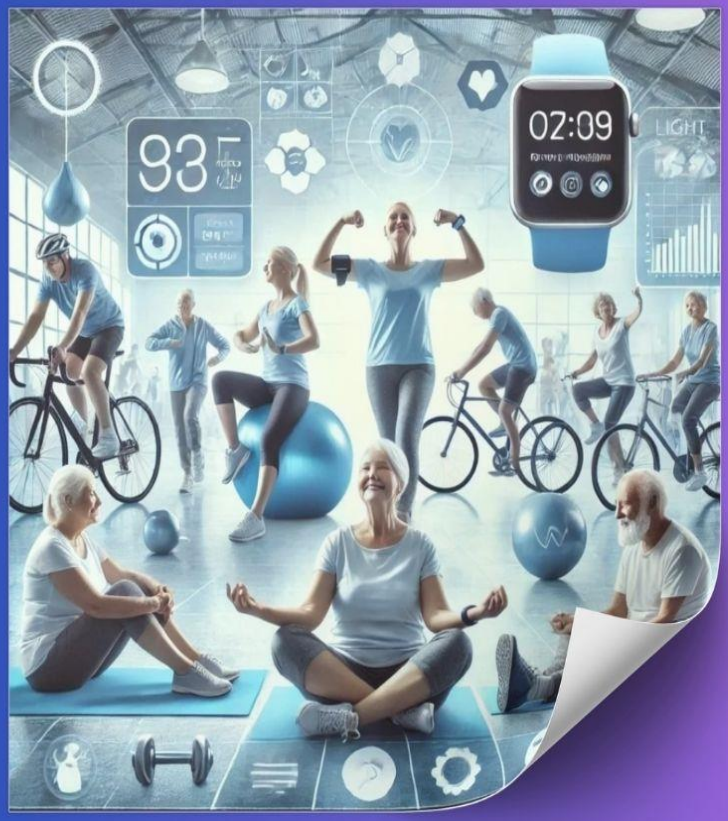
INNOVATIVE APPROACHES IN ENHANCING PHYSICAL ACTIVITY AND QUALITY OF LIFE IN THE OLDER ADULTS:

A Scientific Perspective Course



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Vila Viçosa - Portugal

December 2024

Vila Viçosa
Câmara Municipal

UNIVERSIDADE DE ÉVORA
ESCOLA DE SAÚDE
E DESENVOLVIMENTO HUMANO

Interreg
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INTRODUCTION

Vila Viçosa
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Secretary General Letter

Dear colleagues,

It is with immense pride and great enthusiasm that I present the proceedings of the XVII International Human Motricity Congress (IHMC). This event once again demonstrated the strength of our network, reinforcing the essential role of scientific collaboration in advancing knowledge and practical applications in human motricity.

Held in the historic town of Vila Viçosa from December 10th to 14th, this congress brought together over 300 participants from across the world, fostering meaningful exchanges and interdisciplinary dialogue. This year's theme, bridging tradition and innovation, was reflected not only in the high-quality research presented but also in the networking opportunities that strengthened our global community. The congress was a testament to the growing recognition of motricity sciences as a pillar of health promotion and human development.

One of the central topics that emerged during the event was the urgent need to address the challenges of aging populations through physical activity and movement-based interventions. As life expectancy continues to rise, the focus must shift from simply prolonging life to enhancing the quality of those extra years. The science is clear: regular physical activity plays a fundamental role in preventing age-related decline, maintaining functional independence, and ensuring long-term well-being. The discussions held at the congress reinforced that motricity professionals are not only researchers and educators but also key actors in designing evidence-based solutions that foster active and healthy aging.

A remarkable example of this commitment is the RECORVHABIT project, funded by INTERREG POCTEP, which highlights the transformative potential of physical activity in rehabilitation and aging. This initiative, developed in partnership with institutions from Portugal and Spain, seeks to integrate innovative methodologies in rehabilitation through habit-based interventions. By leveraging cutting-edge technologies and interdisciplinary expertise, RECORVHABIT is paving the way for novel approaches to maintaining cognitive and motor function in aging populations, ensuring that physical activity remains an accessible and effective tool in preventing decline.

The IHMC's role in disseminating such projects is fundamental. Our scientific community thrives when research is shared, debated, and refined in collective spaces like this congress. The success of the XVII IHMC was made possible thanks to the outstanding organization by the University of Évora and the welcoming atmosphere of Vila Viçosa, which provided the ideal setting for the exchange of ideas. The importance of informal moments—shared meals, coffee breaks, and spontaneous discussions—should not be underestimated, as they often give rise to the collaborations that shape the future of our field.

