Dokuz Eylül University, Türkiye*

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- Dr. Eleftheria Giannouli – *ETH Zurich, Switzerland*
- Dr. Jonathan Gómez-Raja – *Government of Extremadura, Spain*
- Assoc. Prof. Arzu Erden Güner – *Karadeniz Technical University, Türkiye*
- Prof. Dr. Michael Brach – *University of Münster, Germany*
- Prof. Dr. Uğur Cavlak – *Biruni University, Türkiye*
- Prof. Abdullah Bora Özkara – *Karadeniz Technical University, Türkiye*
- Assoc. Prof. Fatih Kırkibir – *Karadeniz Technical University, Türkiye*
- Prof. Dr. Akın Çelik – *Trabzon University, Türkiye*
- Asst. Prof. Dr. Kutluk Bilge Arıkan – *Ankara University, Türkiye*
- Prof. Dr. Filiz Can – *Hacettepe University, Türkiye*
- Assoc. Prof. Nursen İlçin – *Dokuz Eylül University, Türkiye*
- Prof. Dr. Serap İnal – *İstanbul Galata University, Türkiye*
- Prof. Signe Tomsone – *Rīga Stradiņš University, Latvia*
- Dr. Kristine Sneidere – *Rīga Stradiņš University, Latvia*
- PD. Dr. Timo Hinrichs – *University of Basel, Switzerland*

The Conference is jointly organised by:

The European Group for Research on Aging and Physical Activity (EGRAPA)
COST Action Evidence-based Physical Activity in Old Age (PhysAgeNet)
Karadeniz Technical University, Trabzon
University of Münster, Germany



The European Group for Research on Aging and Physical Activity aims to promote physical activity and health in older adults through the carrying out and promotion of research and the collection and diffusion of information related to this field of interest. [EGRAPA Website](#)



The COST Action 20104 PhysAgeNet aims to establish a sustainable network that will foster evidence-based research and practice of physical activity in older adults and will enhance integration of innovative ICT solutions based on open data consolidated research information, in order to promote health and reduce the burden of inactivity in ageing populations. [PhysAgeNet Website](#)



Karadeniz Technical University (KTU), established on May 20, 1955, and commencing its educational activities in 1963, stands as one of Türkiye's oldest and most prestigious higher education institutions. Since its inception, KTU has played a pivotal role in the advancement of higher education in Türkiye, offering a diverse range of academic programs across technical sciences, natural sciences, humanities, and health sciences. The university is committed to training competent, professional individuals who can meet the evolving needs of the country and contribute meaningfully to both national and international communities. [Karadeniz Technical University Website](#)



The University of Münster is one of Germany's largest institutions of higher education (~43,000 students, 600 professors and 4900 research staff). The Institute of Sport and Exercise Sciences includes six departments from natural science, social science and humanities. Research and teaching addresses target groups from preschool children to the oldest old, and includes physical education as well as high performance sport, preventive exercise as well as everyday activity. [University of Münster Website](#) + [Movement Science Website](#)

PhysAgeNet & EGRAPA Conference Evidence-based physical activity in advanced age – are we closing the gaps? Microsoft Teams Link: https://events.teams.microsoft.com/event/379fc3f0-0401-44b9-bae7-815cff1db8e8@c3a05a57-b7dc-4c78-b650-eb8f4697aee3		
Time	Wednesday, 7 th May 2025	Location
09:00 – 10:00 local time (LT) 08:00 – 09:00 CET	<p style="text-align: center;">Opening with Traditional Folk Dance Show</p> Arzu Erden Güner: Local Organizer Hamdullah Çuvalcı: Rector - Karadeniz Technical University Yael Netz: President - The European Group for Research on Aging and Physical Activity Michael Brach: Chair - COST Action PhysAgeNet	Hasan Turan Hall All sessions in the Hasan Turan Hall are hybrid and can be attended onsite and online.
10:00 – 10:30 LT 09:00 – 09:30 CET	<p style="text-align: center;">COST Action "Evidence-based physical Activity in old age" -- PhysAgeNet achievements, prospects, lessons learnt by Michael Brach</p> <p style="text-align: center;">Moderator: Yael Netz</p>	Hasan Turan Hall
10:30 – 11:00 LT 09:30 – 10:00 CET	Coffee break	Cocktail Hall
11:00 – 12:00 LT 10:00 – 11:00 CET	<p style="text-align: center;">Symposium: #16 Recruitment Strategies for Older Adults in Physical Activity Interventions: Synthesis of Evidence, Expert Consensus, and Stakeholder Perspectives</p> <p style="text-align: center;">Chair: Rafal Stemplewski Co-chair: Luliia Pavlova</p> <p><i>Effectiveness of different recruitment strategies for engaging older adults in PA interventions: A systematic review</i> Ilke Kara</p> <p><i>Guidelines for recruiting older adults in PA interventions: A formal consensus and Delphi technique</i> Veysel Alcan</p> <p><i>Breaking barriers to the recruitment of older adults in research: Key stakeholder perspectives and recommendations</i> Magdalena Cyma-Wejchenig</p>	Hasan Turan Hall
12:00 – 12:30 LT 11:00 – 11:30 CET	<p style="text-align: center;">Oral Presentations Physical Activity Strategies in Ageing and Diseases</p> <p style="text-align: center;">Moderator: Serap İnal</p> <p>#61 Mindful Physical Interventions in Breast Cancer Patients: A systematic review and meta-analysis Soledad Ballesteros</p> <p>#79 Comparison of the Effects of Music-Assisted Walking Speed and Physical Performance Assessments in Elderly People with and without Alzheimer's Disease Kubra Tuz</p>	Hasan Turan Hall
12:30 – 13:30 LT 11:30 – 12:30 CET	Lunch	Cocktail Hall

<p>13:30 – 14:45 LT 12:30 – 13:45 CET</p>	<p style="text-align: center;">Oral Presentations Participation in Physical Activity Interventions</p> <p style="text-align: center;">Moderator: Nursen Ilcin</p> <p>#31 Health Literacy and Physical Activity in the Elderly Atiye Kaş Özdemir</p> <p>#78 Evaluation of Limitations Affecting Older People's Participation in Open Green Spaces in Urban Areas: A Case of Düzce Sertac Kaya</p> <p>#82 Social Frailty: Identifying Health-Related Outcomes in Older Adults Ulku Kezban Sahin</p> <p>#68 The Relationship Between Loneliness and Patient Activation Levels in Hospitalized Patients: A Cross-Sectional Study Ayşe Kabuk</p> <p>#38 Difficulty in lifting 5 kilograms of weight as a predictor of diseases among European older adults using SHARE dataset Shaea Alkahtani</p>		<p>Hasan Turan Hall</p>
<p>14:45 – 15:00 LT 13:45 – 14:00 CET</p>	<p style="text-align: center;">Practical Project Demonstration: AgeWell Europe - 8 weeks to functional healthy ageing in Europe by Ruth Kavanagh</p> <p style="text-align: center;">Moderator: Ellen Bentlage</p>		<p>Hasan Turan Hall</p>
<p>15:00 – 15:30 LT 14:00 – 14:30 CET</p>	<p style="text-align: center;">Coffee break</p>		<p>Cocktail Hall</p>
<p>15:30 – 16:45 LT 14:30 – 15:45 CET</p>	<p style="text-align: center;">Symposium: #12 Home-Based Digital Interventions for Active and Healthy Aging: New Insights from Clinical Trials and Systematic Reviews</p> <p style="text-align: center;">Chair: Eleftheria Giannouli</p> <p>A Platform for Remote Motor Fitness Assessment and Personalized Exercise Programs for Older Adults: A Randomized Controlled Trial Salit Bar-Shalom</p> <p>Personalized, home-based cognitive-motor training to improve cognitive and motor functioning in frail adults: first results from an international pragmatic randomized controlled trial Asli Karamanlargil</p> <p>Impact of digital interventions for pain and disability in older adults with pain: a systematic review Anabela Silva</p> <p>Effects of home-based interventions using exergames on physical and cognitive functions in community-dwelling older adults: a systematic review Eleftheria Giannouli</p>	<p style="text-align: center;">Oral Presentations Neuromuscular and Sensorimotor Training in Aging Populations</p> <p style="text-align: center;">Moderator: Jonathan Gómez Raja</p> <p>#17 Investigating the Effects of Improved Depth Perception and Physical Activity Relationship in Older Adults Gokce Nur Yilmaz</p> <p>#18 Adding Neuromuscular Electrical Stimulation to Usual Care in Older Adults for Cognitive and Functional Improvement in Rehabilitation Settings: A Pilot Study Evrim Gökçe</p> <p>#39 Motor Imagery Ability Across the Lifespan Nadja Schott</p> <p>#65 The Effect of Single-Session Motor Imagery on Autonomic Functions in Older Adults in Nursing Homes Gözde Akyüz</p> <p>#83 The Impacts of Functional Electrical Stimulation on the Morphological Characteristics of Skeletal Muscles: A Systematic Review Sena Adanir</p>	<p style="text-align: center;">Symposium: Hasan Turan Hall</p> <p style="text-align: center;">Oral Presentations: Fahri Kuran Hall This session can be attended <u>only onsite</u>.</p>
<p>16:45 – 17:00 LT 15:45 – 16:00 CET</p>	<p style="text-align: center;">Closing of the first conference day Arzu Erden Güner: Local Organizer</p>		<p>Hasan Turan Hall</p>

18:30 LT 19:30 CET	Gala Dinner Please make a reservation via the following link: https://docs.google.com/forms/d/e/1FAIpQLSf94a0-xXJqZvbC5lmy3q-9JngdKbj0xKDdRXVQUbdddbeAtw/viewform *Price and details are accessible in the link.	MUZEYEN RESTAURANT
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Time	Thursday, 8 th May 2025	Location	
08:30 – 09:00 07:30 – 08:00 CET	Poster Session Moderator: Umut Apaydin	Foyer Area <i>This session can be attended <u>only onsite</u>.</i>	
09:00 – 10:00 LT 08:00 – 09:00 CET	Keynote: Prof. Dr. Eco de Geus Genetics of physical activity across the adult life span Moderator: Michael Brach	Hasan Turan Hall <i>All sessions in this Hasan Turan Hall are hybrid and can be attended onsite and online.</i>	
10:00 – 10:30 LT 09:00 – 09:30	Coffee Break	Cocktail Hall	
10:30 – 12:30 LT 09:30 – 11:30 CET	<p style="text-align: center;">Symposium: #24 <i>Exercise & Inflammageing: From Cell to Tissue</i> Chair: Ivan Bautmans</p> <p><i>New results from the SPRINT project o Strength training affects intracellular stress response in peripheral immune cells</i> Ivan Bautmans</p> <p><i>Rejuvenation of the immune system following 3 months strength training: results from the SPRINT project</i> Emelyn Mathot</p> <p><i>Do immunonutrients play a role in training-induced effects on circulating immune cells</i> Andreas Delaere</p> <p><i>New results from the Knee Osteoarthritis Pain Trial o Inflammation is associated to pain sensitization in older persons with knee osteoarthritis</i> Sofie Puts</p> <p><i>New results from the Blood Flow Restriction Trial o Acute effects of blood flow restriction training on markers of inflammation and neuroplasticity</i> Orgesa Qipo</p> <p><i>New insights from the literature on The effect of physical exercise on immunosenescence in the skin and wound healing: a systematic review</i> Rose Njemini</p>	<p style="text-align: center;">Oral Presentations: Digital and Technology-Assisted Interventions for Physical Activity in Aging Moderator: Eleftheria Giannouli</p> <p>#22 <i>Experiences of Technology for Increasing Physical Activity of Older Adults: A Qualitative Metasynthesis</i> Irem Huri Karabiyik</p> <p>#54 <i>Design Considerations for Technology-Assisted Fall-Resisting Skills Training Trials in Older Adults: A Pilot Study</i> Christopher McCrum</p> <p>#56 <i>Need for Tailored Technology-Based Physical Activity Interventions for Elderly with Dementia</i> Niharika Bandaru</p> <p>#58 <i>Effects of Digital Exercise Interventions on Muscle Mechanical Function in Community-Dwelling Older Adults: A Systematic Review and Meta-Analysis</i> Paolo Caserotti</p> <p>#76 <i>Integrating Wearable Technology and Machine Learning for Early Detection and Intervention in Age-Related Mobility Decline</i> Salvatore Tedesco</p> <p>#85 <i>Can Digital Technology Enhance Physical Activity in Hospitalised Older Adults?</i> Rosemary Dubbeldam</p>	Symposium: Hasan Turan Hall Oral Presentations: Fahri Kuran Hall <i>This session can be attended <u>only onsite</u>.</i>
12:30 – 13:30 LT 11:30 – 12:30 CET	Lunch	Cocktail Hall	

<p>13:30 – 14:30 LT 12:30 – 13:30 CET</p>	<p style="text-align: center;">Oral Presentations: The Role of Inflammation and Metabolic Health in Aging and Physical Performance</p> <p style="text-align: center;">Moderator: Jonathan Gómez Raja</p> <p><i>#19 The Impact of CRP, hs-CRP, IL-6, IL-10, and TNFα in Physical Performance in Community-Dwelling Older Adults: A Systematic Review</i> Arben Boshnjaku</p> <p><i>#26 Does High-Intensity Interval Training Have a Positive Effect on Selected Biomarkers of Metabolic Syndrome in Postmenopausal Women?</i> Yangjun Liu</p> <p><i>#28 Relationship Between Aging and Ketogenic Diet: A Bibliometric Analysis</i> Tugba Elgun</p>	<p>Hasan Turan Hall</p>
<p>14:30 – 15:00 LT 13:30 – 14:00 CET</p>	<p style="text-align: center;">Dance Session: Dance Intervention for Older Adult: A Practical Demonstration of the Latin American Dance Cha-Cha By Hana Anna Šišková</p> <p style="text-align: center;">Moderator: Filiz Can</p>	<p>Hasan Turan Hall</p>
<p>15:00 – 15:30 LT 14:00 – 14:30 CET</p>	<p style="text-align: center;">Coffee break</p>	<p>Cocktail Hall</p>
<p>15:30 – 16:45 LT 14:30 – 15:45 CET</p>	<p style="text-align: center;">Symposium: <i>#33 Improving Mobility and Cognitive Function in Older Adults: Interdisciplinary Approaches and Evidence-Based Interventions</i></p> <p style="text-align: center;">Chair: Claudia Voelcker-Rehage</p> <p style="text-align: center;">Co-Chair: Vera Belkin</p> <p><i>Prevention in primary care: Results of the PROGRESS project</i> Vera Belkin</p> <p><i>A RCT on the effects of cognitive, motor, and cognitive-motor training on dual-task walking in older adults and the moderating role of baseline cognitive and motor fitness</i> Melanie Mack</p> <p><i>Digital dual-task training for older adults with hearing impairments - results from a modified Delphi-survey</i> Bettina Wollesen</p> <p><i>Testing the bidirectional relationship between vigorous walking and executive functions: A randomized controlled study in seniors</i> Michel Audiffren</p>	<p>Hasan Turan Hall</p>
<p>16:45 – 17:00 LT 15:45 – 16:00 CET</p>	<p style="text-align: center;">Closing of the second conference day Prof. Arzu Erden Güner: Local Organizer</p>	<p>Hasan Turan Hall</p>

Time	Friday, 9 th May 2025	Location	
08:30 – 09:00 LT 07:30–08:00 CET	Poster Session Moderator: Turgay Altunalan	Foyer Area <i>This session can be attended <u>only onsite</u>.</i>	
09:00 – 10:00 LT 08:00–09:00 CET	Keynote: Prof. Dr. Filiz Can Physical Activity and Exercise for Sarcopenia in Older Adults Moderator: Ugur Cavlak	Hasan Turan Hall <i>All sessions in the Hasan Turan Hall are hybrid and can be attended onsite and online.</i>	
10:00 – 10:30 LT 09:00 – 09:30 CET	Coffee Break	Cocktail Hall	
10:30 – 11:45 LT 09:30 – 10:45 CET	<p>Symposium: #32 <i>The Role of Physical Activity in Brain-Body Dynamics in Older Adults</i></p> <p>Chair: Bettina Wollesen</p> <p>Co-Chair: Claudia Voelcker-Rehage</p> <p><i>Brain mechanisms underlying training-induced changes in dual-task walking in older adults</i> Claudia Voelcker-Rehage</p> <p><i>The power of synergy: Cognitive-motor training boosts BDNF more than isolated training in older adults</i> Evrin Gökçe</p> <p><i>Performance differences in dual-tasking between older and younger adults-does the motor complexity matter? An EEG study</i> Bettina Wollesen</p> <p><i>RT and accuracy in a dual-task walking paradigm in older adults vs younger adults from the MoBI-Study</i> Mona Herden</p> <p><i>Effects of ageing on modality compatibility on dual-task performance in a more naturalistic environment</i> Piesie Akwasi Gyimah Asuako</p>	<p>Oral Presentations: Mobility, Balance, and Fall Prevention Strategies in Older Adults</p> <p>Moderator: Signe Tomsone</p> <p>#41 <i>Modified Otago vs. Structured LSVT-BIG: Which Exercise Program Better Improves Balance in Elderly?</i> Arzu Razak Özdinçler</p> <p>#44 <i>Investigation of the Effect of Frailty on Physical Activity and Fall Risk in Older Adults with Non-Specific Low Back Pain</i> Ayşe Abit Kocaman</p> <p>#59 <i>Evaluation of a Virtual Reality Gait-Based Locomotion Fall Prevention Exergame in Community-Dwelling Healthy Older Adults</i> Nadja Schott</p> <p>#70 <i>Do Proprioceptive Exercises with Otago Exercises Have an Additional Effect on Balance, Falls Behaviour, and Sarcopenia in Older People?</i> Mesut Uludağ</p> <p>#80 <i>Turkish Validity and Reliability Study for The Short Form Berg Balance Scale: Pilot Trial</i> Kutay Kaşlı</p>	<p>Symposium: Hasan Turan Hall</p> <p>Oral Presentations: Fahri Kuran Hall <i>This session can be attended <u>only onsite</u>.</i></p>
11:45 – 12:30 LT 10:45 – 11:30 CET	<p>Workshop Joy of Movement and Active Gaming as new Qualities of Movement Motivation - Applicability and Implementation Opportunities with Older Adults by Eckehard Fozzy Moritz</p> <p>Moderator: Eleftheria Giannouli</p>	Fahri Kuran Hall <i>This session can be attended <u>only onsite</u>.</i>	
12:30 – 13:30 LT 11:30 – 12:30 CET	Lunch	Cocktail Hall	

<p>13:30 – 15:15 LT 12:30 – 14:15 CET</p>	<p>Symposium: #48 <i>Designing and Reporting Effective Exercise Interventions for Older Adults: Guidelines and Training</i></p> <p>Chair: Bettina Wollesen</p> <p>Co-Chair: Antoine Langeard</p> <p><i>Development and evaluation of reporting guidelines for exercise studies with older adults</i> Bettina Wollesen</p> <p><i>Development and evaluation of the training curriculum</i> Antoine Langeard</p> <hr/> <p>Oral Presentations I: Effects of Exercise Interventions for Older Adults</p> <p>Moderator: Arzu Erden Güner</p> <p>#36 <i>Effects of Upper Extremity Low-Volume High-Intensity Interval Training on Postural Sway and Upper Extremity Strength in Geriatric Patients with Heart Failure: A Preliminary Result</i> Nurel Ertürk</p> <p>#47 <i>The Goldilocks Approach: Finding the Optimal "Cocktail" of Physical Behaviors for Health Outcomes in Older Adults</i> Jan Vindiš</p> <p>#50 <i>Changes in SMI and Physical Fitness in Response to High-Intensity Interval Nordic Walking Training in Postmenopausal Women</i> Neng Pan</p> <p>#45 <i>Evaluating the 30-Minute Physical Activity Guideline in Older Adults: A 24-Hour Movement Behaviour Approach to Obesity Prevention</i> Jana Pelclová</p>	<p>Oral Presentations II: Physical Activity, Cognitive Function, and Mental Well-Being in Older Adults</p> <p>Moderator: Ugur Cavlak</p> <p>#21 <i>Perceptions of the Effect of Physical Activity on Mental Health and Well-Being of Older People Who Do and Do Not Do Physical Activity: A Qualitative Comparative Study</i> Aysegul Ilgaz</p> <p>#23 <i>The Effect of Kinetic Brain Exercises on Dual-Task Activities in Healthy Elderly Individuals</i> Arzu Razak Özdinçler</p> <p>#35 <i>Dual-Task Effects on Functional Mobility and Sleepiness Level in Older People with Musculoskeletal Pain</i> Aysun Yağcı Şentürk</p> <p>#37 <i>The Impact of Cognitive Tasks on Arm Muscle Activation in Older Adults: A Pilot Study Using Surface Electromyography</i> Fatma Kübra Çekok</p> <p>#51 <i>Effect of a Six-Month Multimodal Dance Intervention on Physical and Cognitive Performance in Older Adults with Mild Cognitive Impairment</i> Anita Hoekelmann</p> <p>#73 <i>Effects of Game-Based Exercise Training on Physical and Cognitive Well-Being in Older Adults</i> Nursen İlçin</p> <p>#81 <i>Investigation of the Relationship Between Age, Comorbidity, Physical Activity, Physical Performance, and Mobility in Women Aged 65 and Older</i> Kutay Kaşlı</p>	<p>Symposium & Oral Presentations I = Hasan Turan Hall</p> <p>Oral Presentations II Fahri Kuran Hall This session can be attended <u>only onsite</u>.</p>
<p>15:15 – 15:30 LT 14:15 – 14:30 CET</p>	<p>Coffee break</p>		<p>Cocktail Hall</p>
<p>15:30 – 16:15 LT 14:30 – 15:15 CET</p>	<p>Oral Presentations: Exercise Modalities and Intervention Design for Older Adults</p> <p>Moderator: Signe Tomsone</p> <p>#52 <i>Effect of a Bungy Pump Training on Aerobic Capacity in Postmenopausal Women</i> Yintao Niu</p> <p>#57 <i>Effects of Resistance Training with Elastic Bands Compared to Free Weights Training on Functional Performance in Older Adults: A Randomized Controlled Trial</i> Nadja Schott</p> <p>#77 <i>Chronic Effects of Eccentric Strength Training on Biceps Femoris Long Head Elasticity: A Meta-Analysis</i> Gokhan Yagiz</p>		<p>Hasan Turan Hall</p>
<p>16:15 – 16:30 LT 15:15 – 15:30 CET</p>	<p>Closing Ceremony: Announcement on the next EGRAPA Conference Capoeira Performance (Axe Capoeira)</p> <p>Moderator: Arzu Erden Güner</p>		<p>Hasan Turan Hall</p>

KEYNOTE LECTURES

Prof. Dr. Eco de Geus
(*Vrije Universiteit Amsterdam, Netherlands*)



Prof. Dr. Eco de Geus is full professor of Biological Psychology at the Faculty of Behavior and Movement Sciences at the Vrije Universiteit Amsterdam. An important resource for his work is the Netherlands Twin Register (NTR) at Vrije Universiteit Amsterdam that is maintained by his department. The NTR is a population-based cohort recruiting both newborn and adult multiples and their family members since 1987, leading to a current total of over 120000 participants with data across multiple research projects. The longitudinal information in the NTR extends from genotypes to biomarkers to rich behavioural information

including biennial reports on various physical activity behaviors. The research mission of the team of de Geus' is to the study of the determinants of individual differences in behavior and health. De Geus has published over 800 peer-reviewed scientific papers on these topics, cited on average 85 times. Controlled experiments and genetic epidemiological strategies are used to test contribution of genes, stress, and regular physical activity to cardiovascular and mental health. Mental health is studied by a variety of survey measures and diagnostic interviews (e.g. CIDI) as well as tests of cognitive functioning, including brain imaging, and biomarkers for amyloid pathology. Cardiovascular health is studied in the laboratory by recording cardiovascular, autonomic, metabolic, and hormonal responses to standardized conditions, and in “real life” by using ambulatory measurements of blood pressure, cortisol, and the autonomic nervous system. In the study of cardiovascular, affective and cognitive health a genetic perspective is introduced by means of longitudinal twin family designs and molecular genetic approaches, including whole-genome association using SNPs, CNVs, transcript levels (TWAS) or CpG methylation levels (EWAS). Focus areas of research in the past decade have been to elucidate the genetic pathways underlying regular exerciser behavior, and the use of genetically informative prospective studies to unravel causality in the associations between exercise and health.

Keynote lecture

“Genetics of physical activity across the adult life span”

In this lecture I will briefly introduce behavior genetics and the twin design. Using findings from the Netherlands Twin Register I'll show that individual differences in regular exercise behavior and the longitudinal tracking of these differences throughout adulthood is to a large extent explained by genetic factors. This leads me to argue that we are unwise to keep ignoring this heritability of exercise habits in the epidemiology of non-communicable diseases. Instead, we should use the new possibilities afforded by the progress in (molecular) genetics to our advantage. Triangulating across various methods for causal inference like multivariate twin modeling, Mendelian Randomization, and stratification by Polygenetic Risk Scores can help demonstrate the existence of causal effects of regular exercise participation on physical and mental health, even in the presence of residual genetic confounding. The workings of these methods and how they advance the field will be illustrated using left heart failure, cancer and Alzheimer's disease as examples. In closing, I will argue that genetics is not the enemy of public health interventions. That it, on the contrary, can help us unravel the biological impediments against exercise adoption and has the potential to tailor physical activity interventions to subgroups/individuals and thus increase their effectiveness.

Prof. Dr. Filiz Can
(Hacettepe University in Ankara, Türkiye)



Prof. Dr. Filiz Can is Full Professor of Physiotherapy as a lecturer, researcher and clinician at the Hacettepe University, Faculty of Physical Therapy and Rehabilitation in Ankara, Türkiye. She is head of the “Department of Musculoskeletal Physiotherapy and Rehabilitation.” Her clinical practice fields and research topics are on both Orthopaedic and Geriatric Rehabilitation. In addition to leading research and clinical practice in both units with her teams, she has published 51 chapters to national and international orthopaedic and geriatric textbooks as well as published many papers in peer reviewed journals. She took part in many national and congresses as an invited speaker, keynote speaker and also as a member of the organization or scientific committee. She was also the general secretary of the 3rd IPTOP (International Association for Physical Therapists working with the Older People) Congress held in Istanbul in 2006.

She is founding member and president of “Turkish Geriatric Physiotherapy Association” and “Turkish Orthopedic Physiotherapy Association.” She is the former Vice Chair and Chair of IPTOP (International Association for Physical Therapists working with Older People- Subgroup of World Physiotherapy). She has still have a position in IPTOP as a member Research Group. She is also the member of Fragility, Fracture Network (FFN).

She works as official Advisory Board Member in the Ministry of Family and Social Policies in Türkiye. She also works as a consultant or a Core Group/ Expert Group member in many meetings of Ministry of Health and Ministry of Family and Social Policies. She was the vice chair of working group for “Advancing Health and Well-Being Old Age in National Commission on Aging” in Türkiye within the framework of the Madrid international Action Planning of Aging in 2002 and became one of editors of the “Turkish National Plan of Action on Ageing” book. She was one of the chairs for “National Guidelines of Physical Activity Meeting” and contributed as an author in the guideline book.

She has been invited as an expert person and a temporary adviser for a meeting and workshop on integrated long term care for health and social services for older people organized by WHO European Centre for Primary Health Care in Almaty, Kazakhstan, 11–13 December 2018. She was involved in a EU Project titled “Cooperation among CSO for Elderly People” held between 2019-2020. She visited many clinics, day care centers and special care centers for the elderly including the ones for older people with dementia and Alzheimer. She has finished 2 year’s contribution as a multi- professional team member of the Development Group for Dementia to the Development of World Health Organizations’s (WHO) Package of Interventions for Rehabilitation (PIR). Between 2022 and 2024, she served as the representative delegate of the World Physiotherapy-Europe Region at the European Pain Forum meetings of the EFIC for Research Strategy and Redefining Multimodal Pain Care. Currently, she is the member of “Education & Research Matters Working Group” and “Musculoskeletal Disorders Satellite Group” of World Physiotherapy Confederation-Europe Region.

Keynote lecture

“Physical Activity and Exercise for Sarcopenia in Older Adults”

Sarcopenia is a syndrome characterized by progressive and generalized loss of skeletal muscle mass and strength with a risk of adverse outcomes such as physical disability, poor quality of life and death. Prevalance of sarcopenia is 8-40% in the population over 60 years of age and it is higher in women and older age. Its multifactorial causes may include disuse, endocrine malfunction, chronic diseases, inflammation, insulin resistance, and nutritional deficiencies. Muscle loss is associated with mobility disorders, increased risk of falls, reduced ability to function in activities of daily living, loss of independence, and reduced life expectancy. Conditions accompanying sarcopenia such as physical inactivity, decreased mobility, decreased gait speed and decreased physical endurance are the common features of frailty syndrome. The main pathophysiological causes of frailty are sarcopenia, immun deficiency and neuroendocrine disorders. Therefore, sarcopenia is closely associated with frailty and is considered to be one of the key factors in controlling or preventing frailty.

Pharmacological treatment has limited effect on sarcopenia and widely accepted non-pharmological interventions. Physical activity and exercise, nutritional support, Vitamin D and hormonal interventions are most accepted and studied interventions. One of the most used methods for preventing sarcopenia, and consequently dysfunction and falls in the elderly, is physical exercise. Exercise programs, particularly focusing on strength may significantly influence muscle mass and muscle strength, minimizing functional decline and risk of falling. According to guidelines, Resistance training is a form of exercise that can increase or maintain muscle mass and muscle strength, which helps older adults preserve their independence and quality of life. The health benefits of resistance- based training for older adults include muscle hypertrophy, strength gain, and improved physical performance. On the other hand, physical activity and multimodel exercise programs are also recommended in the guidelines. Furthermore, the physical activity and exercise program should be tailored to the needs of older adults and even the type of exercise they are interested in to ensure the sustainability of the program. Therefore the most efficient physical activity and exercise training program must be individually identified, considering the optimal combination between the intensity, volume, and frequency of weekly sessions that can promote muscle adaptations and, in turn, improve the functional capacity in the elderly, thus reducing falls and the risk of falls. This speech will give an opportunity to discuss how to plan most efficient exercise program for the older adults with sarcopenia.

SYMPOSIA PRESENTATIONS

Recruitment strategies for older adults in physical activity interventions: synthesis of evidence, expert consensus, and stakeholder perspectives

Symposium Chair: Rafał Stemplewski

Co-Chair: Iuliia Pavlova

Authors: Sunwoo Lee¹, Rafał Stemplewski², Iuliia Pavlova³, Magdalena Cyma-Wejchenig², Ana Isabel Morais⁴, Ilke Kara⁵, Veysel Alcan⁶, Antoine Langeard⁷, Atiye Kaş Özdemir⁸, Aylin Tanriverdi⁹, Ayse Kabuk¹⁰, Aysegul Ilgaz¹¹, Aysun Yağci Şentürk¹², Eleftheria Giannouli¹³, Eleni Epiphaniou¹⁴, Elpidio Attoh-Mensah¹⁵, Emel Tasvuran Horata¹⁶, Esra Dogru-Huzmeli¹⁷, Fatma Ben Waer¹⁸, Francesca Gallè¹⁹, Gamze Yalcinkaya Colak²⁰, Jan Vindiš¹, Jana Pelclova¹, Melanie Mack²¹, Michael Brach²², Murat Mercan²³, Natalia Chuklantseva²⁴, Patrick Esser²⁵, Rafael Bernardes²⁶, Rahima Gabulova²⁷, Rajesh Shigdel²⁸, Rosemary Dubbeldam²¹, Rukiye Höbek Akarsu²⁰, Sascha Zuber²¹, Sebahat Gözüm¹¹, Seher Özyürek⁵, Yael Netz²⁹, Yintao Niu³⁰, Zada Pajalic³¹, Zaur Gasimov³²

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Despite substantial evidence supporting the benefits of physical activity (PA) in older adults, engaging this population in PA remains challenging. Gaps persist, including: 1) unique barriers faced by older adults at individual, community, and institutional levels, 2) insufficient evidence addressing the diverse needs of ageing populations, particularly the most vulnerable groups, and 3) a lack of clear guidelines for researchers and health professionals on effective recruitment and retention strategies to tackle these challenges. The overall aim of the symposium is to provide state-of-the-art evidence on recruitment strategies to enhance older adults' participation in PA interventions for research and practice. Three research endeavors were pursued: a systematic review, an expert consensus study, and panel discussions with key stakeholders. Each approach offers a distinct and complementary perspective that collectively strengthens the evidence base. Paper 1 synthesizes existing evidence on recruitment practices and identifies knowledge gaps, serving as a basis for empirically grounded recommendations for recruitment strategies across varied settings. Paper 2, using formal consensus and Delphi methods, articulates the collective expertise of multidisciplinary and multinational professionals in PA and ageing research. It seeks agreement on recruitment priorities and recommendations, with a focus on areas where evidence is limited, inconsistent, or complex. Addressing the gap between theoretical evidence and practical application, Paper 3, captures real-world perspectives through stakeholder panel discussions. It integrates the knowledge of practitioners, caregivers, and older adults from two focus group discussions in Poland and Italy. Together, these papers contribute to the development of guidelines for designing, developing, and implementing recruitment strategies for PA interventions targeting older adults. The results will be discussed in the context of evidence-based and contextually relevant approaches.

Ilke Kara: Effectiveness of different recruitment strategies for engaging older adults in PA interventions: A systematic review

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Introduction: This systematic review aimed to evaluate the effectiveness of recruitment strategies for engaging older adults in physical activity interventions, with a specific focus on technology-based ones.

Methods: Following PRISMA 2020 guidelines, the search was done using MEDLINE, EMBASE, SPORTDiscus, CINAHL, and Web of Science databases up to October 2023. Studies on recruitment processes and/or technology integration in promoting physical activity/general health in older adults were included. Sub-groups analysis was done based on potential technology usage, achieving of underrepresented population, and recruitment methods. Primary outcomes were recruitment rates. Data synthesis was performed based on median values for each sub-groups. A secondary analysis categorized studies based on recruitment efficiency thresholds. The protocol was registered in PROSPERO (CRD42023488032).

Results: From 1737 initial records (930 after duplicate removal), 63 articles were analyzed. Technology-assisted interventions showed higher recruitment (32.7%) and eligibility rates (58.1%) than non-technology-based ones (23.4% and 39.8%, respectively). The screening ratio was lower in technology-assisted interventions (1.7 vs. 2.6). Direct recruitment methods yielded the highest approval (78.4%) and eligibility (60.6%) but lower recruitment rates (20.0%). Indirect methods indicated high refusal rates (80.2%) and lower eligibility (27.8%), but had the highest randomization rates (95.7%). Mixed-method recruitment methods had balanced approval (56.9%), eligibility (40.4%), and recruitment (23.4%) rates. Technology-based recruitment, targeting underrepresented populations in the recruitment and direct recruitment methods produced efficient recruitment outcomes (>10% of success). Longer recruitment periods (0.11 months/participant) also showed better recruitment outcomes exceeding that 10% recruitment efficiency threshold.

Conclusion: Technology-based methods demonstrated greater efficiency compared to ones with non-technology-based methods. While direct recruitment methods yielded higher approval and eligibility, it resulted in lower overall recruitment rates. Conversely, indirect methods, while maximizing randomization, faced higher refusal rates and lower eligibility. A mixed-methods approach may offer a more balanced solution. Furthermore, technology-based recruitment and targeting underrepresented groups and longer recruitment periods showed more efficient recruitment outcomes. Future studies should focus on finding recruitment strategies which would be tailored for targeted populations and technology integration.

Keywords: recruitment strategies, older adults, physical activity, systematic review

Veysel Alcan: Key considerations and strategies for recruiting older adults in physical activity studies: A formal consensus and modified Delphi methods

Authors: Sunwoo Lee¹, Magdalena Cyma-Wejchenig², Veysel Alcan³, Ana Isabel Morais⁴, Iuliia Pavlova⁵, Rafal Stemplewski², Antoine Langeard⁶, Elpidio Attoh-Mensah⁷, Eleni Epiphaniou⁸, Melanie Mack⁹, Sebahat Gözüm¹⁰, Aysegül Ilgaz¹⁰, Zaur Gasimov¹¹, Michael Brach¹²

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Background: Despite substantial evidence supporting the benefits of physical activity (PA) for older adults, participation rates remain low due to physical, psychological, social, and institutional barriers. Recruiting older adults for PA studies thus presents significant challenges, particularly for socially vulnerable populations and those facing digital literacy limitations in technology-assisted PA interventions. The present study aimed to articulate and establish a consensus among multidisciplinary and multinational PA experts regarding key considerations and requirements for designing and implementing recruitment of older adults for PA studies.

Methods: This study employed a mixed-methods consensus approach integrating a structured formal consensus process with a two-round Delphi survey. Through face-to-face and online discussions, an expert panel group formulated 104 initial recommendations regarding the recruitment of older adults for PA studies. In the first Delphi round, 42 external experts assessed the relevance of each recommendation, and recommendations with a $\geq 70\%$ agreement threshold were considered consensual. The second round included 60 refined recommendations that were evaluated by 31 experts. A final consensus was reached through iterative expert panel discussions.

Results: Of the 104 initial recommendations, 52 (50%) met the inclusion threshold during the first round. In the second round of Delphi, 36 of the 60 revised recommendations (60%) achieved consensus, with agreement ranging from 71.0% to 96.8%. The final consensus process established 34 key recommendations categorized into four domains: (1) ethical principles (71.7%–93.5%), (2) informed consent (71.0%–96.8%), (3) stakeholder engagement (61.3%–83.9%), and (4) recruitment strategies for technology-assisted PA interventions (74.2%–87.1%). However, there remains a lack of consensus on the extent to which sociocultural diversity and differences in sample representation should be addressed.

Conclusions: This study provides expert-driven, consensus-based recommendations to improve the recruitment of older adults for PA studies. Adherence to ethical considerations, informed consent procedures, stakeholder collaboration, and tailored strategies for technology-assisted interventions were highlighted. These findings offer practical guidance for researchers and practitioners in planning and obtaining adequate participation in PA studies involving older adults.

Magdalena Cyma-Wejchenig: Breaking barriers to the recruitment of older adults in research: Key stakeholder perspectives and recommendations

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Background: Despite growing recognition of the need for inclusive research, participation rates among older individuals remain low, thereby limiting the generalizability and practical implications of research findings. This study aimed to explore the barriers to recruiting older adults into research, based on insights from panel discussions among various stakeholders.

Methods: Panel discussions were conducted during the Wellbeing Days in Kraków (Poland) and the PA4AGE conference in Treviso (Italy). In Kraków, a panel, comprising experts, researchers, and practitioners (n=4), was convened. Additionally, stakeholders from universities, senior centres, and the local host organisation (n=19) actively participated in the discussion. In Treviso, three focus groups were organized: active women aged 65+ (n=4), mixed seniors (n=5), and retired women (n=4). Across both events, discussions were guided by a set of structured questions, used as prompts for open discussion. The sessions lasted 1.5 hours in Kraków and 30 minutes per group in Treviso. Each session was moderated and documented by a minute-taker. To discern recurring themes, findings from each group and across both events were compared.

Results: During both events, participants emphasized the need to align researchers' expectations with the real-world needs of older adults. Key barriers to participation included physical and health-related limitations (e.g., mobility issues, chronic conditions), as well as psychosocial factors such as fear of change, low confidence, apathy, and reluctance to identify as "older adults." Many of the older adults who participated in the discussions were unaware of research participation opportunities due to poor communication; suggested solutions include direct contact, working with senior groups, and tailored outreach. Participants also addressed difficulties with digital tools, which further indicated a need for alternative engagement methods and basic technical support. Additionally, older men appeared more inclined to participate when activities matched their interests.

Conclusion: Enhancing the recruitment of older adults requires a holistic approach that addresses physical, psychological, and structural barriers. Implementing tailored communication, fostering trust through community partnerships, and promoting digital literacy can help create more inclusive, representative studies. These insights, derived from multiple stakeholders, provide a foundation for developing best practices to engage older adults in scientific research.

Home-Based Digital Interventions for Active and Healthy Aging: New Insights from clinical trials and systematic reviews

Symposium Chair: Eleftheria Giannouli

Authors: Salit Bar-Shalom¹, Asli Karamanlargil², Anabela Silva³, Eleftheria Giannouli²

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Advancements in information and communication technologies (ICTs) are transforming healthcare delivery, providing innovative solutions to meet the growing demands on health services. In the context of active and healthy aging, ICTs hold significant potential to enhance the health, well-being, and independence of older adults. This symposium presents insights from two randomized controlled trials and two systematic reviews, shedding light on the role of digital interventions in promoting active and healthy aging within the home environment. Karamanlargil et al. and Giannouli et al. investigate the effectiveness of cognitive-motor exergame training in improving cognitive and motor functions in older adults. Bar-Shalom et al. present a remote motor fitness assessment platform and personalized exercise programs, while Silva et al. examine the impact of digital interventions on pain and disability among older adults experiencing chronic pain. The integration of technology-enabled training and remote management has proven especially valuable during the COVID-19 pandemic, when traditional in-person care faced significant disruptions. As technological advancements accelerate and ICT literacy among older adults continues to grow, the importance of these interventions will only increase. This symposium underscores the critical and timely nature of research in this area, offering actionable insights to advance active and healthy aging through home-based digital solutions.

Salit Bar-Shalom: Remotely delivered personalized exercise program improves motor components at old age - a randomized controlled trial

Authors: Salit Bar-Shalom¹, Yael Netz¹, Esther Argov¹, Michal Arnon¹, Eti Benmoha¹, Jeremy M Jacobs², Keren Tchelet Karlinsky³, Ziv Yekutieli³

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Background: Exercise guidelines for older adults are predominantly “one-size-fits-all”, primarily focusing upon aerobic activity with limited emphasis upon motor components.

Objective: We examined the hypothesis that remotely delivered, personalized multicomponent exercise - based on a simple yet highly reliable and accurate smartphone motor fitness assessment and individually tailored using machine-learning - can improve balance, flexibility, and strength among older adults, obviating the need for a lab or professional supervision.

Methods: This randomized controlled study recruited community-dwelling healthy older adults age ≥ 65 years, with normal cognition, low fall-risk, and no hospitalization within the last year for cardiac/neurological illness. Participants were randomly assigned to the study experimental 8-week Personalized Exercise group (5x/week, multicomponent exercises), an 8-week Active-Control group (exercise counselling according to WHO guidelines), or Control group (no intervention). Participants were assessed at baseline, 4, 8, and 12 weeks. Measurements were remotely recorded using smartphone sensors, and were analyzed using machine learning to create each participant’s unique fitness profile. The primary outcome measures were changes in fitness profile parameters after the 4-weeks/8-weeks intervention period.

Results: We assessed 239 volunteers who consented and met inclusion criteria (155 women, mean age 72.63 ± 5.38 years). Compared to both Controls, the Personalized Exercise group significantly improved in Dynamic Balance ($F_{6,404}=3.232$, $p<0.01$, $\eta^2=0.046$), Total Balance – sum of all balance measurements ($F_{6,432}=3.03$, $p<0.05$, $\eta^2=0.040$), Arm Flexion ($F_{6,448}=2.527$, $p<0.05$, $\eta^2=0.033$), Arm Extension ($F_{6,450}=2.753$, $p<0.05$, $\eta^2=0.035$) and Arm Strength ($F_{6,424}=2.394$, $p<0.05$, $\eta^2=0.033$). Significant improvement was observed with adherence as low as 1.5 exercise sessions per week over 8 weeks, and often within just 4 weeks.

Conclusion: A smartphone platform, with remote assessment and delivery of home-based individually tailored exercises, effectively targets the often-neglected key fitness components—balance, arm flexibility, and arm strength—in older adults. This approach has the potential to generate varied movement profiles and personalized exercise programs for both healthy individuals and those with mobility or cognitive impairments.

Asli Karamanlargil: Personalized, home-based cognitive-motor training to improve cognitive and motor functioning in frail adults: first results from an international pragmatic randomized controlled trial (S.M.A.R.T)

Authors: Asli Karamanlargil¹, Ilaria Carpinella², Maurizio Ferrarin², Mitja Geržević³, Eleftheria Giannouli¹, Valerio Gower², Ruud Knols⁴, Uroš Marušič⁵, Sotiria Moza⁶, Luka Šlosar⁵

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Cognitive frailty, defined as the coexistence of physical frailty and cognitive impairment without dementia, significantly increases the risk of adverse health outcomes in older adults. In the face of rising rehabilitation demands and workforce shortages, scalable and engaging home-based interventions are urgently needed. Cognitive-motor training, which integrates cognitive tasks with whole-body movements, has been shown to be particularly effective in improving both mobility and cognitive function compared to traditional methods. Exergames offer a novel, engaging approach to delivering such training, enhancing enjoyment and adherence. This international multi-center pragmatic Randomized Controlled Trial (RCT) aims to evaluate the effectiveness of personalized, home-based cognitive-motor training using exergames in improving cognitive and motor functions in frail adults. A total of 344 frail participants from five European countries will be enrolled. Participants in the intervention group will engage in a personalized exergame program, while the control group will follow the Otago Exercise Program. Both groups will undergo 12 weeks of training. The primary outcome is dynamic balance, with secondary outcomes including cognitive and motor fall-risk factors, fall incidence, cost-effectiveness, and psychosocial and patient-reported outcomes. Traditional studies often fail to provide adequate guidance for clinical practice, as they focus on determining efficacy under idealized conditions, using rigid protocols and selectively chosen participants. This can lead to overestimated benefits and underestimated harms. Our study aims to generate evidence for the effectiveness of ICT-based, remote cognitive-motor therapy under real-world conditions, thereby providing valuable insights for both the scientific and healthcare communities. As part of this effort, preliminary results of the study will be shared at the conference, providing an initial overview of our findings.

Anabela Silva: Impact of digital interventions for pain and disability in older adults with pain: a systematic review

Authors: Rosa Andias¹, Nelson P Rocha¹, Ana J Santos¹

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Introduction: Musculoskeletal pain is highly prevalent and a leading cause of disability among older adults, who are also underserved in terms of appropriate pain management interventions. Digital health is promising in delivering timely and evidence-based pain management interventions, but its use is not widespread. This systematic review and meta-analysis aimed to summarise the evidence on the effectiveness of digital pain management interventions for pain intensity and functioning of older adults with musculoskeletal pain.

Methods: We searched PubMed, Web of Science, Scopus, and Academic Search Complete from inception to April 2024. We extracted participants' characteristics, outcomes (pain intensity and self-reported disability), intervention characteristics, personalization strategies and adverse events. Risk of bias was assessed using RoB 2.

Results: We included 34 RCTs. No major adverse events directly related to the intervention were reported, and 53% of the included RCTs used only one or no personalization strategy. Most RCTs were rated as high risk of bias for at least one domain. At immediate post-intervention, there were no between-group differences between digital interventions delivered at a distance and other (any) interventions ($k=20$; $es=-0.12$, $95\%CI=-0.29,0.05$; $p=0.15$, $I^2=0.69$), but there was a significant decrease in pain intensity favouring digital interventions when compared to no intervention ($k=5$; $es=-0.26$, $95\%CI=-0.46,-0.06$; $p=0.01$; $I^2=0.0$). No between-group differences were found for self-reported disability, both when compared to any intervention ($k=21$, $es=-0.08$, $95\%CI=-0.29, 0.12$; $p=0.42$; $I^2=0.84$) and to no intervention ($k=4$; $es=0.06$, $95\%CI=-0.15, 0.28$; $p=0.56$; $I^2=0.02$).

Discussion: Results cautiously suggest that digital interventions have similar effects to other interventions for pain intensity. However, included trials vary widely in terms of the characteristics of the digital interventions, and most studies had at least one domain with high risk of bias. More research is needed to investigate whether aspects of the digital intervention, such as personalization, impact the results.

Conclusion: Digital interventions might be an option to extend pain management to more older adults with musculoskeletal pain, and the choice of engaging in a digital intervention might be left to patient preferences. Nevertheless, further high-quality research is needed.

Eleftheria Giannouli: Effects of home-based interventions using exergames on physical and cognitive functions in community-dwelling older adults: a systematic review:

Authors: Eleftheria Giannouli¹, Julia Seinsche¹, Eling de Bruin^{1,2}, Maurizio Ferrarin³, Ilaria Carpinella³

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Introduction. Home-based exergame training offers a promising approach to counteract physical inactivity in older adults. This systematic review aimed to provide a comprehensive overview of home-based exergame interventions and to evaluate their effectiveness in improving cognitive and physical functions in community-dwelling older adults. **Methods.** A systematic literature search was conducted in five databases (PubMed, Web of Science, Embase, Scopus, and CINAHL). Studies were included if they (1) investigated community-dwelling older adults aged 60 years or older without specific diseases, (2) examined exergame-based exercise programs conducted at least partially in a home setting, and (3) reported intervention-related physical and/or cognitive outcomes. Eligible study designs included randomized controlled trials (RCTs) and other types of pre-post intervention studies published in English. No restrictions were placed on the type of control group or publication date. **Results.** Eighteen studies met the inclusion criteria (10 RCTs, 1 quasi-RCT, 1 non-randomized controlled trial, and 6 single-arm pre-post studies), encompassing a total of 1125 participants (mean age: 76.5 years). The exergame systems used were grouped into four categories: (1) Microsoft Kinect-based movement detection, (2) inertial measurement unit (IMU)-based motion detection, (3) pressure-sensitive stepping systems, and (4) Nintendo Wii platforms. Home-based exergames were found to effectively improve a broad range of physical and cognitive functions. Stepping exergames, in particular, appeared most effective in enhancing cognitive performance, while for physical outcomes, the effectiveness varied depending on the specific function targeted and the device used. **Conclusion.** Substantial heterogeneity in outcome measures, assessment tools, and intervention protocols, along with a moderate to high risk of bias in the included studies, limited the feasibility of conducting a meta-analysis. High-quality studies with rigorous methodology are needed to draw more definitive conclusions regarding the efficacy of home-based exergame interventions for older adults.

Exercise & Inflammaging: from cell to tissue.

Symposium Chair: Ivan Bautmans

Authors: Ivan Bautmans¹, Emelyn Mathot¹, Andreas Delaere ¹, Sofie Puts¹, Orgesa Qipo^{1,2}, Rose Njemini¹

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Unsuccessful biological ageing is characterized by chronic low-grade inflammation, described as inflammaging. Several factors such as immune cell senescence and a higher concentration of pro-inflammatory cytokines are responsible for an elevation of the basal inflammatory milieu. With regards to other age-related pathologies such as knee osteoarthritis more evidence emerges of the biochemical origins of this pathology and especially the impact of inflammatory mediators on this process. Evidence shows anti-inflammatory effects of physical exercise, potentially reducing biological ageing and progression of age-associated chronic diseases. In this symposium, we will first present recent evidence from the SPRINT-study (<https://fria.research.vub.be/en/sprint>). Ivan BAUTMANS will show new data confirming that both high and moderate intensity ST improves the stress response of peripheral mononuclear blood cells by mimicking in-vitro an acute infection by lipopolysaccharide challenge. Emelyn MATHOT will present evidence that strength training can help reducing senescent immune cells providing immune space for more functional cells, thus rejuvenating the immune system. Finally, Andreas DELAERE will report on the association between immonutrient intake and immune adaptations following strength training. Sofie PUTS will report new data from the Knee Osteoarthritis Pain Trial (<https://rere.research.vub.be/koa-project>) showing the link between systemic inflammation (assessed by hsCRP and suPAR) and characteristics of peripheral and central sensitization in radiographic knee osteoarthritis patients suffering from knee pain. Blood flow restriction strength training is very promising since it addresses specific physiological responses. Unique data on the acute effects of blood flow restriction strength training on inflammatory and neuroplasticity biomarkers will be presented by Orgesa QIPO. Since it remains unclear to which extent the effects of physical exercise training on blood biomarkers also reflects exercise-induced adaptations in the tissues, Rose NJEMINI will present a systematic literature review demonstrating that physical exercise has beneficial effects on immunosenescence in the skin and wound healing. These findings are highly relevant since the skin is highly exposed to age-related changes. The symposium will end with an interactive discussion between lecturers and the audience.

Ivan Bautmans: Strength training affects intracellular stress response in peripheral immune cells

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Introduction: The aim of the present study was to examine the impact of a three-month resistance exercise intervention on the expression of inflammation related genes in peripheral blood mononuclear cells (PBMCs) of older adults, after an acute infection mimicked by an in-vitro challenge by lipopolysaccharide (LPS) in PBMCs.