As we look to the future, we eagerly anticipate the XVIII IHMC, set to take place at Tiradentes University in Aracaju, Brazil, under the theme *"Health, Sports, and Innovation: The Age of AI in Building Healthy Societies."* This congress will further consolidate our collective mission: to ensure that human motricity remains at the

forefront of health promotion, bridging scientific progress with real-world application.

I extend my heartfelt gratitude to all those who contributed to this congress— participants, speakers, organizers, and sponsors. Your dedication and passion continue to drive the success of our community. Let us remain committed to fostering a society where movement is not only a fundamental human right but also a vehicle for longevity, independence, and well-being.

With my best regards,

José Parraça

Secretary General of the International Human Motricity Network

Mensagem do Secretário Geral

Caros colegas,

É com imenso orgulho e grande entusiasmo que apresento o livro de atas do XVII Congresso Internacional de Motricidade Humana (IHMC). Este evento demonstrou, mais uma vez, a força da nossa rede, reforçando o papel essencial da colaboração científica no avanço do conhecimento e das aplicações práticas da motricidade humana.

Realizado na histórica vila de Vila Viçosa, entre os dias 10 e 14 de dezembro, este congresso reuniu mais de 300 participantes de diversas partes do mundo, promovendo trocas significativas e um diálogo interdisciplinar enriquecedor. A temática deste ano, que uniu tradição e inovação, refletiu-se não apenas na elevada qualidade das investigações apresentadas, mas também nas oportunidades de interação e cooperação que fortaleceram a nossa comunidade global. Este congresso reafirmou o reconhecimento crescente das ciências da motricidade como um pilar essencial para a promoção da saúde e o desenvolvimento humano.

Um dos temas centrais que emergiram ao longo do evento foi a necessidade urgente de abordar os desafios do envelhecimento através da atividade física e das intervenções baseadas no movimento. Com o aumento da esperança de vida, a preocupação não deve ser apenas prolongar os anos de vida, mas garantir que esses anos sejam vividos com qualidade. A evidência científica é clara: a prática regular de atividade física desempenha um papel fundamental na prevenção do declínio associado à idade, na manutenção da independência funcional e na promoção do bem-estar a longo prazo. As discussões realizadas durante o congresso reforçaram que os profissionais da motricidade não são apenas investigadores e educadores, mas também agentes fundamentais na conceção de soluções baseadas na ciência para um envelhecimento ativo e saudável.

Um exemplo notável desse compromisso é o projeto RECORVHABIT, financiado pelo INTERREG POCTEP, que evidencia o impacto transformador da atividade física na reabilitação e no envelhecimento. Esta iniciativa, desenvolvida em parceria com instituições de Portugal e Espanha, procura integrar metodologias inovadoras na reabilitação, combinando intervenções baseadas em hábitos. Através da utilização de tecnologias avançadas e da colaboração interdisciplinar, o RECORVHABIT está a abrir novos caminhos na preservação da função cognitiva e motora em populações envelhecidas, garantindo que a atividade física continue a ser um recurso acessível e eficaz na prevenção do declínio funcional.

O papel do IHMC na divulgação de projetos como este é fundamental. A nossa comunidade científica cresce quando a investigação é partilhada, debatida e refinada em espaços coletivos como este congresso. O sucesso do XVII IHMC só foi possível graças à excelente organização da Universidade de Évora e ao acolhimento caloroso de Vila Viçosa, que proporcionaram um ambiente ideal para a troca de ideias. Os momentos informais—refeições partilhadas, pausas para café e conversas espontâneas—não devem ser subestimados, pois muitas vezes são nesses encontros que surgem colaborações e iniciativas que moldam o futuro da nossa área.

Olhando para o futuro, preparamo-nos com entusiasmo para o XVIII IHMC, que terá lugar na Universidade Tiradentes, em Aracaju, Brasil, sob o tema *"Saúde, Desporto e Inovação: A Era da Inteligência Artificial na Construção de Sociedades Saudáveis."* Este será mais um momento crucial para a nossa rede, consolidando a internacionalização e o impacto global da IHMN e reforçando a nossa missão comum: assegurar que a motricidade humana continue a ser um pilar essencial da promoção da saúde, unindo o progresso científico à sua aplicação prática.