Methods: Adults aged 65 years, or more were randomized to three-month intervention, 2 to 3 times a week: an intensive strength training (IST, 3 sets of 10 reps. at 80% 1RM), strength endurance training (SET, 2 sets of 30 reps. at 40% 1RM) or a flexibility training (CON, 3 sets of 30 sec.). Whole blood was collected by a venipuncture at baseline and after three months intervention. PBMCs were isolated and cultured with and without LPS challenge for 24 hours. RNA was extracted from isolated PBMCs (blanco) and isolated PBMCs cultured without and with LPS (respectively control and LPS samples). A core set of 36 genes was investigated with Quantigene method.

Results: No statistical differences were observed in the participants' characteristics between the three intervention groups at baseline. Both men and women showed comparable exercise-induced gene expression patterns after an LPS immunochallenge, however different genes were affected. In CMV seronegative men and women a more pro-inflammatory genes were downregulated after the exercise intervention regarding the LPS-induced gene expression in PBMCs. In the CMV seronegative men a more pronounced exercise-induced effect is visible in the SET group compared to the CON group than in seropositive men.

Conclusion: A confirmatory analysis via Quantigene of a core gene set identified after RNA sequence analyses showed that different resistance exercise intensities impacted the gene expression linked to inflammation, immunosenescence, and ageing in PBMCs after an LPS challenge. Both gender and CMV status have an impact on the immune function at the genetic level. In which CMV seronegative men benefit more from exercise regarding an immunochallenge. Thus, resistance exercise induces effects on gene expression after an immunochallenge, however a balanced resistance exercise program is recommended for optimal immune adaptations in older adults.

Emelyn Mathot: Rejuvenation of the immune system following 3 months strength training: results from the SPRINT project

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Introduction: Immunosenescence, in particular the shift towards senescence-prone T-cells, can threaten healthy ageing. Six weeks resistance exercise was previously shown to decrease circulating senescence-prone T-cell numbers in women. We aimed to investigate the effects of a long-term (3 month) resistance exercise program on gene expression and surface markers of T-cell immunosenescence in both men and women.

Methods: Community-dwelling adults aged 65 and over were assigned to either 3 months intensive strength training (IST, 3x10 repetitions at 80% 1RM), strength endurance training (SET, 2x30 repetitions at 40% 1RM) or flexibility training (CON). Peripheral blood mononuclear cells (PBMC) were isolated from venous blood samples and the proportions and absolute counts of circulating naïve, memory, and senescence-prone T-cells were determined via flow cytometry. Gene expression analysis was performed via Quantigene analysis after RNA-extraction of PBMC. Between group ($p < 0.05$) effects were determined with Kruskal-Wallis and Mann-Whitney U-tests, time effects via Wilcoxon's signed rank test. Genes with an absolute fold change of ≤ 0.67 or ≥ 1.5 were considered clinically relevant. Cytomegalovirus (CMV) status was determined via chemiluminescent microparticle immunoassay of serum CMV immunoglobulin G levels.

Results: Three months of SET, but not IST, was able to decrease CD3+(CD28-)CD57+ senescence-prone T-cells compared to CON. Moreover, the proportions of CD28-CD57- memory T-cell phenotypes were also increased after 3 months SET. Most effects remained significant in men but not in women. The effects were also more prominent in CMV-positive. In men, CD28+CD57- naïve T-cells were also increased after 3 months SET. At the gene level, expression of CCL3 and CXCL8 was decreased after SET in CMV-negative only.

Conclusion: Three months of SET was able to counteract a 3+ year worth accumulation of senescence-prone T-cells. More prominent changes in CMV-positive may have been driven by the preferential mobilization of CMV-positive T-cells and subsequent exposure to circulating apoptotic stimuli. Moreover, SET was also able to decrease gene expression markers of immunosenescence, although additional effects on T-cell senescence may have been masked in the PBMC pool.

Andreas Delaere: Do immunonutrients play a role in training-induced effects on circulating immune cells

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Objectives: To examine whether changes in dietary intake during a strength training intervention are associated with alterations in circulating T-cell subsets in community-dwelling older adults (65+). **Design:** Randomized controlled trial.

Participants: Community-dwelling men and women (n=139) aged 65 years and older who had not engaged in regular physical activity during the six months preceding enrollment.

Methods: Participants completed a 3 month exercise intervention, consisting of three supervised training sessions per week. Intervention groups included Intensive Strength Training (IST) and Strength Endurance Training (SET), with a Flexibility Training (FT) group serving as control. No dietary advice was provided. Nutritional intake was assessed using 3-day food diaries at baseline, 6 weeks, 3 months. Blood samples were collected at baseline (T0) and at 3 months (T2) for immunophenotyping of T-cell subsets. Paired t-tests were used to analyze within-group changes in nutrient intake and T-cell percentages. Subsequently, multiple linear regression analyses were conducted to explore associations between changes in nutrient intake and changes in T-cell subsets.

Results: In the IST group, significant changes were observed in omega-3 intake (+0.41 g/day; p = .036), the omega-6/omega-3 ratio (-0.63; p = .036), and total energy intake (-147 kcal/day; p = .035), along with a reduction in senescent-like T-cells (CD3⁺CD28⁻CD57⁺: -0.75%; p = .049). In the SET group, total energy intake decreased significantly (-111 kcal/day; p = .038), accompanied by changes in multiple T-cell subsets (e.g., CD8⁺CD28⁻CD57⁻: +3.34%; p = .009). In the FT group, significant changes were noted in the intake of carbohydrates, vitamin D, zinc, omega-3, and omega-6 fatty acids. However, in none of the groups were the observed dietary changes significantly associated with the changes in T-cell profiles.

Conclusions: Despite significant changes in dietary intake during the intervention period, these were not significantly related to changes in T-cell subsets. The observed immunological adaptations are therefore likely driven by the strength training itself, supporting the role of exercise in mitigating age-related immunosenescence.

Sofie Puts: Inflammation is associated to pain sensitization in older persons with knee osteoarthritis

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Objective: To investigate whether systemic inflammation is associated with characteristics of human-assumed peripheral and central sensitization in radiographic knee osteoarthritis (KOA) patients with pain.

Design: Ninety KOA patients were assessed for peripheral (electrical pain thresholds) and central (temporal summation (TS), conditioned pain modulation (CPM), and offset analgesia) sensitization. Blood was collected at baseline and assayed for acute (high-sensitivity C-reactive protein (hsCRP)) and chronic (soluble urokinase plasminogen activator receptor (suPAR)) inflammation. Bivariate correlations were performed for both inflammatory markers with all variables of peripheral and central sensitization. Age was investigated as mediator in the effect of suPAR on KOOSSYMPT, and BMI was investigated as mediator in the effect of hsCRP on KOOSPAIN.

Results: Acute inflammation (i.e. hsCRP) was associated with BMI and KOOSPAIN, and chronic inflammation (i.e. suPAR) was associated with TSknee, TSwrist, CSI, and age. The chronic/acute inflammation ratio ($\log(\text{suPAR})/\log(\text{hsCRP})$) was associated with BMI, KOOSPAIN, ICOAPscore and CPMwrist. Furthermore, we demonstrated the mediating role of age in the negative relationship between $\log(\text{suPAR})$ and KOOSSYMPT, however, BMI was not a mediator in the relationship between $\log(\text{hsCRP})$ and KOOSpain.

Conclusion: These findings reveal important insights into the working mechanisms behind the complex relationship among systemic inflammation, pain modulation, and sensitization in KOA. Our results indicate that chronic inflammation, rather than acute inflammation, is a key factor in the impaired endogenous analgesia responses in KOA patients. Future studies should explore these relationships in prospective studies.

Orgesa Qipo: New results from the BRAIN-M trial: Acute effects of blood flow restriction training on markers of inflammation and neuroplasticity

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Background: Age-related declines in muscle strength and neuroplasticity are linked to lower levels of neurotrophic and anabolic hormones, such as brain-derived neurotrophic factor (BDNF) and insulin-like growth factor-1 (IGF-1). Exercise is known to mitigate these effects, but the differential impacts of resistance training modalities on neurotrophic biomarkers in older adults remain unclear.

Objective: To examine the acute and chronic effects of two resistance training interventions, blood flow restriction training (BFRT) and muscle damage resistance training (MDRT), on circulating BDNF and IGF-1 levels in healthy older men.

Methods: Sixty-three males aged 60–75 were randomized into three groups: BFRT, MDRT, or a non-exercising control group. Participants in the intervention groups trained twice weekly for 12 weeks. Blood samples were collected at baseline, after an acute exercise session, and post-intervention to assess BDNF and IGF-1 levels. Data were analysed using ANCOVA, adjusting for baseline values and covariates including age and body fat percentage.

Results: A significant interaction effect (time × group) was found for BDNF ($p = .017$), indicating differential changes across groups over time. While adjusted post-intervention BDNF levels were highest in the BFRT group, these differences were not statistically significant in post-hoc comparisons. IGF-1 results showed no significant between-group differences after 12 weeks.

Conclusion: Both BFRT and HIRT induced changes in BDNF levels over time, with BFRT showing a non-significant trend toward higher post-intervention levels. These findings suggest that different resistance training modalities may differentially influence neuroplasticity-related biomarkers in older men, warranting further investigation into their long-term cognitive and functional benefits.

Rose Njemini: New insights from the literature on The effect of physical exercise on immunosenescence in the skin and wound healing: a systematic review

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Background: The signs of aging are most prominently reflected in the skin, driven by biological mechanisms such as immunosenescence and inflammaging. These processes are influenced by internal factors, including genetic predisposition and hormonal changes, as well as external factors like UV radiation, pollution, and lifestyle habits. While exercise is a well-known non-pharmacological intervention to counteract age-related changes in the circulatory system, its effects on skin immunity and wound healing are less understood. This systematic review synthesizes current evidence on exercise's impact on skin immunity and wound healing, exploring its potential to mitigate age-related skin deterioration.

Methods: The review was conducted following a PROSPERO-registered protocol (ID: CRD42021248948). Comprehensive searches were conducted in PubMed and Web of Science for studies examining the effects of exercise on cutaneous immunosenescence and wound healing. Data were extracted on participant characteristics, exercise interventions, and outcomes related to skin immunity and wound healing. Methodological quality and risk of bias were assessed using the Cochrane Risk of Bias Tool.

Results: Eighteen studies met the inclusion criteria, including 12 randomized controlled trials, 2 non-randomized controlled trials, and 4 non-controlled intervention studies. Studies varied widely in exercise modalities (resistance training, endurance training, flexibility exercises, or combined approaches), study populations (<65y, ≥65y, sedentary, and active), and outcomes measured (wound healing rates, delayed-type cell-mediated immunity, skin barrier function, histological changes, mitochondrial DNA alterations). Most studies found that exercise interventions increased skin elasticity and dermal thickness, accelerated wound healing, and improved ulcer closure rates compared to controls. Prolonged moderate-intensity exercise also modulated immune function, with some evidence of suppressed cell-mediated immune responses.

Conclusion: Both endurance and resistance exercises were found to improve skin elasticity and the structural integrity of the upper dermis, with resistance training showing a more pronounced effect on increasing dermal thickness. The findings suggest that regular physical activity may serve as an effective non-pharmacological strategy to mitigate age-related declines in skin function and immune competence. Given the heterogeneity of study designs and outcomes, future research should focus on standardized protocols to better elucidate the mechanisms through which different types and intensities of exercise influence cutaneous immunosenescence and tissue repair processes.

Improving mobility and cognitive function in older adults: Interdisciplinary approaches and evidence-based interventions

Symposium Chair: Claudia Voelcker-Rehage

Co-Chair: Vera Belkin

Authors: Vera Belkin¹, Claudia Voelcker-Rehage¹, Melanie Mack², Bettina Wollesen³, Michel Audiffren⁴

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Maintaining mobility and cognitive function is essential for the health, independence and quality of life of older adults. However, physical inactivity, environmental barriers and age-related declines in cognitive-motor function can limit participation in daily activities and increase the risk of falls. This symposium explores interdisciplinary approaches to promoting physical activity, cognitive-motor performance and adherence to exercise interventions in older adults. The first presentation introduces the PROGRESS study, a cluster-randomised controlled trial investigating the combined effects of exercise interventions and guided environmental modifications on physical activity behaviour, physical functioning, and life-space mobility in nursing home residents. The findings of the study will inform strategies to foster active participation in social life and health promotion (Vera Belkin). The second and third presentations focus on cognitive-motor dual-tasking (DT), a key component of everyday mobility. One study explores how cognitive, and motor fitness influence the effectiveness of DT training, revealing the complex interplay between cognitive and motor outcomes (Melanie Mack). The other project, entitled "GeHörBalance," focuses on the role of hearing tasks in DT training and presents insights from a Delphi process on the development of a mobile health intervention tailored to hearing-impaired older adults (Bettina Wollesen). The final presentation focuses on the bidirectional relationship between physical activity and cognitive health. The findings from this randomised controlled trial demonstrate the effects of a structured walking and muscle-strengthening program on executive function, as well as the role of executive function in adherence to physical activity programmes (Michel Audiffren). The symposium integrates perspectives from clinical trials, environmental psychology and digital health innovations, offering evidence-based recommendations for fostering mobility and cognitive resilience in ageing populations. The presented findings contribute to the development of tailored interventions that enhance physical activity behavior, reduce fall risk and support active participation in daily life.

Vera Belkin: Early prevention in stationary care: Results of the PROGRESS project

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Introduction: Nursing home residents often have a sedentary lifestyle, which might negatively impact their health and psychosocial well-being. Exercise classes are important to maintain PF. Otherwise, environmental interventions capitalize on the influence of the environment at a low level, making it easy to integrate PA and LSM into everyday life. Thus, combining exercise classes and environmental interventions might be more effective in increasing PA behavior, PF, and LSM. The PROGRESS study aims to investigate the short- and long-term effectiveness of combined exercise and environmental interventions in improving PA behavior, PF, and LSM in nursing home residents.

Method: We employed a cluster-randomized controlled crossover design with four intervention groups. Participants were randomly assigned to a combined exercise and guided environmental intervention or one of three control conditions, i.e., exercise intervention, guided environmental intervention, or non-guided environmental intervention. The exercise intervention involved group-based sessions twice a week. The environmental intervention focused on implementing physical activity in daily routines. The guided environmental intervention was equal to the non-guided, but was offered with support two to four times a week. Seven nursing homes with N = 123 residents aged 61 to 103 years (M = 84,9, SD = 8 years), were recruited. Each nursing home received two interventions for 16 weeks each (36 weeks in total) plus a 16-week follow up (non-guided environmental intervention). Primary outcomes were PA behavior (Fitbit activity tracker, number of steps), PF (short physical performance battery (SPPB), and LSM (Nursing Home Life Space Diameter).

Results: All four interventions led to the maintenance or improvement of the physical functions (no significant decline). The number of steps and the LSM are currently being analyzed.

Discussion: The findings contradict our initial assumptions of a superior effect of combined interventions, highlighting the unique characteristics of the nursing home environment. Since the changes in the different groups are not significantly different, we can only conclude that any form of intervention is useful in the nursing home setting - although it should be noted that we did not have a passive control group and therefore cannot rule out test replication effects.

Melanie Mack: A RCT on the effects of cognitive, motor, and cognitive-motor training on dual-task walking in older adults and the moderating role of baseline cognitive and motor fitness

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Cognitive-motor dual-tasking (DT), essential for daily activities like walking in busy spaces, declines with age. Research suggests that cognitive (cogT), motor (motT), and cognitive-motor DT training (DTT) can improve DT performance in older adults, yet studies report heterogeneous effects. This RCT examined whether baseline cognitive (cf) and motor fitness (mf) moderates training effects of these interventions on cognitive-motor DT performance in older adults. Participants (N = 103, aged 65–75) completed 12-week interventions in cogT, motT, or DTT. A battery of cognitive and motor tests was conducted at pretest to create composite scores of cf and mf. Cognitive-motor performance was assessed at pre- and posttest using a Serial 3s Task (S3), a Stroop task (STR), and a walking task for both domains (cognitive and motor). For the cognitive domain, outcomes included correct responses (S3) and accuracy of incongruent trials (STR); for the motor domain, step variability (inverted to step stability) was used. Outcomes were assessed under single-task (ST) and DT conditions. Linear mixed models showed a significant three-way interaction (time × group × domain) for DTT vs. motT (S3: $p = .007$, STR: $p = .038$) and cogT vs. motT (S3: $p = .025$, STR: $p = .038$), but not for DTT vs. cogT (S3: $p = .732$, STR: $p = .592$). The overall pattern indicated that DTT and cogT mainly improved cognitive performance, while motT enhanced motor performance. Additionally, cf — but not mf — significantly moderated intervention effects for S3. The four-way interaction (cf × time × group × domain) was significant for DTT vs. motT ($p < .001$) and cogT vs. motT ($p < .0001$), but not for DTT vs. cogT ($p = .153$). The pattern suggested that while cf had little influence on pre-post changes in cogT and DTT, in motT, higher cf was associated with greater increases of cognitive performance but smaller increases of motor performance compared to individuals with lower cf. Results did not differ between ST and DT conditions. The results emphasize the complex relationship between cognitive and motor outcomes in cognitive-motor interventions and the key role of baseline fitness in moderating intervention effects.

Bettina Wollesen: Digital dual-task training for older adults with hearing impairments - results from a modified Delphi-survey

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Background Age-related hearing impairments significantly impact social interactions and physical activities for older adults. Recent studies have highlighted the potential benefits of cognitive-motor training but lack specificity regarding the unique needs of this population. This study aimed to determine the exercise preferences and specific needs of older adults with hearing impairments to develop tailored cognitive-motor training programs. Methods A Delphi survey was conducted to gather expert opinions and user preferences to inform the development of an app. The survey engaged 220 health and exercise professionals and 30 older adults with hearing impairments across three rounds, using a combination of open and closed questions. Data collection lasted from December 2023 to July 2024 and resulted in 10 to 14 complete responses per group and round. Statistical analyses included frequency analysis, mean, standard deviation, and one-way ANOVA to identify significant differences between expert and user responses. Results The study gathered 570 responses, which were clustered into 148 items, with 35 removed due to low relevance. Analysis showed significant differences between health professionals and hearing-impaired older adults in ratings of training components. Health professionals rated motor-related items like “Combined strength and balance exercises for fall prevention” ($F(1,22)=5.307$; $p=0.031$) and “Exercises with closed eyes” ($F(1,22)=8.208$; $p=0.009$) higher than hearing-impaired participants. Similar trends were seen for hearing-related items, such as “Listening exercises with background noise” ($F(1,17)=6.243$; $p=0.025$) and “Exercises with and without hearing aids” ($F(1,17)=5.676$; $p=0.031$). Health professionals also rated dual-task (DT) items like “Listening tasks during balance exercises” ($F(1,20)=4.675$; $p=0.044$) higher. Hearing-impaired adults rated “Flexibility exercises” and “Performing exercises with music or background noise” higher, though these differences were not significant. Conclusions Tailored cognitive-motor training programs that incorporate the preferences and sensory capabilities of hearing-impaired older adults promise high adherence and effectiveness. Frequent training sessions stimulate neuroplasticity, enhancing both cognitive and motor functions. These programs should emphasize ease of use, flexibility, and autonomy to promote engagement while supporting greater independence and quality of life for this vulnerable population.

Michel Audiffren: Testing the bidirectional relationship between vigorous walking and executive functions: A randomized controlled study in seniors

Authors: Michel Audiffren¹, Nathalie André¹

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The positive effects of physical exercise on cardiovascular health are well-documented and widely recognized by the scientific community. However, the bidirectional relationship between physical exercise and cognitive health is less well understood and deserves greater attention. The objective of this presentation is to explore both aspects of the virtuous cycle linking physical exercise to executive functions: on the one hand, the beneficial effects of physical exercise on cognitive health, and on the other, the role of executive functions in adherence to a structured physical activity program. These two relationships will be illustrated through a randomized controlled trial funded by the French Research National Agency, conducted between 2014 and 2018 in Poitiers and Bordeaux, involving 145 participants. In the first part of the presentation, we will demonstrate the effects of a six-month vigorous walking and muscle-strengthening program on executive functions, particularly controlled inhibition. The second part will highlight the role of executive functions in maintaining adherence to the program over the following six months. The final part of the presentation will discuss the neurophysiological mechanisms that may explain these links and provide perspectives for future research in this field.

The Role of Physical Activity in Brain-Body Dynamics in Older Adults

Symposium Chair: Bettina Wollesen

Co-Chair: Claudia Voelcker-Rehage

Authors: Mona Herden¹, Piesie Akwasi Gyimah Asuako², Evrim Gökçe³, Claudia Voelcker-Rehage², Bettina Wollesen⁴

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Physical activity is widely recognized as a key factor in reducing age-related declines in brain and physical functions. Numerous studies on older adults have demonstrated its role in the interaction between the brain and body, where neural and biomechanical processes work together to regulate movement, emotions, cognition, and overall health. However, the underlying mechanisms of physical activity's influence on brain-body dynamics remain less understood and continue to be an area of active research. This symposium presents findings from neuroimaging and behavioral studies that explore the effects of physical activity on neurophysiological and biomechanical pathways in dual-task performance among older adults. The first presentation discusses an EEG study comparing dual-task performance between older and younger adults. It focuses on event-related potentials (latency and amplitude at P1, N1, and P3) to explain behavioral differences in dual-tasking while standing and walking. The second talk presents fNIRS data from the MIND2 study, highlighting brain activation during dual-task walking in a virtual environment. Findings reveal increased activation from single to dual-task conditions, with higher brain activation predicting greater declines in behavioral performance. The third presentation examines the impact of modality compatibility on dual-task performance in older adults using data from the MONALI study (a subproject of MIND2). Results show how the similarity between stimulus modality (e.g., auditory, visual) and sensory-related task response (e.g., vocal, manual) influences dual-task performance. The final talk explores the effects of a cognitive-motor (dual-task) intervention on BDNF levels in older adults, again findings of the MIND2 study. Findings indicate that cognitive-motor training enhances BDNF more effectively than isolated training. Taken together, the symposium will integrate these findings to summarize the mechanisms underlying brain-body interactions and their role in improving cognitive functions and overall health in older adults.

Claudia Voelcker-Rehage: Brain mechanisms underlying training-induced changes in dual-task walking in older adults

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Walking is fundamental for mobility and independence in older adults. Performing additional tasks like navigating or talking while walking (dual-tasking) increases neurocognitive demands, often reducing task performance due to limited neurocognitive capacity. Age-related declines in dual-task performance are discussed to reflect neuronal inefficiency. Cognitive and motor training seem to counteract neurocognitive declines. However, the differential effects of these training approaches are inconclusive. This study investigated the effects of three training approaches (cognitive (COG), motor (MOT), and combined cognitive-motor training (CMT)) in 106 healthy older adults (69.15 ± 2.71 years; 59 females). Participants were randomly assigned to one of the three training groups and completed 12 weeks of training (24 sessions, 45 minutes each). At pre- and post-test, dual-task performance was assessed in the Gait Real-Time Analysis Interactive Lab (GRAIL). Participants performed a standing baseline task, a treadmill walking task (1 m/s), a Stroop inhibition Task (Stroop), and a Serial 3's updating Task (Serial 3's) under single- and dual-task conditions (Walking + Stroop/Serial 3's). We analyzed step time variability (StepVar) for Walking, accuracy on incongruent trials for Stroop, and correct subtractions for Serial 3's. Functional near-infrared spectroscopy (fNIRS) were used to assess changes in oxygenated hemoglobin (HbO₂) in prefrontal (PFC) and parietal cortices (PC). Linear mixed models revealed that CMT led to reduced StepVar during Walking + Serial 3's, compared to COG ($t = 2.07$, $p = .041$), although no differences for Serial 3's or HbO₂ emerged. Furthermore, CMT reduced HbO₂ during Walking + Stroop in PFC ($t = 2.12$, $p = .035$), and COG reduced HbO₂ while Walking + Stroop, in both PFC ($t = 3.00$, $p = .003$) and PC ($t = 3.27$, $p = .001$). There were no behavioral differences, neither in StepVar nor in Stroop. Results suggest CMT and COG re-enhance neural efficiency during dual-task walking. Benefits of COG may reflect broader task-specific improvements (PFC and PC), while CMT may enhance dual-task coordination (PFC only). Selective brain activation changes for Walking + Stroop may further suggest improved visuomotor processing. Conclusively, training interventions might be most effective for enhancing neural efficiency during dual-task walking when integrating cognitive exercises.

Evrım Gökçe: The power of synergy: Cognitive-motor training boosts BDNF more than isolated training in older adults

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Background: Cognitive, motor, and cognitive-motor dual-task (DT) training are promising strategies for promoting cognition in older age. However, the cellular mechanisms underlying training-induced cognitive improvements remain poorly understood. This study aimed to investigate the effects of a 12-week cognitive training (CT), motor training (MT), or combined cognitive-motor training (CMT) program on circulating BDNF and CTSB levels, as well as cognitive function in healthy older adults. **Methods:** Forty-eight healthy older adults (70.14 ± 3.39 years, 28 female) were randomly assigned to CT, MT, or CMT groups and completed a 12-week intervention with 45-minute sessions twice weekly. Cognitive functions were assessed via the Simon Task, N-back Task, and Digit Symbol Substitution Test (DSST), and myokine levels were assessed via the ELISA test at baseline and after the intervention. Linear mixed models (LMMs) were used to analyze the effects of intervention on myokines and cognition. **Results:** LMM revealed a significant time-by-group interaction indicating BDNF levels significantly increased in CMT compared to CT ($\beta = 4120.44$, $p = 0.021$). No significant effects were observed for CTSB levels. There was no significant effect of time-by-group interaction for cognitive outcomes; however, a main effect of time was observed, indicating reductions in the Simon Effect ($\beta = -25.74$, $p < 0.001$) and improvements in accuracy for both the N-back task ($\beta = 7.60$, $p = 0.037$) and DSST ($\beta = 3.61$, $p = 0.04$). No significant correlation was found between changes in BDNF levels and cognitive performance. **Discussion:** The CMT group's BDNF increase suggests a synergistic effect of cognitive and motor training. The lack of correlation with cognition may indicate that BDNF supports long-term neuroplasticity, while the cognitive improvements observed in our study were likely driven by practice effects. The high education level of our sample (16.20 ± 3.32 years) may have limited cognitive gains, as participants already function well due to their high cognitive reserve. **Conclusion:** CMT elicits a superior neurotrophic response compared to MT and CT, likely due to a synergistic effect. Further research with larger samples and varying exercise doses and intensities is needed to confirm and expand these findings.

Bettina Wollesen: Performance differences in dual-tasking between older and younger adults-does the motor complexity matter? An EEG study

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Age-related dual-task decrements during standing and while walking are discussed in line of several theoretical assumptions. We examined age-related differences in behavior and electrocortical parameters measured with electroencephalography (EEG) during dual-task (DT) performance, focusing on cognitive and motor modulations. Specifically, we assessed the P1/N1 and P3 components of the event-related potential (ERP) related to infrequent stimuli during simple and dual tasks. We hypothesized that DT walking would induce greater cognitive-motor interference, especially for older adults during early and central visual processing. Method A sample of 24 younger and 20 older adults participated in the study and data of n=19 younger adults (n= 11 males, n= 8 females) and n= 11 older adults (n= 6 males, n= 5 females) were included in data analysis. Participants completed prescreening for demographics, health, cognition, and physical performance. Three motor tasks were randomized: sitting, standing on a force plate, and treadmill walking. The DT was an oddball choice-reaction task. ERPs (N1, P3) were recorded to measure latencies and amplitudes related to information processing. A 2x2x3 mixed-design analyzed changes in ERPs during increasing motor task complexity, with age group (20-35 years vs. 65+ years) as a between-factor, and stimulus type (target vs. non-target), and motor task (sitting, standing, walking) as within- factors. Results Results showed age effects for step length, with older adults exhibiting shorter steps. In addition, older adults demonstrated slower reaction times as task complexity increased. P1 and N1 latencies increased with task complexity, with older adults showing higher N1 latencies and a greater increase from sitting to standing. P3 latencies were longer for older adults compared to younger adults, but while P1 and N1 amplitudes increased with task complexity, P3 amplitude did not. Discussion The results suggest that older adults experience greater cognitive and motor demands during DT conditions, especially during walking, which may affect both motor control and sensory processing. As task complexity increases, older adults require more cognitive resources, leading to slower reaction times and altered sensory processing. The findings highlight the interaction between sensory processing and motor control. Future research should explore whether these age-related differences are universal or task-specific.

Mona Herden: RT and accuracy in a dual-task walking paradigm in older adults vs younger adults from the MoBI-Study

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BACKGROUND: As global aging increases, cognitive impairment has become a leading cause of disability and mortality in older adults (1). Cognitive decline significantly impacts daily functioning and quality of life in the aging population (2,3). Yet, research highlights the brain’s plasticity also in older age, suggesting potential avenues for prevention (4, 5).

OBJECTIVE & METHODS: This study investigates cognitive-motor interference in dual-task (DT) situations during walking, examining how the Simon effect varies between young and older adults under different task conditions. A total of 48 participants (24 young adults and 24 older adults) completed either a single-task (ST) condition involving a visual or auditory Simon task or a DT condition combining the same Simon task with overground walking.

RESULT: Results showed that both age groups exhibited longer reaction times (RT) and reduced task accuracy for misaligned stimulus-response pairs during walking compared to sitting. However, older adults showed a greater reduction in task accuracy than young adults. Additionally, older adults showed a greater reduction in task accuracy for auditory stimuli compared to visual stimuli. These findings suggest that cognitive-motor interference is greater in older adults during walking and that this interference is modulated by the sensory modality of the stimuli.

CONCLUSION: The results highlight age-related differences in cognitive-motor interactions, emphasizing the heightened vulnerability of older adults in complex, real-world DT situations. These insights may inform targeted interventions aimed at improving cognitive-motor coordination, enhancing daily functioning, and promoting independence in aging populations.

REFERENCES: (1) WHO (2012) (2) Fink et al. (2023) (3) Wang et al. (2022) (4) Nguyen, Murphy & Andrew (2019) (5) Brehmer et al. (2014)

Piesie Akwasi Gyimah Asuako: Effects of ageing on modality compatibility on dual-task performance in a more naturalistic environment

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Many studies show age-related differences in dual-task costs (DTC), with older adults (OA) experiencing greater DTC than young adults (YA). Furthermore, research indicates that DTC are influenced by the modality compatibility effect (MCE), which refers to the difference in performance between modality-compatible (auditory-vocal or visual-manual) and modality-incompatible mappings (auditory-manual or visual-vocal) between stimuli and responses. Typically, modality-compatible mappings result in lower DTC than modality-incompatible mappings. MCE is also discussed as being influenced by lifelong experiences, with OA exhibiting a stronger MCE than YA. In previous research, MCE has been investigated mainly in classical laboratory environments rather than more naturalistic ones, such as a driving simulator (DS). Additionally, age-related differences in MCE were amplified in the laboratory environment. Here, we investigated the effects of age group and environment on MCE in DTC. We hypothesised that OA exhibit stronger MCE than YA, that MCE would be higher in the laboratory than in the DS. Additionally, we expected that OA would show a greater laboratory-DS difference than YA. Twenty-five YA (20–30 years) and twenty-five OA (65–75 years) responded manually or vocally to visual or auditory stimuli under modality-compatible or modality-incompatible conditions. Tasks were performed under single- and dual-task conditions in both environments. Main outcomes were MCE for reaction time (MCERT) and accuracy (MCEACC), calculated as the difference between DTC in the modality-incompatible and the modality-compatible conditions. Linear mixed models assessed the effects of age group and environment on MCERT and MCEACC. Results showed no significant age-related differences in MCERT ($p = .59$, $\eta^2 = 0.03$) or MCEACC ($p = .11$, $\eta^2 = 0.06$). MCEACC did not differ between laboratory and DS ($p = .09$, $\eta^2 = 0.07$) but MCERT was significantly lower for DS than laboratory across age groups ($p < .001$, $\eta^2 = 0.48$). MCE were similar across age groups for RT (Age * Environment: $p = .56$, $\eta^2 < .01$) and ACC (Age * Environment: $p = .99$, $\eta^2 < .01$). These findings suggest that during dual-tasking OA and YA may similarly benefit from pre-learned sensorimotor associations (i.e., modality-compatibility), effectively reducing DTC under compatible conditions, and that this effect persists in real-world settings.

Designing and reporting effective exercise interventions for older adults: Guidelines and training

Symposium Chair: Bettina Wollesen

Co-Chair: Antoine Langeard

Authors: Bettina Wollesen¹, Antoine Langeard², Mona Herden³, Piesie A. G. Asuako⁴, Melanie Mack⁵, Michel Audiffren⁶, Nicola Lamberti⁷, Christoforos Giannaki⁸, Claudia Voelcker-Rehage⁴

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The global population is aging at an unprecedented rate, with the number of individuals aged 65 and older expected to double by 2050. This demographic shift underscores the urgent need for effective interventions that can enhance the overall health and quality of life of older adults (WHO, 2022). Exercise interventions have emerged as a vital component in promoting physical, cognitive, and mental health in this population, offering benefits such as improved mobility, enhanced cognitive function, reduced risk of chronic diseases, increased well-being, and lower all-cause mortality. The FITT principles (Frequency, Intensity, Time, and Type) are key in designing and evaluating exercise interventions for older adults. Detailed reporting of these components is essential for several reasons. It helps to identify which aspects of exercise impact health and functional outcomes (American College of Sports Medicine, 2009), ensures interventions can be replicated (Lamb et al., 2002), and supports adherence and safety, especially for older adults with varied health conditions (Paterson & Warburton, 2010). Additionally, it aids meta-analyses and systematic reviews to establish evidence-based guidelines for exercise in this population (Higgins & Green, 2011). Comprehensive FITT reporting enhances the clarity, reproducibility, and applicability of research findings. However, the efficacy of (published) interventions is often undermined by inconsistent and incomplete components as well as reporting in research studies, which hampers the ability to replicate findings, perform meta-analyses, and translate research into practice. Within this symposium we want to present the development of new reporting guidelines, a description tool and curricula of training for students in exercise physiology, therapy and other health areas that can be regarded as the next generation that will design future exercise interventions for older adults across Europe. These ideas result from a working group within the EU COST action PhyAgeNet. The symposium includes two presentations:

Bettina Wollesen: Development and evaluation of reporting guidelines for exercise studies with older adults

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Introduction: The comprehensive reporting of exercise interventions in scientific research is crucial for the reproducibility of findings, to facilitate systematic literature reviews and meta-analyses, and to support the development of effective and tailored exercise programs for older adults. Here we provide revised reporting guidelines based on existing guidelines designed to improve the quality of exercise intervention descriptions for older adults in scientific papers. The goal of these guidelines is to enhance the consistency, transparency, and completeness of reporting, ultimately enabling the development of evidence-based interventions that can improve the health and well-being of older adults.

Methods: The development of this guideline involved systematic process following the guidance provided by Moher et al. (2014). The process included: (1) a Delphi survey with 93 experts across three rounds; (2) a systematic review of existing reporting guidelines (e.g., TIDieR, CERT, CONSORT, SPIRIT); (3) a face-to-face consensus meeting to refine initial items; (4–5) expert and editor rating rounds; and (6) a final consensus survey involving 39 journal editors.

Results: Experts emphasized the need for detailed documentation of exercise interventions using FITT principles, intensity control, and participant characteristics. Key additions included reporting age, sex, baseline fitness, digital literacy, comorbidities, adherence, and control group details. The final checklist extended existing CONSORT items and integrated best practices from multiple frameworks. Ratings of importance were high across most items ($M = 8.0\text{--}10.0$), with strong agreement among both experts and editors. Feedback also underscored the importance of tailoring interventions and describing technology use when applicable. Items related to motivational strategies, adverse events, and compliance were retained despite redundancy concerns, to enhance clarity and support replication.

Conclusion: This multi-stage consensus process resulted in a comprehensive and context-sensitive reporting guideline for exercise interventions in older adults. The checklist improves standardization, transparency, and utility of future trials, aiding systematic reviews and practical implementation.

References: Moher, D., Altman, D. G., Schulz, K. F., & Simera, I. (2014). How to develop a reporting guideline. *Guidelines for reporting health research: a user's manual*, 14-21.

Antoine Langeard: Training future experts in evidence-based physical activity for older adults: implementation and evaluation of a European PhysAgeNet curriculum

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Introduction: There is a pressing need for harmonized and evidence-based training on physical activity interventions targeting older adults. As part of the COST Action CA20104 – PhysAgeNet, we developed and piloted a curriculum aimed at providing postgraduate students with the necessary skills to design, evaluate, and report interventions for older adults in accordance with evidence-based medicine (EBM) standards.

Methods: The curriculum was delivered as a 3-hour module in master's programmes at three European universities. The course included lectures on physiological and cognitive aspects of aging, intervention design using the FITT framework, and an overview of reporting guidelines. Evaluation included student feedback collected through questionnaires, assessing clarity, usefulness, and engagement. In addition, a digital recognition system using open badges was developed to acknowledge participants and educators.

Results: Data from 180+ students revealed consistently high satisfaction. Mean scores across institutions (Caen, Münster, Ferrara) ranged from 3 to 4.8 on a 5-point scale. Clarity and perceived usefulness were particularly high though some variability existed in perceived novelty and interactivity, depending on students' prior experience.

Discussion: The curriculum could effectively enhance student understanding of EBM-based physical activity interventions in aging. Student feedback emphasized the value of structure and practical relevance, but also highlighted the need for adaptive content depending on audience background. The open badge system offers a promising model for incentivizing participation of both educators and students and tracking engagement across the network.

ORAL PRESENTATIONS

Physical Activity Strategies in Ageing and Diseases

Soledad Ballesteros: Mindful Physical Interventions in Breast Cancer Patients: A systematic review and meta-analysis

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Mind-body interventions in breast cancer (BC) survivors are considered to improve physical and psychological well-being and quality of life (QoL) and ameliorate adverse effects of cancer treatment. This review and meta-analysis aim to explore and update the evidence on the effectiveness of different mind-body practices such as Yoga, Tai Chi, or Qigong in improving quality of life (QoL), and reducing fatigue, anxiety, and depression in middle-aged and older adults with BC. The review also explores whether these interventions reduce circulating inflammatory markers. Following the PRISMA guidelines, we systematically searched electronic databases for randomized controlled studies (RCT) published from inception to January 2025. Eligibility criteria included studies conducted with BC patients and a mean age of 40+ years, published in English in peer-reviewed journals, the participants engaged in body-mind exercise, and the outcomes were quality of life, fatigue, anxiety, depression, cognition, or inflammation markers. The search was performed in Cochrane Central Register of Controlled Trials (CENTRAL, 447 records) and PsycINFO (88 additional records), yielding a total of 535 records. After removing 62 duplicates, 363 records were excluded based on title/abstract screening, and 110 full-text articles were assessed for eligibility, of which 71 studies were included. Findings suggest that mind-body practices significantly reduce levels of fatigue, anxiety and depression while enhancing mood, sleep quality, pain management, cognitive function, and overall QoL. Some studies also indicate reductions in inflammatory cytokines post-treatment, which may contribute to improved physical and psychological health. Although effects vary across studies, the data suggest that mind-body interventions may offer lasting benefits during cancer treatment. However, the need for more standardized protocols and longitudinal studies is highlighted to evaluate the long-term effectiveness. Findings from this meta-analysis will help to design effective mind-body interventions to improve and/or maintain QoL, reduce anxiety and depression, and promote mind-body practice initiation and maintenance in BC patients.

Kubra Tuz: Comparison of the Effects of Music-Assisted Walking Speed and Physical Performance Assessments in Elderly People with and without Alzheimer's Disease

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Introduction: The use of dual-task assessments incorporating cognitive tasks has been increasing in the literature for detecting cognitive impairment and developing treatment plans. In this study, walking speed and physical performance were assessed in elderly individuals with and without Alzheimer's disease, while participants listened to music, and the effects were compared.

Method: A total of 60 elderly participants were included in the study: 30 with Alzheimer's disease and 30 without. Participants performed the chair sit-to-stand test (30 seconds) and the 10-meter walking test, respectively. These tests were conducted three times under three different conditions: with motivational music (120 bpm), with relaxing music (60 bpm), and without music. After a 5-minute rest period, the 10-meter walking test was repeated using the same protocol.

Results: The average age of Alzheimer's patients was 77.90 ± 5.39 years, while the average age of the control group was 75.16 ± 6.23 years. The walking speed of Alzheimer's patients was statistically significantly higher with motivational music compared to relaxing music. Similarly, the 30-second chair sit-to-stand test scores were statistically significantly higher with motivational music than with relaxing music. When comparing the test averages between groups under both relaxing and motivational music conditions, the control group showed statistically significantly higher values than the Alzheimer's group. **Discussion:** Our study is significant as it incorporates music into assessment tests for elderly individuals with and without Alzheimer's disease. Various cognitive tasks are added as neurophysiological tasks in dual-task applications depending on the level of difficulty. However, there is no consensus in the literature regarding the most appropriate cognitive task for use in dual-task tests. We believe that determining the effects of different modalities, such as music, is particularly important for identifying approaches that facilitate adaptation and participation in rehabilitation for elderly individuals with Alzheimer's disease. **Conclusion:** The study data indicate that walking speed and physical performance assessments conducted while listening to music are more challenging for Alzheimer's patients compared to those without the disease. It has been demonstrated that physical performance tasks accompanied by music can serve as an alternative cognitive task option for dual-task tests involving cognitive components.

Participation in Physical Activity Interventions

Atiye Kaş Özdemir: Health Literacy and Physical Activity in the Elderly

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Introduction: Although health literacy is increasing day by day, there is still a lack of information in the elderly. It is also known that physical activity levels are low in the elderly. It has been reported that low health literacy and physical activity are risk factors for frailty in these individuals and constitute risk factors for disability and death. The aim of this study was to analyze the health literacy and physical activity levels of elderly individuals.

Methods: The study was conducted with 83 participants over 65 years of age. Demographic information of the participants was obtained, Adult Health Literacy Scale (AHLS) and Physical Activity Scale for the Elderly (PASE) scores were calculated.

Results: The participants were 66.98±1.57 years old. 39 (47%) were illiterate, 39 (47%) were literate, 18 (21.7%) were primary/secondary school graduates, and 5 (6%) were high school graduates. PASE score was 58.55±38.19 and AHLS score was 12.13±4.09. Gender and education level affected the AHLS score, but had no effect on PASE. AHLS score was found to be higher in male subjects and as the educational level increased ($p<0.05$). A positive correlation was found between AHLS and PASE ($r=0.345$, $p=0.001$).

Discussion: As in adults, physical activity rates increase as health literacy increases in the elderly. Health knowledge improves individuals' adoption of healthy behaviors and participation in physical activities. The development of individuals' ability to obtain, understand and apply information about their own health and the adoption of healthy behaviors increase their participation in physical activity.

Conclusion: It was found that health literacy and physical activity levels of the elderly individuals who participated in our study were low and related to each other. In order to increase the awareness of elderly individuals on these issues, health education campaigns, facilitating access to mass media and increasing information through these means are recommended.

Sertac Kaya: Evaluation of limitations affecting older people’s participation in open green spaces in urban areas: A case of Düzce

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Urban green spaces (parks, gardens, walkways, etc.) are of great environmental and social importance. They offer environmental benefits such as improving air quality, reducing the urban heat island effect and supporting biodiversity, while enhancing the physical, mental and social well-being of urban residents. Especially for older people, green spaces provide an environment that encourages mobility, reduces stress and prevents social isolation. However, older people’s access to and use of these spaces are affected by various physical, social and environmental factors. This study aims to determine the main factors affecting the access and use of open green spaces by elderly individuals. The study was conducted by face-to-face survey with 150 elderly individuals in the city centre of Düzce. The reason for choosing Düzce is that the interaction of green spaces with the elderly population is intense and varies in terms of accessibility, safety and social interaction. The collected data were analysed using structural equation modelling (SEM) and factor analysis with SPSS. These analyses provided a reliable framework for understanding the attitudes and behaviours of older people towards green space use. The study revealed that accessibility, safety, removal of physical barriers and social interaction opportunities should be improved to increase the participation of older people in green spaces. Urban planners and local governments should design elderly-friendly green spaces by taking these factors into account and make urban spaces more inclusive. Such arrangements can improve the quality of life of elderly individuals and make cities livable spaces that appeal to all age groups.

Ulku Kezban Sahin: Social Frailty: Identifying Health-Related Outcomes in Older Adults

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Objective: Social frailty is associated with negative health consequences. There is insufficient research on social frailty. This study aims to identify the relationship between social frailty and health parameters such as physical performance, cognitive status, polypharmacy, and falls.

Method: The study included 113 community-dwelling older adults (female: 56.41%). We used the Tilburg Frailty Indicator, 30-s sit-to-stand test, and Mini-Mental State Examination to investigate social frailty, physical performance, and cognitive status, respectively. We also recorded the number of medications used for polypharmacy and the number of falls that occurred in the last year.

Results: The mean age was 70.86 ± 5.77 years for the participants. A positive correlation was found between social frailty and age ($r=0.306$; $p<0.001$), polypharmacy ($r=0.241$; $p=0.010$), and falling number ($r=0.224$; $p=0.018$). A negative correlation was found between social frailty and the 30-s sit-to-stand test ($r=-0.260$; $p=0.005$) and the Mini-Mental State Examination ($r=-0.238$; $p=0.010$).

Conclusion: This study found a correlation between social frailty and many health problems in older adults. Social frailty is correlated with age, physical performance, polypharmacy, falls, and cognition. In order to prevent or delay social frailty, which is especially common in older ages, clinical assessments and the application of treatment modalities such as exercise are very important.

Ayşe Kabuk: The Relationship Between Loneliness and Patient Activation Levels in Hospitalized Patients: A Cross-Sectional Study

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Introduction: This study aimed to determine the relationship between loneliness and patient activation levels in hospitalized patients.

Methods: This descriptive and correlational study included 269 patients hospitalized in a public hospital between April and September 2024. Data were collected using a Personal Information Form, the UCLA Loneliness Scale-Short Form, and the Patient Activation Measure (PAM). Statistical analyses included Pearson correlation, independent samples t-test, and Anova.

Results: The mean age of participants was 45.99 ± 17.22 years, with 49.88% under 45 years old. Of the participants, 57.2% were female, 78.8% were married, 30.9% were high school graduates, and 75.1% had children. Additionally, 40.5% had never worked, 61.3% reported income equal to expenses, 58.4% had chronic diseases, and 55.8% rated their health as moderate. A significant negative correlation was found between PAM and UCLA scores ($r = -.372$, $p < .001$). Age was negatively correlated with PAM scores ($p < .001$), with participants under 45 years old having higher PAM scores than older groups ($p < .001$). Women, married individuals, those without children, higher education, employment, and income were associated with higher PAM scores ($p < .05$). Conversely, chronic diseases, hospitalization in internal medicine clinics, and poor self-rated health were linked to lower PAM scores ($p < .05$). UCLA scores showed a positive correlation with age ($p < .001$). Participants under 45 years old had lower UCLA scores than older groups ($p = .05$). Lower education, unemployment, chronic diseases, and internal medicine hospitalization were associated with higher UCLA scores ($p < .05$). Poor self-rated health also correlated with higher UCLA scores ($p < .05$).

Discussion: The findings highlight the importance of addressing loneliness and patient activation in nursing care. Patient activation, a modifiable factor, can be improved through education and self-management tools. Loneliness, particularly among older adults and those with chronic diseases, can hinder recovery.

Conclusion: This study provided guidance to healthcare professionals in addressing loneliness and improving patient activation. By integrating psychosocial support, patient education, and individualized care plans, nurses can enhance patient engagement and reduce loneliness. These efforts are particularly important for vulnerable populations, such as older adults and those with chronic diseases. Future interventions should focus on holistic approaches to improve health outcomes and quality of care.

Shaea Alkahtani: Difficulty in lifting 5 kilograms of weight as a predictor of diseases among European older adults using SHARE dataset

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Objectives: Muscle weakness is a risk factor for multiple diseases. However, most protocols to assess muscle weakness require clinical settings. A difficulty lifting 5 kilograms may be a simple measure of muscle weakness in domestic settings. However, no relevant study about assessing muscle weakness is reported.

Methods: We investigated the potentials of difficulty lifting 5 kilograms in predicting various musculoskeletal, cardiovascular, metabolic, and neurological diseases in European geriatric adults aged 50 or above from 15 countries (n=51,536) over five years. The data was collected from the Survey of Health, Ageing, and Retirement in Europe (SHARE) conducted between 2013 and 2020.

Results: Overall, 10,025 (19.5%) respondents exhibited difficulty lifting 5 kilograms at baseline in 2013. Over the next four years, these respondents exhibited higher risks for developing a low quality of life (QoL) (9.42%), depression (8.14%), low handgrip strength (7.38%), and osteoarthritis (6.98%) after adjusting for age and gender. Additionally, these respondents exhibited mild to moderate risks for developing rheumatoid arthritis, heart attack, diabetes mellitus, hypertension, Alzheimer’s disease, stroke, or hip fracture (all p<0.05). After adjusting for age and country, the risks of developing various diseases were higher in men than in women.

Conclusion: Collectively, difficulty lifting 5 kilograms can herald the onset of several cardiovascular, neurological, and musculoskeletal disorders along with a reduced QoL. We suggest that difficulty lifting 5 kilogram weight may be a valuable indicator of muscle weakness and poor health in domestic settings.

Neuromuscular and Sensorimotor Training in Aging Populations

Gokce Nur Yilmaz: Investigating the Effects of Improved Depth Perception and Physical Activity Relationship in Older Adults

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Introduction: To analyze the effects of advanced technology on physical activity in older adults, how depth cues and immersive 3-dimensional (3D) video contents can activate mirror neuron activities and improve depth perception while playing a game in an auto-stereoscopic display is investigated in this study.

Methods: In the course of the investigations, first of all, a comprehensive set of 3D video contents was developed for the game (i.e. Tower of Hanoi) using the Unity platform. This platform provided the necessary tools for designing and manipulating factors such as significant depth cues and 3D video content characteristics including colors, different viewing angles (i.e., 0°, 45°, and 60°) of the positioned objects in the game, and interactive behaviors. Then, subjective experiments are undertaken in an autostereoscopic display in which the participants' game interaction and completion time are recorded while the participants play the game.

Results and Discussions: The obtained results confirm that different depth cues and varying angles of viewing (i.e., 0°, 45°, and 60°) lead to higher depth perception and task performance which resulted in the participant's increasing engagement and smoother interactions. Notably, it is observed that the 45° angle provides the most effective angle for placing the objects in the game to improve depth perception. The results also indicate that when the auto-stereoscopic display is used to interact with the game, it augments participants' spatial awareness and depth perception. Such enhancement contributed to a faster understanding of the game's structure and facilitated easier solving of it. The enhanced performance was also associated with more effective decision making which made the game less engaging while the display was used to enhance the player's excitement.

Conclusion: We believe that the detailed matters of importance forthcoming from this study will assist in the enhancement of robotics technology that aims to improve complex cognitive and motor skills performance to assist well-being of the older adults in terms of physical activity.

Evrım Gökçe: Adding Neuromuscular Electrical Stimulation to Usual Care in Older Adults for Cognitive and Functional Improvement in Rehabilitation Settings: A Pilot Study

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Background: Neuromuscular Electrical Stimulation (NMES), applying electrical current to the muscles through surface electrodes to trigger muscle contraction, is commonly utilized in rehabilitation clinics for older adults. However, its impact on cognition remains insufficiently explored. This pilot study evaluated the acceptability and preliminary outcomes of a multi-level intervention combining NMES with Adapted Physical Activity (APA) to improve mobility and cognition in hospitalized older adults.

Methods: Twenty-eight older adults with ambulatory capability (20F, 8M) were randomized into two groups, APA (n = 15) and APA+NMES (n = 13), with the intervention conducted 3 days per week over 3 weeks. Before and after the intervention, cognitive outcomes were assessed using the TAP (Test of Attentional Performance) battery, which focused on cognitive flexibility, attention, working memory, and inhibitory control. Mobility outcomes were evaluated through the 6-minute walk test, the timed up and go test, the chair test, and the Tinetti test. Acceptability was assessed using an 8-item questionnaire based on the theoretical framework of acceptability, with participants rating each item on a 5-point scale and scores ≥ 3 considered satisfactory. Linear mixed-effects models (LMEM) were used for mobility and cognition analyses, while t-tests assessed acceptability.