Expresso o meu profundo agradecimento a todos os que contribuíram para o sucesso deste congresso—participantes, palestrantes, organizadores e parceiros. A vossa dedicação e paixão continuam a ser o motor do sucesso da nossa comunidade. Continuemos juntos a construir uma sociedade onde o movimento não é apenas um direito fundamental, mas também um caminho para a longevidade, a autonomia e o bem-estar.

Com os meus melhores cumprimentos,

José Parraça

Secretário-Geral da International Human Motricity Network

Mensaje del Secretario General

Estimados colegas,

Es con inmenso orgullo y gran entusiasmo que presento el libro de actas del XVII Congreso Internacional de Motricidad Humana (IHMC). Este evento demostró, una vez más, la fortaleza de nuestra red, reafirmando el papel esencial de la colaboración científica en el avance del conocimiento y en la aplicación práctica de la motricidad humana.

Celebrado en la histórica ciudad de Vila Viçosa, del 10 al 14 de diciembre, este congreso reunió a más de 300 participantes de diversas partes del mundo, fomentando intercambios significativos y un diálogo interdisciplinario enriquecedor. La temática de este año, que combinó tradición e innovación, se reflejó no solo en la alta calidad de las investigaciones presentadas, sino también en las oportunidades de interacción y cooperación que fortalecieron nuestra comunidad global. Este congreso reafirmó el creciente reconocimiento de las ciencias de la motricidad como un pilar fundamental para la promoción de la salud y el desarrollo humano.

Uno de los temas centrales que emergió durante el evento fue la necesidad urgente de abordar los desafíos del envejecimiento a través de la actividad física y las intervenciones basadas en el movimiento. Con el aumento de la esperanza de vida, la preocupación no debe ser solo prolongar los años de vida, sino garantizar que estos años sean vividos con calidad. La evidencia científica es clara: la práctica regular de actividad física desempeña un papel fundamental en la prevención del deterioro asociado a la edad, en el mantenimiento de la independencia funcional y en la promoción del bienestar a largo plazo. Las discusiones celebradas en el congreso reforzaron la idea de que los profesionales de la motricidad no son solo investigadores y educadores, sino también actores clave en el diseño de soluciones basadas en la ciencia para un envejecimiento activo y saludable.

Un ejemplo notable de este compromiso es el proyecto RECORVHABIT, financiado por INTERREG POCTEP, que demuestra el impacto transformador de la actividad física en la rehabilitación y el envejecimiento. Esta iniciativa, desarrollada en colaboración con instituciones de Portugal y España, busca integrar metodologías innovadoras en la rehabilitación, combinando intervenciones basadas en hábitos. A través del uso de tecnologías avanzadas y la cooperación interdisciplinaria, RECORVHABIT está abriendo nuevos caminos en la preservación de la función cognitiva y motora en poblaciones envejecidas, asegurando que la actividad física siga siendo un recurso accesible y eficaz en la prevención del deterioro funcional.

El papel del IHMC en la difusión de proyectos como este es fundamental. Nuestra comunidad científica crece cuando la investigación se comparte, se debate y se perfecciona en espacios colectivos como este congreso. El éxito del XVII IHMC fue posible gracias a la excelente organización de la Universidad de Évora y a la cálida hospitalidad de Vila Viçosa, que proporcionaron un entorno ideal para el intercambio de ideas. Los momentos informales—comidas compartidas, pausas para el café y conversaciones espontáneas—no deben subestimarse, ya que

muchas veces es en estos encuentros donde surgen colaboraciones e iniciativas que marcarán el futuro de nuestra área.

Con la vista puesta en el futuro, nos preparamos con entusiasmo para el XVIII IHMC, que se celebrará en la Universidad Tiradentes, en Aracaju, Brasil, bajo el tema *"Salud, Deporte e Innovación: La Era de la Inteligencia Artificial en la Construcción de Sociedades Saludables."* Este será otro momento clave para nuestra red, consolidando la internacionalización y el impacto global de la IHMN y reforzando nuestra misión común: garantizar que la motricidad humana continúe siendo un pilar esencial en la promoción de la salud, uniendo el progreso científico con su aplicación práctica.

Expreso mi más profundo agradecimiento a todos los que contribuyeron al éxito de este congreso—participantes, ponentes, organizadores y colaboradores. Su dedicación y pasión siguen siendo el motor del éxito de nuestra comunidad. Sigamos trabajando juntos para construir una sociedad donde el movimiento no solo sea un derecho fundamental, sino también un camino hacia la longevidad, la autonomía y el bienestar.