Results: There was a significant Time \times Group interaction (Estimate = 6.6898, p = 0.048) for cognitive flexibility, indicating a greater decrease in error scores over time in the APA+NMES group compared to the APA group. No significant changes were observed for other cognitive tasks or mobility outcomes. The APA+NMES group demonstrated satisfactory acceptance (3.15 ± 0.44), whereas the APA group's score was below the threshold (2.99 ± 0.54). A marginal trend was observed for perceived effectiveness (p = 0.080), which did not reach statistical significance.

Discussion: The APA+NMES intervention shows promise for improving cognitive flexibility in older adults. Moderate acceptability suggests potential for broader application, emphasizing the need for tailored approaches in multi-level interventions.

Conclusion: Incorporating NMES into usual rehabilitation care could hold promise for improving executive functions, a critical component in maintaining mobility in older adults. Larger trials are needed to confirm these findings and explore how skeletal muscle contractions influence cognitive processes via peripheral signals.

Nadja Schott: Motor Imagery Ability Across the Lifespan

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The ability to generate, manipulate, and control motor imagery (MI) varies considerably but is critical for successful motor learning. However, it remains uncertain whether MI's vividness, timing, controllability, and accuracy remain constant or change during development and at later stages of life (Schott, in press). In contrast to adulthood, childhood is characterized by rapid changes in musculoskeletal aspects and an increase in sensorimotor and cognitive abilities, while later in life, there is a decline in these abilities and motor skills. However, no study to date has investigated the ability to imagine movement (BV) under standardized conditions over the entire lifespan. This study examines the generation, manipulation, and maintenance of movement imagination in children/adolescents and young and older adults. A random sample of 151 people aged 10 to 75 (40.2 ± 21.4 ; 80 men, 71 women) was examined and divided into four age groups (10-15, 18-30, 40-60, and 60+ years). MI was assessed using the revised version of the Test for the Controllability of Motor Imagery (TKBV; Schott, 2013); working memory performance was evaluated with the Block Tapping Test (BTT; Corsi, 1972). Significant differences were identified between the age groups for the TKBV. Older adults ($M=3.54$, $SD=.73$) exhibited significantly lower scores compared to all other groups (children/adolescents: $M=4.58$, $SD=.85$; younger adults: $M=5.05$, $SD=.97$; middle-aged adults: $M=4.17$, $SD=.85$), $F(3,143)=22.6$, $p<.001$, $\eta^2=.322$. Sex-related differences were only significant among the younger adult group, with female participants demonstrating superior performance compared to their male counterparts ($M=5.41$, $SD=.51$ vs. $M=4.79$, $SD=1.14$). Pearson correlations revealed only a relationship between TKBV and BTT among the two older age groups ($r=.330$ and $r=.476$). In both groups, there were hardly any MI values above a certain level of working memory that were above the scale midpoint. In other words, a certain level of working memory performance was required in the older age groups, whereas in the younger age group, high MI values occurred even when working memory was low. The present results suggest that working memory may already be impaired in middle age. This could limit the use of mental practice as a rehabilitation strategy in older and cognitively impaired individuals.

Gözde Akyüz: The Effect of Single-Session Motor Imagery on Autonomic Functions in Older Adults in Nursing Homes

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Introduction: Protecting physical and mental health in older adults living in nursing homes is of great importance in terms of improving quality of life. In recent years, it has been thought that cognitive exercises such as motor imagery may affect autonomic nervous system functions in a similar way to physical exercises. The aim of this study is to examine the effects of a single session of motor imagery on autonomic functions in older adults living in nursing homes and to evaluate the effectiveness of this method in the older adults population.

Methods: The study included 17 participants living in a nursing home. Their opinions about the motor imagery session were evaluated with a 10-point Likert scale. Before and after the application; Blood pressure, heart rate, respiratory frequency, O₂ saturation level were evaluated. Participants were applied a single session of motor imagery during action observation.

Results: Four participants who did not meet the inclusion criteria were excluded from the study. Analyses were performed on 13 individuals (8 female, 5 male; mean age=78.50±9.47 years) and as a result of the analysis, it was seen that single-session motor imagery training did not create a statistically significant difference ($p>0.05$) on systolic ($p=0.473$) and diastolic blood pressure ($p=0.722$), heart rate ($p=0.488$), respiratory frequency ($p=0.070$) and saturation level ($p=0.100$). After the single-session motor imagery session, the participants' average opinion on the action observation application measured with a 10-point Likert scale was 8.769 points.

Discussion: In the study, it was observed that older adults had positive views about the single-session motor imagery application applied to older adults and stated that they would like to apply the motor imagery application again at a high rate. The study data show that motor imagery did not have a significant effect on autonomic functions. However, the borderline significance in respiratory frequency indicates that the potential effects of this method should be examined in more detail.

Conclusion: No significant effect of a single session of motor imagery on autonomic functions was observed. It is recommended that future studies evaluate the effects of longer-term motor imagery applications on a larger sample.

Sena Adanir: The Impacts of Functional Electrical Stimulation on the Morphological Characteristics of Skeletal Muscles: A Systematic Review

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Introduction: Functional electrical stimulation (FES) induces involuntary muscle contractions through the activation of motor nerves. FES-based interventions aim to preserve muscle structure in clinical populations, including patients with neurological or orthopaedic disorders, etc. This review aimed to gather existing evidence in the literature on the effectiveness of FES-based interventions for human muscle morphology.

Methods: On February 14th, 2025, Cochrane Library, PubMed, and ProQuest Databases were searched by using the combinations of the following key terms: “Functional Electrical Stimulation”, “Functional Electric Stimulation”, “Functional Electrical Muscle Stimulation”, FES, ACSA, Architectur, “Cross Sectional Area”, “Crosssectional Area”, Fascic, “Fiber Length”, “Fibre Length”, Pennat, Pinnat, “Muscle Thickness”, “Muscle Volume”, “Muscle Structure”, “Muscle Length”, PCSA. Randomised controlled trials (RCTs) published in English in a peer-reviewed journal, using the FES as an intervention, focusing on at least one muscle morphological parameter in humans, were included in the systematic review.

Results: Five hundred ten records were retrieved via Cochrane Library (46), PubMed (217), and ProQuest Databases (247). As a result, seven RCTs were incorporated into the qualitative synthesis following the authors’ independent screening of all citations, which was based on the titles, abstracts, and full texts. Among the eligible studies, two RCTs showed significant increases in thigh muscles in patients with chronic spinal cord injury (SCI) after FES interventions. Another RCT found that FES increased the pennation angle and muscle thickness of the tibialis anterior in chronic stroke survivors with dropped foot. Additionally, FES also increased the rectus femoris and tibialis anterior muscles in elderly patients with COVID-19. Moreover, abdominal expiratory muscle thickness increased, supporting FES’s effectiveness in mechanically ventilated patients. However, two studies emphasised the need for further investigation with larger samples to determine FES’s impact on muscle morphology.

Discussion: Five of seven RCTs noted significant improvements in muscle morphology, favoring FES interventions in patients with SCI, chronic stroke, COVID-19, and mechanical ventilation. However, the remaining two studies mentioned that their small sample sizes hindered conclusions about FES effectiveness for muscle morphology.

Digital and Technology-Assisted Interventions for Physical Activity in Aging

Irem Huri Karabiyik: Experiences of Technology for Increasing Physical Activity of Older Adults: A Qualitative Metasynthesis

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Background: Technologies used to increase the physical activity of older people encourage them to move more in their daily lives. In particular, innovative technologies such as wearable devices, mobile applications and virtual reality help older people to exercise and increase their motivation. These technologies enable the creation of more targeted and personalised physical activity programmes by monitoring the health status of older individuals. This study is the first metasynthesis of qualitative research focusing on older people’s experiences with technological solutions used to increase physical activity.

Methods: This qualitative metasynthesis study was conducted by searching PubMed, CINAHL, Scopus, MEDLINE online databases without any year limitation. The search strategy followed the following keyword combinations: “older adult”, “older people”, “elderly”, “aged”, “geriatric”, “aging”, “ageing”, “senior”, “physical performance”, “exercise”, “physical activity”, “physical fitness”, “digital”, “technolog”, “electronic”, “telehealth”, “telenursing”, “wearable device”, “digital solution”, “digital assistance”, “telemonitoring”, “qualitative research”, “qualitative study”, “qualitative methods”. The data were analyzed using a thematic approach.

Results: The preliminary results highlighted the opportunities and challenges older adults encounter when utilizing technology to increase their physical activity levels. Although technology may seem complicated or difficult at first, older people have come to appreciate its usefulness and simplicity. Technology also has the ability to foster independence, improve social ties, and boost motivation. However, problems like difficulty using technology and a lack of digital literacy also surface. In order to encourage older adults to engage in physical exercise, technologies must be accessible, easy to use, and customized to meet their specific needs. Technology that promotes physical activity in the older people must be user-friendly, accessible, and tailored to each person’s needs.

Conclusion: Technologies that encourage older adults to be more physically active can strengthen their motivation and promote their independence, which in turn can improve social relationships. However, the effective use of these technologies is limited by their lack of digital literacy and access issues. The design of technologies should therefore take older people’s demands and abilities into account. It is crucial to create technical solutions for older people that are easier to use, more accessible, and supported by education.

Christopher McCrum: Design Considerations for Technology-Assisted Fall-Resisting Skills Training Trials in Older Adults: A Pilot Study

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Introduction: Training fall-resisting skills (e.g., proactive gait adaptability, gait robustness, reactive gait recovery) may prevent falls in older adults. This pilot study guided the design of a future RCT of technology-assisted fall-resisting skills training. The aims were: 1) check if non-task-specific balance tasks can be perceived as training and be used as placebo tasks; 2) investigate the anxiety-task unpredictability relationship during walking perturbations; 3) explore older adults' perceptions of stability during walking perturbations related to a biomechanically-determined stability loss threshold.

Methods: 11 healthy older adults (73.5 ± 5.5 y) participated in this study at the Gait Realtime Analysis Interactive Lab (GRAIL) at Hasselt University and at the Computer Assisted Rehabilitation Environment (CAREN) at Maastricht University. Participants performed non-task-specific “placebo” balance tasks (weight-shifting games controlling a boat and car) and fall-resisting skills tasks. For aim 1, participants answered questions about the placebo tasks after completion. For aim 2, participants experienced large walking perturbations progressing from single to multiple directions, to adding auditory dual-tasks. Anxiety was assessed with a 7-point Likert scale. For aim 3, participants experienced walking perturbations of increasing magnitude and a biomechanically-determined threshold for stability loss (using 3D motion-capture) was compared to participants' self-reported perceptions of their stability.

Results: 10/11 and 6/11 participants thought they could improve on the boat and car games, respectively. For all placebo tasks combined, 9 believed that such a training could improve their balance, while 2 did not know. During large walking perturbations, participants' anxiety scores started at 2.1 ± 1.3 (1=low, 7=high) and progressively decreased with increasingly unpredictable perturbations. For aim 3, the biomechanically-determined threshold did not consistently align with participants' perceptions of stability, who sometimes reported balance loss despite only showing small deviations in measured stability.

Conclusions: Weight-shifting tasks are perceived as balance training by most older adults, indicating their potential as placebo tasks for fall-resisting skills trials. Using increasing types of perturbations and dual tasks does not increase anxiety given they are introduced in this order (i.e., repetition reduces anxiety). Older adults' perceptions of their stability during walking perturbations do not consistently align with biomechanically-determined stability.

Niharika Bandaru: Need for Tailored Technology-Based Physical Activity Interventions for Elderly with Dementia

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Background and Objectives: The technology to promote physical activity is expanding quickly, from trackers or wearables in virtual and augmented reality to exergames for people of all ages and genders. We aimed to convert a dancing rollator into an Inter-Communication Technology Rollator (ICT-Rollator) so that older adults with dementia can engage in physical activity. This study aims to evaluate the effectiveness of a digitalized dance intervention that integrates with an ICT rollator to improve the physical abilities of older people with Alzheimer’s and vascular dementia.

Methods: The study analyzed six case studies with Alzheimer’s or vascular dementia. Participants engaged in a dance intervention twice a week, each lasting one hour over three months. Blood pressure was measured before and after each dance session. We divided the sessions into three phases, where Phase 3 featured video-based dance interventions with a dance rollator. Physical performance measures (gait speed, stride length, balance, hand grip strength, and mobility) were measured pre-intervention and post-intervention. The Wilcoxon signed-rank test was used to see statistical significance due to the small sample size.

Discussion & Results: Improvements in stride length ($n = 6$, $p = 0.043$), balance ($n = 6$, $p = 0.031$), and mobility ($n = 6$, $p = 0.031$) were seen from pre-testing to post-testing for all six participants together. However, participants experienced declines in hand grip strength except for one. The improvements in mobility and balance are higher in subjects with Alzheimer’s dementia in comparison with case studies of vascular dementia. Overall, participants’ feedback indicated high levels of satisfaction and no adverse events, indicating the safety and efficacy of the intervention. The research results underscore the potential of digitalized dance interventions to improve the physical performance of seniors with different types of dementia.

Conclusion: A physical activity intervention via a dance rollator is feasible and safe for individuals with vascular and Alzheimer’s forms of dementia. However, a vascular form of dementia may require a longer duration of physical activity intervention for optimal outcomes. Future studies involving larger cohorts should validate and expand upon these findings.

Paolo Caserotti: Effects of Digital Exercise Interventions on Muscle Mechanical Function in Community-Dwelling Older Adults: A Systematic Review and Meta-Analysis

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Introduction: Digital exercise interventions are progressively becoming popular among the ageing population as a stand-alone solution, supplement to traditional exercise programs, and as part of rehabilitation programs. Despite potential barriers related to digital literacy, such interventions may be extraordinarily important for older adults with reduced access to exercise facilities (e.g. physical limitations, poor mobility, poor public transportation, prohibitive weather conditions), financial challenges, time availability, or simply personal preferences. Regardless, the effectiveness of such interventions on muscle mechanical function (MMF) (e.g. muscle strength, power and explosive muscle force) which is strongly associated with functional performance and independent living, remains relatively unknown. Also, the effects of digital intervention format and delivery (e.g. interactive format: participants interact with the “virtual environment”; presence of supervision; relative intensity, frequency, volume and progression of the intervention), have been poorly addressed. We aimed thereby at investigating the effects of digital exercise interventions on muscle mechanical function in community-dwelling older adults.

Methods: Systematic review of randomised controlled trials (RCTs) retrieved from PubMed, EMBASE (Ovid), the Cochrane Central Register of Controlled Trials, and Web of Science. The Cochrane RoB2.0 tool and GRADE were employed for quality assessment. A meta-analysis using random-effects model and sub-group and meta-regression analyses to investigate the robustness of the findings was performed. GRADE was used to assess the overall certainty of the evidence.

Results: Thirty RCTs, comprising 1697 participants (mean age: 71.27 years), were included. The meta-analysis revealed a significant overall effect of digital physical activity intervention on MMF (Hedge’s $g = 0.27$, $p = <0.001$). In the sub-analysis, 18 studies focused on interactive interventions on handgrip strength (SMD 0.10, 95 % CI -0.17 to 0.38) and leg strength (SMD 0.56, 95 % CI 0.19 to 0.93).

Discussion and Conclusions: Digital exercise interventions seem effective in enhancing MMF in older adults (small effect size) only when delivered as interactive and semi-interactive format possibly due to higher engagement and adherence. This systematic review provides interesting novel findings on the effectiveness and delivery mode of the interventions and supports researchers and health-care personnel in planning and designing new digital interventions for older adults.

Salvatore Tedesco: Integrating Wearable Technology and Machine Learning for Early Detection and Intervention in Age-Related Mobility Decline

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Introduction: Aging is associated with declines in neuromuscular control, mobility, and overall physical function, increasing the risk of frailty and reduced quality of life. Early detection and targeted interventions are critical in mitigating these effects. At Tyndall National Institute, we have explored evidence-based approaches to assessing and improving physical activity (PA) in older adults, leveraging wearables, machine learning (ML), and neuromuscular control analysis to optimize clinical interventions.

Methods / Results: Three key research approaches investigated on the topic:

- 1. Mobility Assessment:** A cohort of older orthopedic patients (n=113, median age 78) wore ankle accelerometers to assess gait patterns before and after a Frailty Care Bundle intervention targeting mobilization, nutrition, and cognition. A Random Forest classifier (74.7% accuracy) and logistic regression model (77.6% accuracy) were used to analyze gait parameters such as stride length, gait speed, and Lyapunov exponent to assess intervention impact.
- 2. Frailty Detection:** A separate study utilized wrist-worn consumer activity monitors to predict hand grip strength—a key indicator of frailty—using 7-day accelerometry data and ML models. Classification models achieved AUC-ROC scores of 0.86–0.87, demonstrating the feasibility of frailty/pre-frailty screening in free-living environments.
- 3. Neuromuscular Control Analysis:** To evaluate age-related neuromuscular decline, dynamic motor control index (DMCI) was assessed during walking and stepping tasks in older vs. younger adults. One-synergy variance accounted for (VAF) metrics revealed significant age-related differences during stepping forward exercises ($p = 0.033$), indicating potential for early detection of neuromuscular deficits.

Discussion: The Frailty Care Bundle intervention improved gait speed and altered stride characteristics, though long-term adaptive benefits remain unclear. ML models demonstrated moderate-to-high accuracy in predicting frailty and grip strength, supporting the potential for consumer-grade wearables as practical clinical assessment tools in older adults. Neuromuscular control analysis using DMCI and one-synergy VAF metrics effectively identified age-related neuromuscular decline, possibly serving as low-cost accessible methods for detecting early motor control deficits.

Conclusion: Integrating wearables, ML, and neuromuscular control assessments presents a promising, data-driven approach to monitoring and improving PA in older adults. These findings highlight the potential of personalized, evidence-based interventions to enhance frailty detection, rehabilitation, and mobility outcomes in aging populations.

Rosemary Dubbeldam: Can Digital Technology Enhance Physical Activity in Hospitalised Older Adults?

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Introduction: Hospitalization rates are high in older adults and notably higher among those with multimorbidity. Also, older patients often face long lengths of stay due to complications such as functional decline and increased healthcare needs, which are exacerbated by their age and health status. Unfortunately, in one third, hospitalisation leads to hospitalisation-associated disability, i.e., loss of ability to perform one or more basic activities of daily living independently at discharge. Physical activity interventions in hospitals generally show positive effects to prevent such functional decline and hospital-associated disability. Health professionals are however busy and concerned with medical issues and task-oriented care, while patients report to appreciate individualised care and are often bored during hospitalisation. Hence, digital technology may be an opportunity to support physical activity in older hospitalized patients.

Aim: This study aimed to review the effects of using digital technology in rehabilitation, with and without a specific focus on enhancing physical activity, during hospitalisation.

Methods: In a recent review on the use of digital technology to enhance physical activity in older adults in their homebased environment, no studies were found applying such technologies in hospital environments. This may have been caused by excluding rehabilitation studies. Therefore, this study searched using keywords or synonyms for physical activity, digital technology, older adults and hospitalisation.

Results: The use of technology-assisted physical activity interventions for older adults in hospital settings is limited. Most interventions focus on rehabilitation of a specific pathology. Others are only introduced during hospitalisation and aim to enhance physical activity after discharge. The limited technology-assisted hospital interventions report mixed results: adherence was high for supervised interactive gaming and activity trackers but low for self-regulated exergames. Furthermore, while interventions improved Time-Up-and-Go test results with no serious adverse events, no balance improvements with two adverse events related to pain were reported as well.

Conclusion: Tech-based interventions have some potential to reduce risk of hospitalization-associated disability, however the overall picture is still not clear. Future studies should carefully design digital technology systems and evaluate their potential to enhance physical activity and sustain or increase physical functions in older adults after hospitalization.

The Role of Inflammation and Metabolic Health in Aging and Physical Performance

Arben Boshnjaku: The Impact of CRP, hs-CRP, IL-6, IL-10, and TNF α in Physical Performance in Community-Dwelling Older Adults: A Systematic Review

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Background: Physical performance (PP) is an important component of health and well-being in older adults, often characterized by age-related decline. Inflammatory biomarkers, such as high sensitive C-reactive protein (hs-CRP), CRP, interleukin-6 (IL-6), interleukin-10 (IL-10), tumor necrosis factor-alpha (TNF α), that are commonly elevated as a result of low-grade systemic inflammation have been associated with a decline in physical functioning. Therefore, we systematically searched the articles investigating the relationship between these specific inflammation biomarkers and PP in community-dwelling older adults.

Methods: Following PRISMA guidelines, a systematic search was conducted across the CINAHL, Cochrane, Medline, PubMed, and Eric databases. Studies included adults aged ≥ 60 that measured CRP, hs-CRP, IL-6, IL-10, TNF α , and their association with physical performance gait speed (normal and fast pace), Short Physical Performance Battery (SPPB), timed up and go (TUG), chair stand (CST), and 6-minutes walking tests (6MWT). The quality of the studies was assessed using a modified version of the Newcastle-Ottawa scale.

Results: Twenty studies were included in the final review, out of which six studies were classified as having very good quality, twelve with good quality, and two with satisfactory quality (assessed by an adapted Newcastle-Ottawa scale for cross-sectional studies). The majority of studies (85%) reported a statistically significant association between increased inflammation levels and PP decline. Gait speed (normal pace) and SPPB were the most frequently assessed parameters, whereas IL-6, TNF α , and CRP were the most investigated inflammation biomarkers. CRP and hs-CRP were consistently linked with poorer PP in 85.7%, and 100% of studies respectively, while IL-6 showed positive associations in 53.8% of the studies.

Conclusions: Findings suggest that hs-CRP and CRP biomarkers are associated with physical performance decline in older adults. Future research including a broader range of inflammation biomarkers should provide insights and understanding of mechanisms linking inflammation and physical decline.

Yangjun Liu: Does High-Intensity Interval Training Have a Positive Effect on Selected Biomarkers of Metabolic Syndrome in Postmenopausal Women?

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Objective: We aimed to evaluate the effects of a 12-week high-intensity interval Nordic walking (HIIT-NW) intervention compared to standard lifestyle education (CG) on metabolic syndrome (MetS) biomarkers in postmenopausal women.

Methods: This randomized controlled trial enrolled 48 postmenopausal women with an average age of 70 years. Women participated in a 12-week HIIT-NW training (n =24) or a lifestyle education control group (n =24). The primary outcome measures included the changes in selected obesity and MetS biomarkers before and after the intervention in each group, as well as the differences in these measures between the intervention and control groups. Key metrics assessed were waist circumference (WC), blood pressure (BP), triglycerides (TG), high density lipoprotein cholesterol (HDL-C), and fasting blood glucose (FBG).

Results: Compared to baseline, the 12-week HIIT-NW training significantly reduced WC ($p < 0.05$), significantly increased HDL-C levels ($p < 0.05$), significantly lowered FBG levels ($p < 0.05$), and also demonstrated a significant reduction in TG levels ($p < 0.05$).

Conclusion: These findings indicate that a 12-week HIIT-NW regimen provides an effective strategy for improving WC and MetS markers, such as HDL-C, FBG and TG levels.

Tugba Elgun: Relationship Between Aging and Ketogenic Diet: A Bibliometric Analysis

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Introduction: The potential benefits of the ketogenic diet (KD) on aging are currently receiving increasing attention. Although there are various studies on this subject in the existing literature, there is a lack of systematic review and bibliometric analysis. The aim of this study was to review the existing studies examining the relationship between KD and aging, to identify trends in this field and to provide a basis for future research.

Materials and Methods: In the study, all articles, reviews and other publication types on KD and aging published between 1995 and 2024 in the Scopus (Elsevier) database were analyzed. Keyword and cluster analysis were performed with VOSviewer software (v.1.6.16, The Netherlands).

Results: In the study, a total of 8,257 scientific documents were identified in the Scopus database between 1995 and 2024 worldwide. The author who published the most on the subject is Cunnane, S.C. The country that contributed the most in this field is the United States of America (USA). The institution that produced the most documents was Harvard Medical School. In a total of 8257 records, the most preferred type of publication was articles. *Nutrients* journal was the journal with the highest number of publications.

Conclusions: The results of this study show that there has been a significant increase in the number of studies investigating the effects of KD on aging. However, more high-quality, randomised controlled clinical trials are needed in this field. In particular, there is a lack of studies examining the effects of KD on age-related diseases at the molecular level.

Mobility, Balance, and Fall Prevention Strategies in Older Adults

Arzu Razak Özdingler: Modified Otago vs. Structured LSVT-BIG: Which Exercise Program Better Improves Balance in Elderly?

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Introduction: The Otago Program is rhythmic, slow movements to improve balance, strength, and fall prevention in the elderly. Unlike this LSVT-BIG program involves high-effort, large-amplitude movements to enhance posture, mobility, balance, and overall function of the body. It has been used especially for these purposes in Parkinson's disease. This study aims to compare the effectiveness of the modified Otago Exercise Program and the structured LSVT-BIG Exercise Program in elderly living in care centers.

Methods: Seventy elderly participants (mean age=78.05±6.53/years, F:42, M:28) living in three different elderly care centers were included. Participants were randomized into two groups: Modified Otago Exercise Group (Group I, n=35) and Structured LSVT-BIG Exercise Group (Group II, n=35). The Modified Otago Exercise and the Structured LSVT-BIG Exercise programmes were applied twice a week for 12 weeks under the supervision of physiotherapists. Participants evaluated with the Timed Up and Go Test (TUGT), the Five Times Sit to Stand Test (FTSST), dynamic balance with the Performanz Balance System, the Functional Reaching Test (FRT), and the Six-Minute Walking Test (6MWT) before and after the treatment.

Results: After the 12 weeks exercise program, there were improvements in the FRT ($p<0.01$), and the Performanz Balance System score ($p=0.01$) results in the Group I. In the Group II, improvements were seen in the TUGT ($p<0.01$), the FTSST ($p<0.01$), the FRT ($p<0.01$) and the Performanz Balance System score ($p<0.01$). When comparing the groups, statistically significant results were seen in favour of Group II on the FRT ($p=0.03$).

Discussion: The study has shown that the Modified Otago Exercise Program and the Structured LSVT-BIG Exercise Program may be used to improve balance, and that large-amplitude exercises are superior to the Modified Otago Exercise Program in order to improve the dynamic balance of elderly people.