Un enorme Saludo

José Parraça

Secretario General de la International Human Motricity Network

PART 1. KEYNOTE PRESENTATIONS

Opening Keynote: Scientific Advances in Geriatric Exercise Physiology

Keynote Speaker: José Parraça - Secretary-General of the IHMN

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Scientific Advances in Geriatric Exercise

Introduction to Population Aging

The proportion of people over 60 years old is increasing worldwide, a trend also observed in Portugal. According to UN (2007) and INE (2010), by 2050, 22% of the population is expected to be elderly. Demographic aging may reach a ratio of 218 elderly individuals per 100 young people, significantly altering social structures and public health challenges (World Health Organization [WHO], 2002).

The Impact of Aging on Physical Abilities

Aging is associated with a progressive decline in various physical capacities, including:

- **Balance**
- **Muscle strength**
- **Flexibility**
- **Reaction speed**

Falls are one of the most significant problems in this age group, affecting 30-35% of community-dwelling elderly individuals, with institutionalized seniors experiencing three times more falls annually (Hausdorff, Rios, & Edelberg, 2001). Falls represent one of the leading causes of morbidity and mortality, highlighting the need for effective prevention strategies (Padilla et al., 1998; Perry et al., 1982).

Active Aging: A New Perspective

Aging should not be seen as a problem but rather as a natural process of the life cycle. The Portuguese Directorate-General for Health (DGS, 2004) and the World Health Organization (WHO, 2002) emphasize the importance of active aging, where seniors engage socially, economically, culturally, and spiritually, optimizing their quality of life by enhancing health, security, and inclusion opportunities.

Technology and Cognitive Health in Aging

The use of technology, has been associated with improvements in various cognitive functions among the elderly, including:

- **Reduced depression**
- **Increased attention**
- **Better executive function**
- **Faster processing speed**
- **Enhanced memory and visual attention**

These tools contribute to preventing cognitive decline and maintaining autonomy in older adults (Simões et al., 2019).

Health Promotion and Disease Prevention

Health promotion should focus on healthy lifestyle habits, including:

- **A balanced diet (Mediterranean Diet)**
- **Regular physical exercise**
- **Chronic disease prevention**

The Mediterranean Diet, as described by Trichopoulou et al. (2009), is recognized for its longevity and quality-of-life benefits, characterized by:

- **High consumption of vegetables, legumes, and olive oil**
- **Moderate intake of fish, poultry, and eggs**
- **Reduced consumption of salt, red meat, and alcoholic beverages**

This dietary approach is one of the most recommended for preventing cardiovascular, metabolic, and neurodegenerative diseases (Serra-Majem et al., 2004; Valagão, 2011).

Managing Chronic Diseases

Aging is often associated with chronic diseases, such as:

- **Hypertension**
- **Type 2 diabetes**
- **Dyslipidemia**
- **Osteoarticular diseases (osteoporosis, arthritis, arthrosis)**

Exercise and proper nutrition play a crucial role in managing these conditions, slowing their progression and improving patients' quality of life (Lacour et al., 2000; Cameron et al., 2010).

Physical Exercise for Older Adults

Exercise programs for older adults should include:

- **Physical abilities: strength, flexibility, cardiovascular endurance**
- **Affective-social skills: self-esteem, social interaction, and environmental adaptation**

The most effective programs combine:

- **Aerobic exercise – improves cardiovascular capacity (American Heart Association, 1983)**
- **Strength training – prevents sarcopenia (Bompa, 1983)**
- **Flexibility exercises – maintains joint mobility (Dvir, 1993)**
- **Balance training – reduces the risk of falls**

Additionally, exercise enhances motivation, body control, concentration, and self-confidence, which are essential for healthy and active aging.

Final Reflection: What Does It Mean to Be Elderly?

Old age should not be synonymous with inactivity or dependence. It should be viewed as a time for new opportunities, where seniors can:

- **Take better care of themselves and others**
- **Dedicate time to family and friends**
- **Travel, explore new cultures, and remain socially engaged**
- **Participate in volunteer work and community support**

The key takeaway from the presentation is that we must ensure that older adults do not just live longer but enjoy more years with a high quality of life, promoting an active and healthy aging process.

Conclusion

Population aging is a global challenge, but research and practice show that effective strategies exist to ensure seniors live with health, autonomy, and well-being. Combining physical exercise, a healthy diet, social inclusion, and technology can transform the aging paradigm, making this stage of life fulfilling and enriching.