Conclusion: The structured LSVT-BIG exercise program is a safe and effective rehabilitation approach for elderly individuals in nursing homes and care facilities. Its benefits highlight the potential of structured exercise programs in physiotherapy and elderly care.

Nadja Schott: Evaluation of a Virtual Reality Gait-Based Locomotion Fall Prevention Exergame in Community-Dwelling Healthy Older Adults

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Falls are a prevalent health concern among older adults, potentially resulting in substantial physical, psychological, and social ramifications. Interventions aimed at fall prevention must consider effectiveness, enjoyment, and meaningfulness. Gait impairments have been identified as a pivotal factor in fall risk, underscoring the significance of incorporating natural locomotion techniques and cognitive skills with single- and dual-task components. To this end, we developed a fully immersive virtual reality (VR) exergame called EXploVR: A Mountain Mastery, which employs natural gait-based locomotion and is designed to offer an enjoyable training experience, create meaningfulness during training, and extend to daily life. Forty-six participants were assigned either to an exergame intervention group (IG) or a passive control group using a single-blinded quasi-randomized design. Over three weeks, the IG participated in two 60-minute sessions per week. Baseline, mid-, and post-assessments for both groups included single- and dual-task gait, lower limb strength and transitional movement ability (5x Sit-To-Stand), and static postural control. In-game performance (time to complete a station) was recorded during every intervention session. Additionally, standardized questionnaires assessed enjoyment (Flow Short Scale, Physical Activity Enjoyment Scale Short Version and adaptations, Exergame Enjoyment Questionnaire) and balance confidence (Activities-specific Balance Confidence Scale). Custom questions regarding perceived safety, fear of falling, daily-life integration, emotional challenges, and perceived effectiveness for fall prevention were administered. Data from 32 participants (IG: n=16, 70.003.33 years; CG: n=16 control, 68.385.54 years) were analyzed. Significant improvements in effectiveness were observed for walking gait speed and tandem gait speed. Under dual-task conditions, only tandem gait speed improved significantly. 5x Sit-to-Stand showed a significant interaction for duration, while postural sway demonstrated non-significant trends toward improvement. In-game station completion time improved significantly in 5 out of 6 station sets. Enjoyment measures remained high or increased over time, and meaningfulness was supported by significant gains for advanced activities (ABC-8). This pilot study suggests that the fully immersive VR exergame EXploVR, which emphasizes natural gait-based locomotion, has the potential to be effective and enjoyable while also fostering meaningfulness for older adults. Further research with larger samples and extended interventions is needed to confirm long-term effects and transfer to daily life.

Mesut Uludağ: Do Proprioceptive Exercises with Otago Exercises Have an Additional Effect on Balance, Falls Behaviour, and Sarcopenia in Older People?

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Introduction: The Otago Exercise Program (OEP) is a strength and balance retaining program designed to prevent falls and increase functionality in older people. Proprioceptive exercises can also be used in the exercise program of older adults because they stimulate motor learning, help maintain proper posture and balance, and improve body control. Although OEP include balance and fall exercises, proprioceptive exercises may enhance the effects of OEP. However, there is no study in the literature using both exercise program to promote effectiveness on balance, fall and muscle strength. The aim of this study was to investigate the possible additional effects of proprioceptive exercises applied with OEP on balance, fall and sarcopenia.

Methods: A total of 36 elderly individuals aged between 65-81 years were included in the study and were divided into two groups: study and control groups. All individuals were evaluated for sarcopenia, balance and fall risk before and after the exercise program. Sarcopenia was measured by hand grip, quadriceps muscle strength and 10 meters Walk Test. Tinetti Balance & Gait Scale and Falls Behavioural Scale (FaB) for the Older Persons were used to evaluate balance and fall behaviour. The study group had proprioceptive exercises in addition to OEP, while the control group was exercised OEP alone. All individuals in both groups underwent an 6 weeks exercise program of 40-45 minutes, 3 sessions per week.

Results: There were improvements in hand grip, quadriceps muscle strength, walk test, balance and fall risk in both groups after the 6 weeks' exercise program ($p < 0.05$). Although there was no difference between the groups in terms of muscle and grip strength, the 10 m Walk Test was in favor of the Study Group ($t = 4.78$; $p < 0.05$). Tinetti Balance & Gait Test result was superior in the Study Group ($t = -4.06$; $p < 0.001$) and FaB Scale score was $p = 0.053$; $z = -1.93$

Discussion: Proprioceptive exercises combined with Otago exercises have superior effects on improving balance and fall behavior than Otago exercises alone. It also has some beneficial effects on sarcopenia.

Conclusion: Additional proprioceptive exercise may be beneficial, especially in older adults with greater balance and fall risk.

Health Aspects of Physical Activity

Kutay Kaşlı: Turkish Validity and Reliability Study for The Short Form Berg Balance Scale: Pilot Trial

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Background: The Berg Balance Scale (BBS) is one of the most widely used performance-based scales to assess balance, mobility and fall risk. The Short Form Balance Scale (SFBBS) has been developed to reduce the time required and to facilitate scoring, containing 7 items instead of 14 and scored in 3 levels instead of 5. The study aims to validate the Short Form BBS (SFBBS) in a Turkish older adult population.

Methods: In our study, expert, construct and concurrent validity were assessed, while scale reliability was examined using Cronbach's alpha coefficient and the test-retest method. Concurrent validity was examined by comparing the Timed Get Up and Go Test (TUGT) with the BBS and the 10-metre walk test (10mWT) to determine the reliability of the SFBBS in 74 older adults.

Results: Seventy-four volunteer older adults (68.7±4.7 years, 27.12±4.93 BMI, 97% female) was recruited. Experts confirmed the quality of the Turkish version of the SFBBS. Reliability was calculated with a Cronbach's alpha of 0.702, an ICC of 0.99 and a test-retest correlation coefficient of 0.88. It also showed a unidimensional factor structure and good fit indices. The average variance extracted was 0.577 and the composite reliability was 0.867. The Pearson correlation coefficients between the SFBBS and the BBS, TUGT and 10mWT scores were -.284, -.322 and .994 respectively.

Discussion: The Turkish version of the SFBBS has been demonstrated strong validity and reliability in older adults. Its elevated internal consistency, test-retest reliability, and significant correlations with established mobility tests support its utilisation as a practical balance assessment tool. Further studies should explore its applicability in different clinical settings and populations.

Conclusions: All these results show that the 7-item SFBBS is a valid and reliable scale tool that can be used in both clinical practice and research to assess balance, mobility and fall risk in Turkish older adults.

Effects of Exercise Interventions for Older Adults

Nurel Ertürk: Effects of Upper Extremity Low-Volume High-Intensity Interval Training on Postural Sway and Upper Extremity Strength in Geriatric Patients with Heart Failure: A Preliminary Result

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Introduction: Upper extremity function and hand grip strength are closely linked to body stability and postural sway. In heart failure patients, balance and upper extremity function are impaired, yet the impact of cardiac rehabilitation on these parameters in geriatric patients remains unclear. This study aimed to investigate the effect of low-volume high-intensity interval training (LV-HIIT) for the upper extremities on postural sway and upper extremity strength in geriatric heart failure patients.

Methods: Six geriatric heart failure patients were included. Demographic data were recorded, and upper extremity exercise capacity was assessed using an arm ergometer. The LV-HIIT program consisted of 90% and 40% of maximum workload in 1-minute intervals (1:1 work/rest ratio), repeated eight times per session, twice weekly for eight weeks. Postural sway was assessed pre- and post-intervention using the GYKO (Microgait, Italy) device, measuring sway along two axes with eyes open and closed. Hand grip strength was measured using a Jamar dynamometer.

Results: The median age of participants was 69 years (IQR: 51.75-77.5), with 33% female. The median ejection fraction was 52.5% (IQR: 48.75–55). Following the intervention, upper extremity maximum workload significantly increased ($p=0.027$), hand grip strength improved (right $p=0.43$; left $p=0.28$). Postural sway decreased significantly: eyes open: Sway area (SA, $p=0.028$), medial-lateral length (MLL, $p=0.046$), anteroposterior length (APL, $p=0.028$), and anteroposterior mean distance (APMD, $p=0.028$). Eyes closed: SA ($p=0.028$), APMD ($p=0.028$), and total sway length ($p=0.028$). **Discussion:** This study suggests that upper extremity LV-HIIT improves postural sway, upper extremity function, and hand grip strength in geriatric heart failure patients. Since balance and upper extremity function are interrelated, increased arm strength and coordination may contribute to better stability. The significant reduction in postural sway, both eyes open and closed, indicates improved neuromuscular coordination and proprioception with upper extremity training.

Conclusion: Upper extremity LV-HIIT is an effective and feasible intervention for improving postural stability, strength, and grip in geriatric heart failure patients. Incorporating high-intensity upper extremity training into cardiac rehabilitation may help reduce fall risk and enhance quality of life in this population. This research was conducted by Tarsus University Department of Scientific Research Projects with project number SBF.24.001.

Jan Vindiš: The Goldilocks Approach: Finding the Optimal "Cocktail" of Physical Behaviors for Health Outcomes in Older Adults

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Purpose: The Goldilocks approach is based on the principle that neither too much nor too little of any activity is ideal; rather, there is an "optimal" amount that can lead to better health outcomes. This study aimed to determine the optimal 24-hour composition of physical behaviors—sleep, sedentary behavior, and physical activity—that promotes obesity prevention, supports physical fitness, and reduces the risk and fear of falls in older adults.

Material & Methods: The study analyzed data from 309 older adults (65+ years) recruited from Czechia. Participants wore accelerometers on the wrist, thigh, and hip for 7 consecutive days to measure 24-hour physical behaviors. Compositional data analysis was used to model the optimal time-use composition for various of health outcomes, including BMI, Timed-up and Go Test (TUG), Falls Efficacy Scale International - questionnaire (FES), Short Physical Performance Battery (SPPB), usual gait speed, and the five-times sit-to-stand test (5TSST).

Results: In younger older adults (65–70 years), optimal BMI was associated with 7.6 hours of sleep, 12.1 hours of sedentary behavior (SB), 3.1 hours of light physical activity (LPA), and 1.2 hours of moderate to vigorous physical activity (MVPA). In old older adults (>70 years), optimal BMI was linked to 7.2 of sleep, 13.1 hours of SB, 2.8 hours of LPA, and 0.8 hours of MVPA. For both groups, increased LPA and MVPA, and reduced sleep and SB were associated with better physical fitness and reduced risk of falling.

Conclusion: Our findings highlight the importance of personalized recommendations for older adults regarding the optimal balance of sleep, SB, LPA and MVPA. The optimal sleep duration was 7–8 hours, with more than 1 hour of MVPA daily for most health outcomes. SB should range from 11.7 to 13.2 hours. These results emphasize the need for individualized health strategies to optimize outcomes in older adults. This research was supported by the research grant from the Czech Science Foundation No. 22-02392S.

Neng Pan: Changes in SMI and Physical Fitness in Response to High-Intensity Interval Nordic Walking Training in Postmenopausal Women

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Changes in SMI and physical fitness in response to High Intensity Interval Nordic Walking training in postmenopausal women Speaker: Neng Pan Authors: Katarzyna Krasowska, Ewelina Perzanowska, Ossowski Zbigniew Background: Many studies have shown that high-intensity interval training and Nordic walking can improve skeletal muscle mass index and physical fitness in postmenopausal women. However, there is a lack of research evidence to combine the two training methods. This study was designed to explore the effects of HIIT-based Nordic walking on SMI and physical fitness in postmenopausal women. Methods: The participants were 47 women aged 60-79. Participants were assigned to the HIIT NW group (12 weeks of Nordic walking training, three times per week), and the control group. The skeletal muscle mass and skeletal muscle index (SMM, SMI) was determined by InBody 720 octupole bioimpedance analyzer. Gait speed (GS) was assessed using the 6 m walk test Results: Following the intervention, no significant between-group differences were observed in primary outcome measures between the HIIT NW group and control group (all $p > 0.05$). However, within the HIIT NW group, Skeletal muscle mass (SMM) exhibited a significant increase ($p < 0.001$, Cohen's $d = 0.8$); The skeletal muscle index (SMI) showed substantial enhancement ($p < 0.001$, Cohen's $d = 0.9$); Gait speed (GS) measurements revealed notable improvement ($p < 0.001$, Cohen's $d = 0.9$). Conclusion: Short-term HIIT NW improves skeletal muscle mass, index, and gait speed in postmenopausal women. HIIT NW is a form of exercise that improves SMI and physical fitness in postmenopausal women.

Jana Pelclová: Evaluating the 30-Minute Physical Activity Guideline in Older Adults: A 24-Hour Movement Behaviour Approach to Obesity Prevention

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Background and Purpose: Recent public health guidelines advocate accumulating 30 minutes of physical activity (PA) per day to counteract obesity and related health risks. However, it remains unclear how reallocating daily time from sedentary behaviour (SB) to different PA intensities or specific postures (e.g., lying, sitting, walking) influences adiposity among older adults. We aimed to examine the impact of short-term (1–60 minutes) and long-term (7-year) reallocations of SB to light physical activity (LPA) and moderate-to-vigorous physical activity (MVPA), as well as posture-specific transitions, on key anthropometric outcomes (e.g., fat mass percentage [FM%], body mass index [BMI]) in older populations.

Methods: Data were drawn from several cross-sectional and longitudinal studies of community-dwelling adults aged 65 years and older. Time-use patterns were measured by accelerometers and analysed using isotemporal and compositional modelling to estimate changes in FM% and BMI under hypothetical scenarios of reallocating 1–60 minutes per day from one behaviour or posture to another. Statistical adjustments were made for age, sex, and relevant health covariates.

Results: A 30-minute reallocation from SB to MVPA was associated with a 2.18 percentage-point reduction in FM%, whereas shifting SB to LPA did not yield significant reductions. Posture-specific reallocations in the 65–70 age group (e.g., from lying or sitting to “moving”) resulted in a 2.26–2.51 kg/m² decrease in BMI. Among older adults (71+), replacing 20 minutes of sitting with slow or fast walking lowered BMI by 0.50–0.69 kg/m². Over a 7-year span, maintaining or increasing MVPA showed the strongest protective effect on adiposity.

Conclusions: Findings underscore the importance of both duration (e.g., 30 minutes) and intensity (MVPA) in reducing adiposity among older adults. Although light-intensity movement and posture transitions confer some benefit, the most pronounced improvements in FM% and BMI occur when substituting SB with MVPA, especially over the long term.

Physical Activity, Cognitive Function, and Mental Well-Being in Older Adults

Aysegul Ilgaz: Perceptions of the Effect of Physical Activity on Mental Health and Well-Being of Older People Who Do and Do Not Do Physical Activity: A Qualitative Comparative Study

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Background: Physical activity has a positive effect on both physical health and mental health and general well-being. Older adults who do not engage in physical activity often do not have the opportunity to experience the benefits of being active. The aim of this study is to compare the perceptions of older adults who do and do not engage in physical activity on the effects of physical activity on mental health and well-being.

Methods: We conducted a qualitative comparative study through in-depth interviews with 30 older people aged 65 years and above in Türkiye. Interviews were transcribed and we used thematic analysis to examine the data.

Results: Physical activity has contributed to the mental health of older adults, reducing stress, depression, anxiety, fear of death and loneliness. Physical activity made older adults feel happy, peaceful, dynamic, energetic and relieved/relaxed, more productive and more valuable. Individuals who did not do physical activity experienced problems such as pain, fatigue, unhappiness, withdrawn, weakness, pessimism and weakness. The reasons for not doing physical activity in older people were lethargy, laziness, lack of motivation, fear of falling, weakness, and fear of losing weight. Suggestions for physically inactive individuals to do physical activity in the future are as follows: Providing motivational resources, having a friend to walk with, advice from doctors and relatives, reminding activities by people living together and group activities.

Conclusion: Physical activity improves the mental health of older adults and reduces negative emotions such as stress, depression, anxiety and loneliness. Older people who do not engage in physical activity face negative emotional and physical conditions such as pain, fatigue, unhappiness and pessimism. Most of older people who do not engage in physical activity face concerns such as fear of falling, weakness and weight loss. In order to encourage the participation of older people in physical activity, awareness-raising trainings about the positive effects of physical activity on mental health should be organised and motivational resources should be provided. In addition, group activities that offer safe environments and exercise guidance can be organised to overcome these fears that prevent the initiation of physical activity.

Arzu Razak Özdingler: The Effect of Kinetic Brain Exercises on Dual-Task Activities in Healthy Elderly Individuals

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Introduction: Kinetic Brain Exercises, it generalizes the development of these connections by enabling each individual's brain and body, which has different visual and physical activities, to concentrate on different tasks and establishing new neurological exercises. These events are fun and mentally challenging. There are very few studies examining the effects of these exercises on dual-task activities.

The aim of the study is to examine the effect of Kinetic Brain Exercises on dual-task activities in healthy elderly individuals.

Methods: A total of 33 individuals, 4 women and 29 men, aged 65-80 years (73.88±3.69 years) were included in the study. In the study, after recording the demographic and clinical characteristics of the individuals, Dual Task Performance Tests (Timed Up and Go Test (TUG), 30 Seconds Sit and Stand Test, Tandem Gait Test, 360° Turning Test and One Leg Standing Test) were used to evaluate the dual task activities. It was evaluated with single task, cognitive additional task and motor additional task. Additionally, the Falls Efficacy Scale (FES) was used. Individuals were given an exercise program 2 days a week for 8 weeks. Individuals participating in the program were divided into 2 groups. Group 1 (n=17) was given Core Stabilization Exercises and Kinetic Brain Exercises, and Group 2 (n=16) was given only Core Stabilization Exercises.

Results: In intra-group comparisons; in Group 1 30-Second Sit-and-Stand Test's single and cognitive additional task significant post-exercise results and in the additional motor task of the Tandem Gait Test ($p<0.05$), in Group 2, the cognitive additional task of TUG and 360° Rotation Test and FES score were found to be statistically significant ($p<0.05$). In the comparison of between the groups only in the motor additional task of the Tandem Gait Test, there was a statistically significant difference in favor of Group 1 ($p<0.05$).

Conclusion: Participants reported that they enjoyed doing kinetic brain exercises. However, the recovery levels of dual-task activities of both groups were below our expectations. We think that it is necessary to search at the long-term effects of kinetic brain exercises combined with strengthening in physical activity planning in the elderly.

Aysun Yağci Şentürk: Dual-Task Effects on Functional Mobility and Sleepiness Level in Older People with Musculoskeletal Pain

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Introduction: Many daily activities involve more than one task, but musculoskeletal pain, sleep, attention and balance problems that increase in older ages cause individuals to experience difficulties during daily activities. Therefore, we aimed to evaluate the dual task performance of older individuals with musculoskeletal pain and to determine the relationship between pain and daytime sleepiness and dual task performance.

Methods: The study was conducted on 92 subjects aged 65 years and older. Single task TUG (TUG-single), dual motor task TUG(TUG-motor) and dual cognitive task TUG(TUG-cognitive) were administered to all subjects. Pain intensity was assessed with Visual Analog Scale(VAS). Localization, duration, type, and factors increasing and decreasing pain were evaluated. Epworth Daytime Sleepiness Scale(EDSS) was used to determine the level of daytime sleepiness. The correlation of EDSS scores with TUG test durations was analyzed by Spearman or Pearson correlation in accordance with normal distribution. ANOVA, independent t test, Kruskal Wallis or Mann Whitney U test were used to analyze the correlation between TUG scores and pain variables depending on the normal distribution.

Results: The mean age of the participants was 70.03 ± 4.79 . The mean VAS score was 6.21 ± 1.56 and the mean EDSS score was 9.75 ± 4.95 . EDSS was only associated with motor dual task performance. In individuals with musculoskeletal pain, pain intensity was not associated with TUG test duration. The localization of pain was effective on all TUG test durations. Factors that increase pain were not found to be effective on TUG-cognitive, but were effective on TUG-single and TUG-motor. Pain-reducing factors, pain duration and type were not effective on dual task performance.

Discussion: Daytime sleepiness is associated with motor dual task performance rather than single task performance. However, the same relationship was not valid for the cognitive dual task in the current study. In addition, in line with the literature, lower extremity pain causes prolonged dual task duration.

Conclusions: The characteristics of musculoskeletal pain and the daytime sleepiness have an effect on dual task performance in older adults. Moreover, increased duration of motor dual task is positively associated with increased risk of daytime sleepiness in older adults.

Fatma Kübra Çekok: The Impact of Cognitive Tasks on Arm Muscle Activation in Older Adults: A Pilot Study Using Surface Electromyography

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Introduction: Age-related neuromuscular changes can impact motor control, particularly under dual-task conditions where cognitive demands are integrated with physical tasks. This study examines the impact of cognitive tasks on arm muscle activation during a daily life task using surface electromyography (sEMG).

Methods: The study involved 17 older adults (4 females, 13 males), aged 61-81 years. Cognitive function was assessed using the Mini-Mental State Examination (MMSE). Forearm muscle activity was recorded using the Myo Armband, a wearable electromyography (EMG) device. Participants performed a daily task of drinking a glass of water for 30 seconds under two conditions: (1) a single-task condition (motor task alone) and (2) a dual-task condition (motor task combined with counting backward). Forearm muscle Root-mean-square (RMS) amplitude and mean frequency were compared between single- and dual-task conditions using Mann-Whitney U tests.

Results: The analysis revealed that dual-tasking influenced extensor muscle activation, particularly in the extensor digitorum (Ch3), extensor carpi radialis (Ch2), extensor carpi ulnaris (Ch4), and extensor digiti minimi (Ch5). A significant increase in mean frequency was observed in the extensor digitorum (Ch3) during the dual-task condition compared to the single-task condition (59.03 ± 4.75 Hz vs. 61.44 ± 3.59 Hz, $p = 0.048$). However, other extensor muscle channels (Ch2, Ch4, Ch5) showed no significant differences in mean frequency or RMS values between conditions ($p > 0.05$). For the flexor muscle group (flexor carpi radialis, pronator teres, palmaris longus, flexor carpi ulnaris), there were no statistically significant changes in either mean frequency or RMS values under dual-task versus single-task conditions ($p > 0.05$).

Discussion: Our findings suggest that cognitive tasking may induce neuromuscular adaptations predominantly in the extensor muscle group. This interpretation aligns with the MYO Armband's known limitation, as it does not selectively record individual muscle activity.

Conclusion: The increased neural drive to these muscles in a dual-task condition suggests a compensatory mechanism to maintain coordination and precision under cognitive load, which may affect daily functional performance in older adults. Given the importance of upper extremity function for independence, further research should explore interventions to boost motor-cognitive resilience and reduce fatigue and decline in aging populations.

Anita Hökelmann: Effect of a Six-Month Multimodal Dance Intervention on Physical and Cognitive Performance in Older Adults with Mild Cognitive Impairment

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Background: There is growing evidence that older adults with mild cognitive impairment (MCI) have poorer balance performance and a higher risk of falling. Therefore, the aim of this study was to investigate the effects of a six-month dance intervention on physical and cognitive performance, especially on balance and fall-related measures in older adults with MCI in relation to dance performance quality.

Methods: The randomized controlled trial included 55 participants divided into an intervention group (IG) and a control group (CG). The IG participated in twice-weekly 90-minute dance training sessions for six months, while the CG maintained their usual activities. Balance was measured with the Sensory Organization Test (SOT) and the Limits of Stability Test (LOS). For evaluation of brain and cognitive function were used MRT and CERAD+ Trail Making Test A; B. The quality of dance performance was judged by three raters with the Falls-Efficacy Scale (FES-I).

Results: All participants could perform the dance choreography at a solid level. There is an interesting correlation between dance performance level and reaction time. The intervention resulted in significant improvements in the use of the visual balance analysis system, particularly in participants aged 70-79 years, as measured by the SOT. LOS showed reduced reaction time (RT) and improved directional control (DCL), supporting the role of weekly 180 minutes of dance in fall prevention. Analyzing the results of the IG of our study, the fear of falling was significantly reduced following the intervention ($p = .032$ [small]) and the number of falls showed a trend in reduction of falls ($p = .088$ [small]). In addition, the general cognitive performances ($p=0,007$), memory ($P=0,035$) and spatial navigation improved significantly.

Conclusion: These findings suggest that functional dance-based training could be a promising approach for supporting the cognitive function and balance abilities of older adults with MCI. These longitudinal findings highlight the potential for dance programs to contribute to prevention, rehabilitation, and social engagement with the goal of enhancing the quality of life in older populations.

Nursen İlçin: Effects of Game-Based Exercise Training on Physical and Cognitive Well-Being in Older Adults

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Background: This study aims to evaluate the impacts of a game based exercise training program combined training program that includes cognitive training and physical exercises, on the physical and cognitive development of community-dwelling older adults.

Methods: Participants were randomly assigned to two groups. The Control Group (n=22) participated thrice a week in a physical exercise program for 15 minutes per session. In addition to this program, the Study Group (n=22) engaged in a game-based exercise program that included cognitive and physical exercises. The program lasted 12 weeks, and all participants were assessed at the beginning and the end of the intervention regarding walking speed, mobility, balance levels, reaction time, and cognitive status. Data were analyzed using the SPSS 20.0 for Windows statistical package. The Mann-Whitney U test was used to compare differences between the two groups, while the Wilcoxon Signed-Rank Test was used to compare intra-group differences. A significance level of $p < 0.05$ was considered statistically significant.

Results: The median age of the participants was 67 years, with an age range of 60 to 81 years. Of the participants, 80.5% (n=33) were female, 56.1% were married, 41.5% lived alone, and 46.3% were university graduates. In the Study Group, significant improvements were observed between baseline and post-intervention assessments in the following tests: 10-meter Walk Speed, 10-meter Walk Speed with Cognitive Task, Timed Up and Go (TUG) Standard, Timed Up and Go (TUG) with Cognitive Task, Tinetti Balance and Gait Assessment, Montreal Cognitive Assessment (MoCA), and Reaction Time ($p < 0.05$). When comparing the 12-week changes in both groups, the Study Group showed statistically significant improvements in the 10-meter Walk Speed and Tinetti Balance and Gait Assessment scores ($p < 0.05$) then the control groups.

Conclusion: The findings of this study indicate that, among individuals over the age of 60, a combined exercise training program that includes both game-based activities and physical exercises significantly enhances cognitive function, walking speed, mobility, balance, and reaction time. Additional research is necessary to better assess the impact of game-based exercises on older populations with varying cognitive and functional abilities.

Kutay Kaşlı: Investigation of the Relationship Between Age, Comorbidity, Physical Activity, Physical Performance, and Mobility in Women Aged 65 and Older

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Background: Aging naturally impacts women's health risk profiles, with comorbidities, physical activity, physical performance, and mobility being key determinants of functional independence. This study examines the relationships among these factors in women aged 65 and older.

Methods: Fifty-two female volunteers over the age of 65 (69.06±5.04 years, 70.55±11.15 kg) were included. Demographics were recorded, and physical activity was evaluated using the Physical Activity Scale for the Elderly (PASE). Physical performance was measured using the 5-times Sit to Stand test (5TSTS), and mobility was measured using the 10-meter walk test, the Timed Up and Go test (TUG) and the 3-meter backward walk test (3MBW). Comorbidity was determined by the Modified Charlson Comorbidity Index. All assessments were performed by an experienced physiotherapist. The relationships between variables were analysed with Pearson's correlation coefficient.

Results: The study revealed a positive correlation between comorbidity level and age and mobility (age $r=0.626$, $p<0.05$; TUG $r=0.421$, $p<0.02$; 3MBW $r=0.410$, $p<0.03$, respectively). In addition, significant positive correlations were identified between 3MBW and TUG, 10-metre walking speed, 5TSTS and comorbidity level ($p<0.05$). It was determined that physical performance was significantly associated with TUG ($r=0.627$, $p<0.05$) and 3MBW ($r=0.458$, $p<0.05$). However, no significant relationship was found between physical activity and age and other variables ($p>0.05$).

Discussion: The study highlights a correlation between comorbidity and mobility in older women, emphasizing backward walking speed as a key indicator of physical performance and functional independence. However, the absence of a significant relationship between physical activity and other variables suggests that self-reported activity levels may not fully capture functional capacity.

Conclusion: The study highlights the impact of comorbidity on mobility and functional capacity in older women. Backward walking speed and TUG emerged as key mobility indicators. The lack of correlation between physical activity and other variables suggests the need for objective assessments. Targeted interventions are essential to preserve mobility and independence in aging populations.

Exercise Modalities and Intervention Design for Older Adults

Yintao Niu: Effect of a Bungy Pump Training on Aerobic Capacity in Postmenopausal Women

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Introduction: 70% of postmenopausal women (PW) who develop cardiovascular disease experience a low level of aerobic capacity. Bungy Pump training (BPT) as a modified sport of Nordic walking may be able to reverse the unfavourable effects and improve the health of PW.

Purpose: The study examined the effect of a 12-week BPT on aerobic capacity in PW.

Method: In a randomized controlled trial based on geographical location, 56 participants (age 61-88 years) with no experience of the BPT were assigned to the BPT group (n=30) and Daily Activity (DA) group (n=26). The Participants in the BPT group completed 36 BPT sessions (3 times a week for 60 minutes). The Participants in the DA group performed daily activities. The maximum oxygen uptake (VO₂max) and resting heart rate (HR) were assessed at baseline and after 12 weeks.

Results: No significant differences were found on VO₂max and HR between groups at baseline. The study found PW in the BPT group significantly increased VO₂max (L/min) ($p = 0.0001$) by $7.24 \pm 6.34\%$. No significant changes on VO₂max were observed in the control group.

Conclusion: Overall, 3 weekly 60-minute BPT for 12 weeks had significant beneficial effects on aerobic capacity in PW with no previous experience of the sport, which is important for the prevention of cardiovascular disease. This finding could be applied to intervention programs for PW.

Nadja Schott: Effects of Resistance Training with Elastic Bands Compared to Free Weights Training on Functional Performance in Older Adults: A Randomized Controlled Trial

Authors: Nadja Schott¹, Benjamin Holfelder¹, Philipp Straßer¹

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Strength training is the most widely recognized strategy for enhancing muscle mass, strength, and function in older adults. However, numerous studies have demonstrated that conventional strength training regimens often yield inconsistent outcomes in functional performance despite increased muscle mass and strength (Kirk et al., 2024; Schott et al., 2019). Conversely, forms of strength training performed with unstable equipment demand high levels of motor control and the generation of muscle strength, which is critical for overcoming external loads and maintaining stability (Pirauá et al., 2019). An alternative approach involves the utilization of elastic exercise bands, which generate less stable training conditions and have the potential to enhance functional performance to a greater extent than conventional training methods. The present study aims to elucidate the comparative effectiveness of a traditional strength training program employing free weights and a functional strength training program designed to optimize performance in specific daily living activities. 48 participants (67.1 ± 5.32 years; 28 men, 20 women) were randomized into three groups: a free-weight group (FWG, $n=16$), an elastic band group (EBG, $n=17$), and a control group (CG, $n=15$). They completed 12 weeks of progressive resistance training twice a week with five main exercises to strengthen the whole body. Changes in strength were assessed using the 1-RM on chest press and leg press; functional performance was assessed with the tasks of climbing stairs, lifting and setting down a heavy box, the 30s chair stand test, and the timed up-and-go test (TUG). The study's findings indicate that group allocation predominantly influences the magnitude of enhancement in a specific outcome. While the CG exhibited negligible changes from the pre-test to the post-test, the EBG demonstrated substantial improvements in the 30s chair test (19.8%), box lift (44.8%), and TUG (11.1%). The FWG and EBG groups exhibited comparable enhancements in maximum strength for the chest (6.1% vs. 3.6%) and leg press (15.8% vs. 23.9%). The findings of this study suggest that 1) resistance training adaptations exhibit a high degree of task specificity in older adults, and 2) significant improvements in functional outcomes can be achieved through the use of elastic bands.

Gokhan Yagiz: Chronic Effects of Eccentric Strength Training on Biceps Femoris Long Head Elasticity: A Meta-Analysis

Author: Gokhan Yagiz¹

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Introduction: Hamstring strain injuries (HSIs) are common in sports requiring sprinting, with rising incidence over the past two decades. The biceps femoris long head (BFlh) is the most injured hamstring muscle. It has been observed that the incidence of HSIs tends to increase with the advancing age among athletes. Furthermore, several risk factors concerning HSIs have been identified, including, but not limited to, passive muscle stiffness of the hamstrings. Eccentric training is proposed to prevent HSIs. This meta-analysis synthesises evidence on the effectiveness of eccentric training for reducing the passive stiffness of the BFlh, offering insights into preventive mechanism of the intervention.

Methods: On February 27, 2025, the Cochrane Library, PubMed, and ProQuest Central were systematically searched using key terms: Eccentric, exercis, training, ‘biceps femoris’, hamstring, ‘knee flexors’, ‘posterior thigh’, semitendinosus, semimembranosus, elastogra, and sonoelastogra*. Randomized controlled trials (RCTs) lasting at least four weeks, published in English in peer-reviewed journals, that examined the effects of eccentric training on elastography-measured BFlh stiffness were included in quantitative synthesis. Missing outcome data were obtained by contacting study authors. After assessing the risk of bias, we calculated the standard mean difference (Hedges’g effect size) using RevMan Web. The meta-analysis’s level of evidence (LoE) was graded with GRADEPro GDT software.

Results: Sixty records were obtained via database searches (Cochrane Library = 13, PubMed = 35, ProQuest Central = 12), with three RCTs eligible for the meta-analysis. Consequently, this meta-analysis detected eccentric strength straining has a trivial effect of decreasing the passive muscle stiffness of the BFlh (g = -0.17, P = 0.4, I² = 0%, LoE = High).

Discussion: All included studies showed consistent results about the trivial effects of eccentric training on the passive muscle stiffness of the biceps femoris long head (BFlh). This meta-analysis provides strong evidence indicating the negligible impact of eccentric training on reducing BFlh passive stiffness. Therefore, additional interventions should be explored for injury prevention programs to reduce stiffness in BFlh.

Conclusions: Programs for eccentric strength training to prevent HSIs should revise strategies by integrating interventions that reduce passive muscle stiffness in the biceps femoris long head (BFlh).

POSTER PRESENTATION

Poster Session 1+2

#7 Mohammad Mosaferi Ziaaldini: Mechanisms of Exercise-Induced Mitochondrial Biogenesis and Dynamics in Aging

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This review article examines mitochondrial adaptations in aged skeletal muscle in response to exercise training. Mitochondrial dysfunction is implicated in the aging process and various health issues, including neuromuscular, metabolic, and cardiovascular diseases. Mitochondria are responsible for cellular energy production and are involved in other functions such as apoptosis and mtDNA maintenance. Mitochondrial function is dependent on biogenesis and dynamics, involving processes such as fusion and fission. Aging is associated with decreased mitochondrial function, including a reduction in the electron transport chain, oxidative phosphorylation, enzyme activity, and mtDNA content. There is also a reduction in mitochondrial size and density as well as increased oxidative stress. The mitochondrial theory of aging suggests that the accumulation of reactive oxygen species (ROS) leads to mitochondrial mutations and cellular dysfunction. Both endurance training (ET) and resistance training (RT) have positive effects on mitochondrial function in older adults. ET increases aerobic capacity, mitochondrial size and number, and biogenesis. The effects of ET on the expression of PGC-1 α , a key regulator of mitochondrial biogenesis, are inconsistent. However, ET does increase the expression of PGC-1 α 's downstream targets, NRF-1 and TFAM. ET also activates pathways involving CaMK, p38MAPK, AMPK, and Sirt1. RT also leads to improved endurance capacity and increases in mitochondrial function and protein expression. RT increases autophagy regulatory proteins and can activate the IGF-1/MAPK pathway, possibly through the expression of a new form of PGC-1 α (PGC-1 α 4). Exercise training can improve mitochondrial function in the elderly, likely through increased activity of AMPK, a higher NAD⁺/NADH ratio, and increased levels of growth factors. Further research is needed to determine the optimal type, intensity, duration, and frequency of exercise and whether nutritional or pharmaceutical interventions could enhance the effects of physical activity.

#8 Abdulsamet Efdal: Life Kinetic Exercises to Improve Cognitive Functions

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Life Kinetics is a modern movement training program aimed at the development of the locomotor system coupled with high activity of the nervous system. The method was first applied and popularized by Horst Lutz, a German football coach. The essence of Life Kinetics training lies in combining different motor activities that actively create and shape relationships in the human brain, especially in the cortical part, and at the same time increase the efficiency of the person's thought processes [1].

With life kinetic applications, new synapses are formed in the brain. With these new synapses; by training the muscles and activating the related cortical areas; more control dominance is achieved over the muscles during the performance of the movement. Thus, the ability to make correct and fast decisions in the execution of voluntary movements is gained. In other words, life kinetic aims to maximize the level of consciousness involved in the action [2]. Life kinetic applications can be easily applied to both children and elderly individuals, considering the age and physical fitness of the individual.

Life kinetic applications are a combination of three component exercises: physical activity, cognitive skills and visual perception exercises. The basic parameters of life kinetic exercise are; motion capture, throwing objects, eye coordination and other extremity movements [3]. Life kinetic exercises, with the complex movement patterns they contain, provide stimulation of brain cells, especially the hippocampus (learning, memory, alertness) [4]. Studies have reported that physical activity increases brain plasticity, regulates psychological function, improves learning outcomes and strengthens memory [5], and that physical activity performed with life kinetic applications plays a more effective role in the development of the human brain [6]. When Life kinetic applications are performed at 60% intensity and in a way that the individual enjoys, it has been observed that new cells are formed in the brain [7]. In summary, life kinetic exercises; It contributes to the development of other cognitive functions such as learning and memory, as well as the ability to make fast and accurate decisions, with exercises consisting of voluntary muscle movements, mainly balance and coordination, progressing from simple to difficult. In this context, it is thought that life kinetic applications will be widely used in every area of life, such as education, sports, and business life, for all age groups from seven to seventy, and will have great benefits in terms of the development of both physical and cognitive capacity. Although studies directly examining the effects of Life Kinetic exercises on elderly individuals are limited, it is generally seen that these exercises have potential benefits in increasing cognitive and physical performance.

#10 Marcel Leppée: The impact of frequency of physical activity on Body Mass Index (BMI) and Percent Body Fat (PBF)

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Background: Physical activity is associated with health benefits and obesity prevention. Methods by which it is possible to estimate obesity are body mass index (BMI) and percent body fat (PBF). The aim of this study was to determine the influence of physical activity frequency on nutritional status in relation to BMI and PBF. **Methods:** During the 2011 in the outpatient clinic of the Center for Preventive Medicine 343 persons older than 18 were examined. Among other things, as part of preventive examinations, morphological variables of the height and weight to calculate BMI were measured. PBF was also measured during examination. Via questionnaire the data on the physical activity frequency for each person were collected. Data were divided into three categories: low frequency (less than 3 times a week), moderate frequency (3-5 times a week) and high frequency (more than 5 times a week). **Results:** The total sample shows that 39.4% (N = 135) person had a low frequency, 50.1% (N=172) moderate frequency, and 10.5% (N=36) high frequency of physical activity. Persons who have a low frequency of physical activity showed higher mean values of BMI with a statistically significant difference than those with moderate frequency ($p = 0.001$) and high frequency ($p=0.010$). Mean values of PBF were also higher in persons with low frequency of physical activity with a statistically significant difference ($p=0,001$) in both the moderate and high frequency. Among persons with moderate and high frequency of physical activity has no statistically significant differences in the mean values in both BMI and PBF. **Discussion:** The results indicate that increased frequency of physical activity three or more times a week affect, among other things, the reduction in body mass index and percentage body fat compared to adults who spend insufficient physical activity two times a week. **Conclusion:** The results of this study support the need for public health interventions to promote healthy active living and increased physical activity in order to maintain weight and reduce chronic diseases.

#11 Neslihan Nur Pehlivan: Integration of Cognitive and Physical Exercises in Older Adults: A Geriatric Clinic Example from Türkiye

Authors: Neslihan Nur Pehlivan¹, Özge Pehlivan¹

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Integration of Cognitive and Physical Exercises in Older Adults: A Geriatric Clinic Example from Türkiye The combined application of cognitive and physical exercises represents a critical approach to promoting brain health and overall well-being in older adults. This study summarizes a program implemented in the geriatrics clinic of a training and research hospital in Türkiye. Conducted on a monthly basis, the program targets a group of older individuals with the primary objectives of enhancing cognitive and physical capacities, fostering social interaction, and supporting overall health. To achieve these goals, a variety of engaging and interactive activities are utilized to motivate participants. Each month, approximately 20 participants attend the program, most of whom are unmarried, independently living women. The exercises integrate physical activities with cognitive challenges, aiming to provide a holistic approach to well-being. For instance, tasks such as forming a fist with one hand while keeping the other hand open, or sequentially opening and closing fingers of one hand while performing the opposite movement with the other hand, are used to enhance motor coordination. Breathing exercises, such as blowing a ball across a certain distance in a water-filled container, are employed to support respiratory functions. Additionally, activities such as building towers with colored blocks according to given instructions or imagining picking fruits from a tree while naming different types of fruits stimulate physical movement and mental recall. More complex tasks include pedaling a stationary bicycle while performing synchronized hand movements, which aim to improve coordination and cognitive engagement. These activities collectively promote mental stimulation, physical mobility, and interactive participation. The program has shown positive outcomes, with improvements observed in participants' physical mobility, cognitive skills, and social interactions. The integration of physical and mental exercises has strengthened the connection between the brain and body while providing an enjoyable experience. This program stands out as an effective, cost-efficient, and easily implementable model for supporting brain health and physical activity in older adults. The adaptation and dissemination of similar programs for different groups could play a significant role in enhancing the well-being of aging populations.

Keywords: Cognitive Exercise, Physical Activity, Aging, Motor Skills

#13 Emine Efe: Relationship Between E-Health Literacy and Physical Activity Levels In Adolescents

Authors: Seçil Aynur Çalik¹, Emine Efe¹

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Introduction: Physical activity is effective in a fit and joyful daily life, protecting the body against diseases, preventing obesity, slowing down the organic decline caused by aging and aging, and preventing posture disorders. Determining the habits of regular physical activity and adequate balanced nutrition that exist in childhood and adolescence and trying to correct the negative ones are important in terms of preventing health problems in the adult and elderly years of the individual. Determining the habits of regular physical activity and adequate balanced nutrition in childhood and adolescence and trying to correct the negative ones are important in terms of preventing health problems in the adult and elderly years of the individual.

Objective: The aim of the study is to determine the relationship between e-health literacy and physical activity levels in adolescents.

Method: The is a cross-sectional, relationship-seeking type of study. The research was conducted in the 2021-2022 academic year in schools selected by cluster sampling method among the high schools affiliated with Burdur Provincial Directorate of National Education. It was conducted among 717 adolescents selected by the stratified sampling method, using the "Personal Information Form", "e-Health Literacy Scale (eHEALS)" and "Physical Activity Questionnaire for Adolescents (PAQ-A)". The data was analyzed using SPSS for Windows 23.0 program.

Results: The mean score of adolescents on eHEALS was found to be 26.84±6.66. In the study, the mean score on eHEALS of students who conducted health research on the internet was significantly higher compared to those who did not ($p=0.014$). The mean score of adolescents on PAQ-A was found to be 2.42±0.78. Among adolescents, the mean PAQ-A score of female participants was significantly lower than that of male participants ($p0.05$). A positive and weak correlation was found between the total mean score eHEALS and the total mean score of PAQ-A of adolescents ($p=0.036$, $r=0.078$).

Conclusion: A significant relationship was found between adolescent e-health literacy and physical activity levels. In this regard, e-health literacy education can be used among nursing plans in order to increase the physical activity level of adolescents and improve their health accordingly.

Keywords: Adolescent, e-health literacy, physical activity, nursing

#14 Stevo Popovic: Enhancing Physical Activity in Older Adults through Age-Friendly Infrastructure in Montenegro

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As Montenegro faces an aging population, the development of age-friendly infrastructures like parks, walking trails, and recreational areas is vital for promoting regular physical activity among older adults. This study examines the impact of these environments on the physical engagement and health outcomes of the elderly across various Montenegrin communities. Focusing on accessibility, safety, and the integration of encouraging natural elements, this research employs a mixed-methods approach, utilizing both quantitative data from activity monitors and qualitative insights from community surveys and focus groups. Initial results indicate that accessible, safe outdoor spaces significantly increase physical activity frequency and duration among older adults. The study identifies existing barriers to facility usage and offers policy recommendations to enhance infrastructure usability and attractiveness. This research contributes to the understanding of how physical environments influence elderly activity levels and informs urban planning and public health policies aimed at supporting an active and healthy aging population in Montenegro.

Keywords: Age-Friendly Infrastructure, Physical Activity, Older Adults, Urban Planning, Montenegro

#15 Emine Efe: Focus And Development Of Studies Conducted On The Effect Of Wearable Technologies On Physical Activity

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The aim of this study is to determine the focus and development of studies conducted on the effect of wearable technologies on physical activity. This retrospective and descriptive study was conducted by examining 745 English studies accessed using the English keywords "wearable technology" and "physical activity" in the Web of Science database on January 14, 2025. 566 research articles published by 3056 authors from 365 different sources between 2003-2025 were included in the study. The study excluded studies such as book chapters, review articles, meeting abstracts, and letters to the editor (179 articles). The RStudio program and the “biblioshiny” tool, an R application, were used in data analysis. Each research article was evaluated in terms of journal, author, citation, country, trends, and themes with the bibliometric analysis method. The annual growth rate of the articles was 6.5%. The average number of citations per document was 16.67. Approximately 66% of the articles were published in the last 5 years (371 articles), and 95% in the last 10 years (538 articles). Sensors (28 articles) was the most productive, and Medicine & Science in Sports & Exercise (519 citations) was the most core journal. The article titled “Effect of wearable technology combined with a lifestyle intervention on long-term weight loss: the IDEA randomized clinical trial” published by Jakicic et al. (2016) in the Journal of the American Medical Association was the most influential publication (372 citations). The country with the most publications and citations is the United States (23 articles, 4508 citations). As a result of the analysis, it was determined that the prominent trend words were “physical activity”, “health”, “exercise”, “adult”, “risk”, “validity-reliability”, “performance” and “sedentary lifestyle”. The main themes include “wearable devices”, “exercise”, “patient monitoring”, “activity monitoring”, “mobile health”, “digital health”, “activity trackers”, “actigraphy”, “obesity”, “telehealth”, “machine learning”, “fitness tracker”, “accelerometer”, “biosensor”, “stress” and “internet of things”. The focus of studies on the effects of wearable technologies on physical activity has increased especially in the last 5 years. Monitoring and improving physical activity with wearable technologies is an effective method for a healthier transition to the aging process.

#20 Yi Wang: Integrating AI and systems thinking in managing physical activity in old age

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In recent years, there has been an increasing interest in the application of systems thinking to exploring, understanding and acting on complex public health issues. The interest in systems thinking arises from the growing body of evidence acknowledging the multiple, systemic and complex causes of many public health issues, and that to address them, actions are required at both the individual and societal level. A complex system is a collection of elements, with interconnections between those elements. Studies have shown that moderate-intensity aerobic activities (like walking or cycling) and strength-training exercises are most effective for improving health outcomes in older adults. This paper will tailor interventions based on individual needs and limitations are essential to ensure that physical activity programs are accessible, safe, and effective. Group-based programs, social support networks, and community-oriented exercise opportunities have been associated with higher adherence rates. Systems thinking allows us to view the promotion of physical activity in older adults as a multifaceted challenge, where individual behaviour is influenced by a combination of personal, social, environmental, and systemic factors. Addressing these interconnections can lead to more effective, sustainable interventions for enhancing physical activity and, ultimately, the quality of life for older adults. Most previous systems thinking research in physical activity in old age is based qualitative System mapping, which has many limitations, such as, the perspectives of the individuals, or groups involved in creating the map can influence the results. This paper will demonstrate an integration of AI and systems thinking has a higher feasibility, applicability and utility. If these results are scaled up to a wider geography, this could be potentially very significant. This modelling approach can be informed conversations backed by evidence with local healthcare leaders in our attempt to provide a realistic view of prevention impact on population health and reducing demand on local health services and cost.

#25 Natalia Chukhlantseva: Digital Divide and Healthy Aging: Exploring Technology Use for Physical Activity in Older Ukrainians

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Background: Given the growing trend of population ageing, this study assessed older adults' use of digital technology (DT), with a focus on physical activity (PA), and sought to identify the factors influencing their engagement.

Method: A cross-sectional study was conducted with 81 older adults (mean age 70.5 ± 7.6 years, 71.6% women) aged 60 and over from Zaporizhzhia, Ukraine, living in the community. Participants completed a questionnaire that included sociodemographics, the Rapid Assessment of Physical Activity scale, and questions on DT use. DT use analysis considered predisposing demographic characteristics (age groups; gender), enabling socioeconomic factors (education, employment, living arrangements), and need-based factors (chronic conditions, compliance with PA recommendations).

Results: Most respondents (58%) were sedentary, while 27% were insufficiently active. Smartphones were the most used devices (84%), followed by smart TVs and computers (33.3% each). Pedometers (30.9%), heart monitors (19.8%), sleep trackers (16%), health/fitness programs (12.3%), and fitness games (9.9%) were also used. DT prevalence was 90.1% (95% CI: 81.5-95.6), with higher usage among women (74.7%), those aged 60-69 (48%), highly educated individuals (62.7%), retirees (58.7%), married individuals (53.3%), and sedentary participants (30.7%). Digital fitness technology (DFT) use among DT users was 23.5% (95% CI: 14.8-34.2). Most DFT users were women (63.2%), and 73.7% had chronic diseases. Among those aged 60-69, 78.9% used DFT, compared to 21.1% in the 70-79 group, with no use reported among those ≥ 80 . Married individuals and those living with a spouse were more likely to use DFT (63.2% and 47.4%). The proportion of users with higher education was 89.5%, while 73.7% were employed. Only 5.3% of DFT users were regularly physically active. Regression analysis showed demographic factors explained 15.1% of variance ($p = 0.002$), with age as a significant predictor ($p = 0.001$), but not gender. Adding socioeconomic factors raised R^2 to 20.6%, though some variables were insignificant. Including need-based factors further increased R^2 to 28.1% ($p = 0.001$), with age ($p = 0.045$) and chronic disease ($p = 0.007$) remaining significant negative predictors.

Conclusion: Age and chronic disease significantly reduce digital fitness technology use among older adults in Ukraine, highlighting the need for targeted interventions.

#27 Özgün Pehlivan: Integrating Physical Activity and Health Education for Older Adults: A Community-Based Model from Türkiye

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A Healthy Life Centre in a central Anatolian city in Türkiye has implemented a structured programme to promote physical activity among older adults. Regular physical activity is essential for healthy ageing, helping to improve muscle strength, balance and coordination, while reducing the risk of falls and maintaining independence. This initiative integrates individual counselling and group-based exercise programmes to improve the physical fitness and well-being of older people. Upon enrolment, each participant undergoes an assessment by a physiotherapist to evaluate their physical condition, posture and balance. Based on the results, a personalised home-based exercise programme is developed, and individuals are trained to perform the exercises correctly. This ensures that physical activity becomes part of their daily routine. In addition to individual counselling, group exercise sessions are organised to promote social interaction and motivation. Small groups of 3 to 6 people take part in supervised sessions 1 to 3 times a week using exercise equipment such as Pilates balls, resistance bands and mats. These sessions focus on improving balance, flexibility, muscle strength and endurance through structured exercises. Regular participation has significantly improved the physical well-being of older people. In addition to the exercise sessions, educational workshops on healthy ageing and physical activity are held. These sessions cover topics such as fall prevention strategies, posture training and ergonomic movements for daily living. The programme is being expanded to include women's cultural centres, public educational institutions and nursing homes, thereby increasing its impact on the community. As a result, participants' physical activity levels increased, coordination and muscle strength improved, fall risk decreased and quality of life improved. Group sessions were also found to contribute to social interaction. This intervention shows that combining individualised interventions with group-based exercise programmes is an effective strategy to promote physical activity in older adults. Scaling up such community-based programmes across Türkiye could significantly improve the health and independence of the older population and support active and healthy ageing.

Keywords: Healthy Ageing, Physical Activity Promotion, Community-Based Intervention, Fall Prevention, Geriatric Exercise Programmes

#40 Nurten Terkes: The Effect Of Online Wigong Exercises on Depression and Cognitive Memory

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Introduction: Nowadays, depression and cognitive disorders are becoming an increasing public health problem. It is known that physical activity can reduce symptoms of depression and improve cognitive functioning by enhancing brain plasticity. Wigong is a mind-body exercise based on traditional Chinese medicine and has become easily accessible through online applications.

Objective: The aim of this study was to evaluate the potential of online Wigong exercises to reduce depression symptoms and improve cognitive functions.

Method: This study followed the recommendations of the Cochrane Handbook version 6.2 and the study was presented according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 checklist. Two authors independently searched the databases to identify eligible English language articles, without year limitation. PubMed, Science Direct, Cochrane Library, Web of Science, Ovid, CINAHL, Proquest and Scopus databases were searched until January 2025. During the search, keywords determined according to Medical Subject Headings (MeSH) terminology such as cognitive function, brain plasticity, geriatric depression, online wigong exercises, randomized controlled trial, older adults and their combinations were used.

Results: The study by Zhao et al. (2020) examined the effect of exercise on brain plasticity and showed that it reduced depression symptoms and supported cognitive functions. Lavretsky et al. (2011) found that mind-body exercises such as Tai Chi alleviate depression symptoms and improve cognitive functions in addition to medication. In addition, the cross-sectional study conducted by Aktaş and Güneş Gencer (2024) showed that physical activity and social participation were positively associated with cognitive functions. When evaluated in the light of the findings, it was observed that online Wigong exercises alleviated depression symptoms and improved cognitive functions. It has been determined that exercises such as Tai Chi and Wigong improve brain plasticity and provide positive neuroplastic changes in depression-related regions.

Conclusion: Literature suggests that online Wigong exercises have positive effects on depression and cognitive functions. Increased accessibility through online platforms may make it possible to reach larger audiences. Future studies may be conducted with larger samples to provide long-term monitoring of the effects.

Keywords: Wigong exercises, depression, age, cognitive memory.

#46 Moreno Sutter: A Machine Learning Approach to Personalized Cognitive-Motor Exergaming in older residents of Long-Term Care Facilities with Cognitive Impairments

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Ageing is often accompanied by a progressive decline in cognitive and motor functioning, negatively impacting quality of life, autonomy and the likelihood of transitioning to long term care facilities (LTCF), which leads to significant healthcare costs. Major Neurocognitive Disorder (MND) is characterized by substantial cognitive decline, often resulting in loss of independence and increased care needs. Exergame training video games that are played with full-body exercises are an excellent tool for simultaneously delivered cognitive-motor training and has gained attention for its potential to slow cognitive decline and enhance cognitive function. However, its implementation in LTCF remains underexplored, with challenges like usability, and practical feasibility requiring further investigation. This study aims to develop a conceptual framework for integrating exergame training into LTCF, by selecting appropriate games based on motor and cognitive functioning profiles and determining the optimal level of support for older adults with MND. A cross-sectional study will be conducted with 100 residents of LTCF, who will undergo assessments including the Short Physical Performance Battery (SPPB), to evaluate balance, lower limb strength and gait speed and the German version of the Quick Mild Cognitive Impairment (QMCI) to evaluate cognitive functioning. Using data from these assessments, along with demographic and in-game performance data, a supervised machine learning model will be developed to predict optimal exergame recommendations and personalized support needs. Preliminary results and an initial model will be presented at the conference.

#49 Elif Okur: Evidence-Based Physical Activity Recommendations And Roles Of Nurses In Older Adults With Sarcopenia

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Sarcopenia is a common geriatric syndrome in older adults characterized by age-related loss of skeletal muscle function and muscle mass. The overall prevalence of sarcopenia increases with age and is estimated to be approximately 6-22% in adults aged 65 years and older. Since sarcopenic individuals have reduced functional capacity in their daily lives, falls may result in hospitalization, requiring long-term care and increasing treatment costs. Due to the high prevalence of sarcopenia among older adults and its association with adverse outcomes, a number of interventions are being explored to combat sarcopenia and minimize such adverse events. These include physical exercise, nutritional supplementation, hormone replacement and therapeutic agents that increase muscle mass. Recommendations for evidence-based clinical practice guidelines for managing sarcopenia in older adults include physical activity with a focus on progressive resistance-based (strength) training as the first-line treatment to manage sarcopenia. In older adults with sarcopenia, resistance-based exercise may be effective for improving muscle strength, skeletal muscle mass and physical function (Grade: strong recommendation, moderate certainty of evidence). Resistance-based training refers to any physical activity using external resistance, such as dumbbells, free weights, elastic therapy bands and body weight itself. Resistance-based training for older adults promotes muscle hypertrophy, strength gains and improved physical performance. Studies in the geriatric population have shown that exercise interventions involving resistance training increase both muscle mass and physical performance. In conclusion, for the management of sarcopenia in geriatric patients, there is a strong recommendation to include older adults with sarcopenia in a resistance exercise program. So, the role of nurses should include encouraging physical activity for older adults to have a good quality of life, guided by evidence-based guidelines in the management of sarcopenia.

Keywords: Exercise, Geriatrics, Sarcopenia

#53 Michel Audiffren: Effects of technology-assisted physical activity interventions on circulating biomarkers for neuromuscular function in community-dwelling older adults aged 60 years old and above: A systematic review and meta-analysis

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Background: Neuromuscular function is essential for maintaining mobility and independence in aging populations. Technology-assisted physical activity interventions (e.g., exergaming, virtual reality, and wearables) offer promising alternatives for improving neuromuscular health. However, little is known about their impact on circulating biomarkers, particularly exerkines—molecules released in response to exercise that mediate neuroplasticity, inflammation, and metabolism.

Objective: This systematic review and meta-analysis examine the effects of technology-assisted physical activity interventions on circulating biomarkers of neuromuscular function in community-dwelling older adults (≥60 years).

Methods: Following PRISMA guidelines, a comprehensive search of PubMed, Web of Science, and Scopus was conducted. Eligible studies included randomized controlled trials (RCTs) assessing changes in circulating biomarkers following technology-assisted physical activity interventions. Primary outcomes included neuroplasticity markers (e.g., BDNF, NGF), inflammatory markers (e.g., IL-6, TNF- α), and adipocytokines (e.g., leptin, adiponectin). A meta-analysis was performed using standardized mean differences (SMD) to evaluate intervention effects.

Results: Meta-analysis revealed significant increases in neuroplasticity markers (BDNF, NGF, NT3), suggesting enhanced synaptic plasticity and cognitive function. Inflammatory markers (IL-6, TNF- α) showed a reduction, indicating potential anti-inflammatory benefits of technology-assisted interventions. However, heterogeneity across studies highlighted the need for standardized protocols in biomarker assessment.

Conclusion: Technology-assisted physical activity interventions appear to positively influence biomarkers of neuromuscular health in older adults, bridging the gap between traditional mechanical assessments and biochemical measures. Future research should establish standardized protocols and explore long-term effects to optimize intervention strategies for healthy aging.

#55 Signe Tomsone: Barriers to Long-Term Adherence and Behavioural Change in Artificial Intelligence-Driven Physical Activity Interventions for Older Adults: A Scoping Review

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Introduction: Older adults often face significant challenges in maintaining adherence to physical activity interventions over the long term, despite the critical role these activities play in promoting their health and well-being. Research on long-term engagement in artificial intelligence (AI)-driven physical activity interventions, designed to facilitate behaviour change and habit formation, is notably lacking for populations aged 65 and above. This scoping review aims to identify the barriers to long-term adherence and behaviour change in AI-driven physical activity interventions for older adults, with the goal of enhancing their effectiveness and improving health outcomes. The review is guided by several research questions:

- What are the barriers to long-term adherence and behaviour change in AI-driven physical activity interventions for older adults?
- What are the main AI-driven physical activity interventions for older adults?
- How effective are AI-driven physical activity interventions for behaviour change and habit formation in older adults?
- What factors impact older adults' adherence to AI-driven physical activity interventions?

Methods: This scoping review follows the PRISMA Extension for Scoping Reviews (PRISMA-ScR) methodology to systematically map the existing literature and identify research gaps. Searches in databases—PubMed, ProQuest, Scopus, Web of Science, and Taylor & Francis—were limited to full-text, peer-reviewed articles published in English. The focus on peer-reviewed literature excludes potentially insightful grey literature.

Results: From 4098 publications, ongoing screening by the research team using the AI-powered tool Rayyan is being conducted. Data from selected articles will be extracted, including: (1) study characteristics (e.g., full reference, country, main objectives), (2) methodological aspects (e.g., sample size, sample characteristics, study design), (3) intervention components (e.g., PA component, duration and frequency of sessions, supervision), (4) AI component (e.g., technology/devices used), (5) study outcomes (e.g., primary and secondary outcomes, outcome measurements, main findings), and (6) main findings related to adherence or behaviour change.

Conclusions: At the conference, synthesized key findings will be presented descriptively to represent the barriers to long-term adherence and behaviour change in AI-driven physical activity interventions for older adults, identified patterns, and main gaps in the literature.

#60 Arzu Erden Güner: The Role of Physical Activity Participation in the Prevention and Management of Delirium: A Traditional Review

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Introduction: Delirium is a clinical syndrome that is frequently seen in intensive care units (ICU), especially in older age groups, and negatively affects patient outcomes. It can lead to cognitive impairment, prolonged hospital stays, and increased mortality. In recent years, physical activity has been shown to play a significant role in delirium management. Therefore, there is an important need to review current evidence regarding the effect of physical activity in the prevention and management of delirium.

Objective: The aim of this study is to examine the role of physical activity in the prevention and management of delirium in ICUs and to evaluate the effectiveness of these interventions in light of existing literature.

Main Text: This review is based on scientific research published after 2010. Studies investigating the effects of physical activity on delirium in ICUs were analyzed, including systematic reviews, meta-analyses, randomized controlled trials, and observational studies. Research findings indicate that early mobilization reduces the incidence of delirium, shortens hospital stays, and helps preserve cognitive function. Even in mechanically ventilated patients, early mobilization has been found to be both safe and effective. Furthermore, early physical rehabilitation has been highlighted as more effective in preventing delirium compared to pharmacological approaches.

Conclusion: Physical activity plays a crucial role in the prevention and management of delirium. Early mobilization can help preserve cognitive function and reduce both the duration and severity of delirium in ICU patients. Therefore, integrating physical activity into ICU care protocols should be encouraged to improve patient outcomes.

Keywords: Delirium, intensive care, early mobilization, physical activity, cognitive function, rehabilitation

#63 Melanie Mack: Chronic exercise for depression in older adults: A meta-analytic review of moderating factors and interactions

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Introduction: This meta-analysis aimed to investigate the effects of chronic exercise on depression severity in RCTs including older adults with an average age of at least 60 years and a minimum level of mild depression. Thereby the moderating effects of various intervention (n = 10), population (n = 8), protocol characteristics (n = 4), as well as their interactions (n = 7) were considered.

Methods: We conducted searches on Web of Science, Academic Search Complete, MEDLINE, CINAHL, APA PsycInfo, SPORTDiscus, and Cochrane from inception until July 2023. Primary outcomes focused on changes in overall depression severity, assessed with validated depression scales from baseline to the end of the intervention. A multilevel meta-analysis was undertaken to synthesize the effects of chronic exercise on depression severity. Moderators were explored through subgroup analyses and meta-regression analyses, including main effects and interactions.

Results: The comprehensive search yielded 20,700 records, of which 143 peer-reviewed articles comprising 182 effect sizes met the inclusion criteria. Chronic exercise significantly reduced overall depression severity ($g = -0.68$, $p < .001$, $k = 182$) with high heterogeneity ($Q = 1208.06$, $p < .001$; $I^2 = 96.92\%$). Regarding intervention characteristics, effects were particularly strong for interventions that included exergames as the type of exercise ($p = .035$, $k = 182$), had a long duration ($p = .027$, $k = 175$), a high volume ($p = .049$, $k = 172$), and involved high cognitive demand ($p = .004$, $k = 181$). Additionally, effects decreased with advancing age ($p < .001$, $k = 181$) and lower baseline depression severity ($p = .004$, $k = 182$). The benefits of high-cognitive-demand exercises increased with declining global cognition levels ($p = .020$, $k = 76$). Individuals with mild to moderate depression particularly benefited from high-intensity ($p = .044$, $k = 178$) and high-cognitive-demand exercises ($p = .001$, $k = 181$).

Discussion: The results of this meta-analysis underscore the importance of tailoring exercise regimens to optimize outcomes in older adults suffering from depression. The findings provide a foundation for developing evidence-based recommendations for exercise programs aimed at alleviating depression in older adults.

#64 Gamze Yalcinkaya Colak: Gait analysis comparison between 2D pose estimation algorithms and inertial measurement unit-based G-walk system: a pilot study

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Introduction: Gait analysis is an essential tool for assessing the overall health of elderly individuals and monitoring their physical function, proneness to falls, and rehabilitation progress. However, using optical motion capture systems for gait analysis in a laboratory setting can be impractical and inaccessible. Recent advancements in artificial intelligence have led to the development of more affordable, cheap, and portable gait analysis systems via 2D pose estimation algorithms. The purpose of this study was to compare the performance of two-dimensional pose estimation (2D-PE) algorithms and the G-walk system in the assessment of gait in elderly individuals.

Methods: Sixteen community-dwelling older adults (Age:65.63±10.93 years, BMI: 26.32±4.50) were recruited for this study. Participants were instrumented with a 4-meter sample of their gait with the G-walk system while their gait was recorded using a video camera HD30 FPS placed 4.5 meters from participant. The video recordings were processed using 2D-PE algorithms (YOLO V.11-Pose Estimation) to extract spatio-temporal gait parameters. The comparison of two methods was analysed by paired-samples t-test, while the agreement was assessed using Bland-Altman analysis and Passing-Bablok regression via the difference and mean values of variables from two different methods.

Results: The G-walk system demonstrated slightly lower values for the left stance phase cycle ($p=0.008$), first double support (FDS) cycles ($p=0.03-0.04$), and gait cycle durations ($p=0.002-0.013$) compared to the 2D-PE approach, except for cadence ($p=0.003$) and gait speed ($p=0.001$). Also, swing phase cycles, right stance phase, single support cycles, stride lengths, and step lengths (% stride length) were found similar between the G-walk system and 2D pose estimation algorithms ($p>0.05$). According to the Bland-Altman graphs, the right single support cycle, stride lengths of both sides, and stride length percentage of height for both sides parameters were significantly compatible with the G-walk system and 2D-PE algorithms.

Discussion & Conclusion: The findings of this study suggest that 2D-PE algorithms can be a viable alternative to inertial measurement unit-based systems for gait analysis in elderly individuals, providing a more accessible and affordable option for clinicians and researchers. Future research should focus on improving the accuracy of 2D pose estimation to enhance the utility of this approach.

#67 Demet İnangil: Effects of an Outdoor Aerobic and Resistance Exercise Program on Senior Fitness Capacity

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This study investigates the effects of a 12-week outdoor aerobic and resistance exercise program on the fitness and aerobic capacity of older adults. A quasi-experimental design was utilized, enrolling individuals aged 65 years and older from senior living facilities. Eligibility criteria included normal cognitive function and cardiovascular and musculoskeletal conditions appropriate for moderate-intensity exercise. All participants took part in supervised exercise sessions conducted by physiotherapists and nurses in the facility gardens, scheduled once weekly for 50 minutes over the 12-week period. In addition, they were assigned two unsupervised exercise sessions per week. The Senior Fitness Test (SFT) was administered at baseline and again after the 12-week intervention. In total, 32 participants successfully completed the study. Following the intervention, significant improvements were noted in the arm curl, chair stand, two-minute step, 8-foot up-and-go, and chair sit-and-reach tests ($p < 0.05$). The incorporation of aerobic and resistance exercises resulted in enhanced fitness and aerobic capacity within the outdoor exercise context.

#69 David Hewson: Co-production of a sarcopenia and frailty screening and intervention programme for older people from a culturally diverse population

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Physical activity is important for healthy ageing, with lower levels of physical activity linked to an increased risk of age-related conditions such as frailty and sarcopenia. Promotion of physical activity for older people is widespread; however, many older people fail to meet recommended physical activity guidelines. Lower rates of physical activity are linked socioeconomic status and culture, while perceptions of capability, the opportunity to undertake activity, and motivation are also important factors in participation. One way in which older people at-risk of frailty and sarcopenia can be identified and prescribed physical activity is by screening in primary care, which is recommended in many clinical guidelines for frailty and sarcopenia in community-dwelling older adults. However, this is difficult in practice, with many older people not routinely accessing primary care, meaning that information in electronic health records is often incomplete. In addition, the time available for healthcare professionals in primary care settings is limited, which makes it difficult to perform opportunistic screening. Another issue with a proactive approach to screening for frailty and sarcopenia is the lack of public awareness of these conditions. This aim of this research programme is to develop a screening and intervention programme for physical frailty and sarcopenia in community dwelling older people from a culturally diverse population. This programme uses a co-production approach in partnership with local stakeholders in the area covered by the Bedford, Luton, and Milton Keynes Integrated Care Service (BLMK ICS) in the United Kingdom, which has a culturally diverse population. Both the screening programme and the physical activity interventions are co-designed with stakeholders from many different communities. This enables preferences for activities to be determined, as well as the best way of identifying people at risk of frailty and sarcopenia. The screening programme is being developed using the Behaviour Change Wheel, which ensures that behaviour change theory is at the heart of the programme. The co-produced screening and intervention programme will then be evaluated in a culturally diverse population of older people, which will influence policy and practice and proactively identify older people at risk of physical frailty and sarcopenia.

#74 Rahman Nurkovic: The Importance Of Physical Activity Exercise Among Older People

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The aim of this paper is to support the change the focus is on lifestyle and in particular physical activity as a driver for a healthy and long life for older people. As populations continue to extend life expectancy, a central concern is whether the added time comprises years of healthy life and promotes a high health-related quality of life into old age. Encompasses exercise, sports, and physical activities performed as part of daily living, occupation, leisure. Physical function is the capacity of an individual to perform the physical activities of daily living. After the results analysis, a high overall level of physical activity of the treated sample of elderly women was determined. The first group of elderly women (age 50-59). Promoting physical activity to improve the quality of life of elderly people should be a priority task of health policy of all local communities. It is important to provide appropriate ways of information about the health status of elderly people in order to determine priorities, and accordingly plan appropriate programs of physical activity. If older adults cannot follow the guidelines because of chronic conditions, they should be as active as their ability and conditions allow. It is important to note that the recommended amount of is in addition to routine activities of daily living like self-care, cooking, and shopping, to mention a few. Exercise can contribute to maintaining quality of life, health, and physical function and reducing falls among older people in general and older people with morbidities in particular. The scientific literature review showed that the decreasing of functional possibilities is the cause of working capacity and social activity limitations. Physical activity is one of the methods for improving of fitness.
Keywords: elderly person, aerobic physical activity, muscle-strengthening activity

#75 María Pilar Jiménez: Mindful Compassion: An Online Intervention Program for Older Patients with Breast Cancer

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Motivational factors and treatment adherence are crucial for any intervention and/or clinical randomized control trial (RCT) success. The factors that affect old adults' participation or adherence to RCTs have been previously discussed in the literature but focused on external factors (e.g., transportation or burden associated with trials) but not so much on psychological factors such as needs and worries. Our central goal is to assess the online Mindful Compassion program's effectiveness in providing psychological support to old cancer patients. Compassion means being supportive of oneself when experiencing suffering and pain. The hypothesis is that the online intervention improves patients' self-compassion, well-being, and motivation to continue participating in the IMPORTANT clinical trial, avoiding dropout in fit and vulnerable/frail older adults with advanced breast cancer (BC) participating in the IMPORTANT project. This six-year project has received funding from the European Union's Horizon 2020 Research and Innovation program. The online intervention program comprises eight modules delivered over eight weeks. The intervention's key elements include mindfulness exercises, psychoeducation, experiential exercises, self-monitoring, and feedback. The treatment adherence will be assessed following the CONSORT-EHEALTH guidelines. The assessments comprise the registration and analysis of several metrics such as the number of logins, average session time, number of modules accessed by the patient, and time spent in each Module. Furthermore, the patients have the option to rate each Module on a scale of 1 to 5 in five dimensions: difficulty, relevance, comprehension, utility, and learning.

#84 Günay Yıldız: The Interaction of Gender and Living Environment on Physical Activity Levels in Older Adults

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Physical activity (PA) is a crucial determinant of health in older adults, yet it may vary based on gender and living environment. This study aimed to investigate the interaction effects of gender and living environment (nursing home vs. community-dwelling) on different PA levels in elderly individuals. A 2x2 multivariate analysis of variance (MANOVA) was conducted to examine the effects of gender (male, female) and living environment (nursing home, community-dwelling) on four PA outcomes: low-intensity PA, moderate-intensity PA, moderate-to-vigorous PA (MVPA), and total PA. The sample included 293 older adults, categorized into nursing home residents (n=156) and community-dwelling individuals (n=137). PA levels were assessed using the International Physical Activity Questionnaire (IPAQ). The multivariate test for the interaction between gender and living environment was non-significant (Pillai's Trace = 0.011, $p = .366$), indicating that the combined effect of gender and living space did not significantly influence PA outcomes. However, a significant main effect was found for living environment (Pillai's Trace = 0.038, $p = .010$), suggesting that community-dwelling elders had higher PA levels than nursing home residents. Gender also had a marginal effect (Pillai's Trace = 0.025, $p = .060$), with males showing slightly higher PA levels than females, particularly in MVPA ($p = .007$). Follow-up univariate analyses revealed that living environment significantly influenced moderate PA ($p = .047$) and MVPA ($p = .016$), with community-dwelling elders engaging in more activity. However, no significant interaction effects were observed across any PA intensity level ($p > .05$). While living environment plays a key role in determining PA levels among older adults, gender differences were relatively small. The absence of a significant interaction suggests that the influence of gender on PA does not differ across living environments. Future interventions should target increasing PA among nursing home residents, regardless of gender, to promote healthy aging.

OTHER CONTRIBUTIONS

Ruth Kavanagh: AgeWell Europe - 8 weeks to functional healthy ageing in Europe

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Introduction: As individuals age, physiological changes increase the risk of adverse health outcomes, such as osteoporosis and cardiovascular diseases, which can impact overall well-being and quality of life. These health conditions are particularly common among individuals who are physically inactive, follow poor dietary habits, or engage in inadequate self-care practices. Therefore, fostering behaviour change is essential for improving health outcomes. Engaging in multimodal exercise, maintaining a nutritious diet, managing stress, and ensuring good sleep hygiene are all critical components of healthy ageing. The AgeWell Europe project aims to provide in long-term middle-aged and older adults with an accessible, evidence-based platform to improve their strength, balance and endurance, to increase their wellbeing and physical self-efficacy. The overall goal is to make physical activity more accessible to middle-aged and older adults, helping them remain engaged in healthy habits.

Methods: The AgeWell Europe Platform consists of an 8-week online program designed for middle-aged and older adults. This program includes 16 multimodal physical activity sessions and weekly health education workshops. Each exercise session lasts between 25–35 minutes conducted twice per week, while the health education modules, which are shorter, are to be completed once a week. Currently, a multi-center pilot-study is being conducted in Ireland, Slovenia, Italy, and Germany to gather feedback of 40 participants per country.

Results: The AgeWell Europe Platform will be presented at the conference. It integrates practical exercise sessions, informative workshops, and the opportunity to monitor the progress of the participants.

Discussion: Interviews will help to identify obstacles and facilitators of participants experienced during the study. Workshops based on the results will take place to discuss the platform adjustments. Also, testing procedures to measure effects on strength, balance and endurance will be discussed.

Link: <https://agewelleurope.eu>

Hana Anna Šišková: Dance Intervention for Older Adult: A Practical Demonstration of the Latin American Dance Cha-Cha

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Dance is a powerful non-pharmacological approach to enhancing the physical, psychological, and social well-being of older adults. This practical demonstration highlights the cha-cha, a vibrant Latin American dance alongside samba, rumba, pasodoble, and jive. Known for its dynamic rhythm, playfulness, and energy, the cha-cha is both engaging and accessible for individuals of all skill levels. The primary aim of this demonstration is to illustrate how cha-cha can enhance coordination, balance, and motor agility in older adults. Its fast, precise footwork strengthens the lower limbs, improves stability, and helps prevent falls. Additionally, the dance's rhythmic and structured nature positively impacts cardiovascular health while maintaining a safe yet effective level of physical activity. Beyond the physical benefits, this demonstration also highlights the psychological advantages of dance. Moving to rhythmical music reduces stress, uplifts mood, and supports cognitive function. Learning and synchronizing choreography with musical accompaniment strengthens memory and spatial awareness—key components of cognitive health in older adults. Depending on the available time, the lesson structure will consist of a rhythmic warm-up, a basic choreography including the following figures: Close Basic Movement, Time Step, New York to Right and Left, Hand to Hand to Right and Left, Spot Turn to Right and Left, followed by a cool-down. Equally significant is the social dimension of dance. Cha-cha fosters connection, encourages communication, and cultivates a sense of belonging. Participating in group dance activities can help reduce social isolation and promote active engagement in community life. This demonstration offers participants the opportunity to experience a simple yet enjoyable cha-cha routine, specifically adapted to the needs of older adults. It also serves as an inspiring model for professionals in senior fitness and movement therapy, demonstrating how dance -specifically Latin American dances can be an innovative and effective tool for holistic well-being.

(It would be advisable to wear firm footwear.)

Eckehard Fozzy Moritz: Joy of Movement and Active Gaming as new Qualities of Movement Motivation - Applicability and Implementation Opportunities with Older Adults

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In this workshop the concepts of Joy of Movement and active gaming as new approaches to motivate for an increase in physical activity are introduced; their applicability and implementation strategies discussed. The focus on Joy of Movement in this regard is a paradigm that has been developed in various global and European projects and networks and is continuously advanced within the framework of the Joy of Movement Pioneers (JOMP). Core insights include triggers of Joy of Movement, dimensions of a culture of Joy of Movement and best practices in various application contexts. Active gaming summarizes mostly technical implementations within this paradigm, bridging between gamification and physical activity; developments here are currently fostered within the German-funded Physical eSports Hub. After introducing concepts and examples of Joy of Movement and active gaming participants of this workshop are invited to reflect on their applicability within the group of older adults and the specific focus that will be most promising. In a second round implementation strategies are being developed, reaching out to existing activities of members of EGREPA and COST networks. As a result, future projects are being planned, future topics for more in-depth research identified.