"It is not just about adding years to life, but adding life to years!"

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Keynote Lecture 1:

Minimizing Anticholinergic Medication Use is Critical for Successful AginG

Keynote Speaker: Bob Wood

Robert Wood, PhD[1], Kara Kunz, MD[2], Kayla Tran[1]

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Minimizing Anticholinergic Medication Use is Critical for Successful Aging

Introduction/Background:

Medications with anticholinergic properties are frequently prescribed for myriad chronic diseases and conditions. These medications also are known to be associated with decreased cognitive and physical function, contributing to poorer health outcomes and loss of functional independence with advancing age.des

Keynote Speaker: **Bob Wood**

Objective:

This presentation reviews the present state of understanding regarding the effects of anticholinergic medications on physical and cognitive function among older adults, and the benefit, if any, of deprescribing anticholinergic medications. Further we present planned work between Boise State University and the St. Alphonsus Health Care System Memory Center, located in Southern Idaho.

Methods:

Meta-analyses were conducted to assess extant literature on anticholinergic burden (ACB) and cognitive and physical function in adults 60 years of age or older. For examining ACB and cognitive function, a total of 32 studies met the inclusion criteria, including 5 RCTs, 18 cohort studies, and 9 case-control studies. For examining ACB and physical function, a total of 28 studies met the inclusion criteria, including 4 RCTs, 14 cohort studies, and 10 case-control studies.

Results:

***COGNTIVE FUNCTION*: The meta-analysis revealed a significant negative association between ACB and both cognitive and physical function. Studies consistently reveal that increased anticholinergic burden is associated with poorer performance on cognitive tests measuring memory, attention, and executive function. Furthermore, results of longitudinal studies indicate that long-term exposure to anticholinergic drugs is associated with increased risk of dementia, particularly Alzheimer's disease, with an odds ratio ranging from 1.5 to 2.3 in high-burden groups. Short-term exposure, especially in hospitalized older adults, is linked to higher rates of delirium and acute cognitive decline. *PHYSICAL FUNCTION*: ACB is associated with a reduction in muscle strength, slower gait speed, and impaired balance. Individuals with high ACB are also more likely to experience falls, and generally present with lower levels of physical activity.**

Conclusion:

Given our current understanding of ACB and functional outcomes, Healthcare providers should regularly review medications in older adults, especially those on long-term anticholinergic medications, to minimize anticholinergic burden and its negative effects on physical function. There are few studies that have successfully implemented deprescription of anticholinergic medications, and those that have been conducted are inconclusive. Future studies should explore the benefits of reducing ACB in older adults.

Keywords: **Anticholinergic Medications, Anticholinergic Burden, Physical Function, Cognitive Function.**

Keynote Lecture 2:

Aplicando la ciencia para innovar motivando en los adultos mayores a través del ejercicio físico
Keynote Speaker: Juan Moreno Murcia

Author's Name: Juan Moreno Murcia

Institutional Affiliation: Universidad Miguel Hernández de Elche

Aplicando la Ciencia para Innovar Motivando en los Adultos Mayores a Través del Ejercicio Físico

El envejecimiento conlleva cambios fisiológicos y psicológicos que pueden afectar la calidad de vida. No obstante, el ejercicio físico, cuando se implementa con estrategias motivacionales adecuadas, representa una herramienta clave para fomentar el bienestar en adultos mayores. La Teoría de la Autodeterminación (SDT, por sus siglas en inglés) es un marco teórico que ayuda a entender los mecanismos de motivación y cómo estos pueden mejorar la adherencia al ejercicio y la satisfacción personal en esta población.

Motivación y Bienestar en la Actividad Física

La SDT postula que la motivación humana puede dividirse en intrínseca y extrínseca. La primera se basa en la satisfacción y disfrute personal de la actividad, mientras que la segunda es impulsada por factores externos como recompensas o reconocimiento. Para lograr una participación efectiva en el ejercicio físico en adultos mayores, es crucial fomentar la motivación intrínseca y la internalización de la motivación extrínseca.

Las necesidades psicológicas básicas de autonomía, competencia y relación social son fundamentales en la SDT. Cuando estas necesidades se satisfacen, los adultos mayores se sienten más comprometidos y motivados para participar activamente en el ejercicio. En cambio, si se frustran, pueden experimentar desmotivación y abandono de la actividad.

Estrategias para Mejorar la Motivación en Adultos Mayores

1. **Fomentar un Clima Motivacional Positivo**
    - **Crear entornos que promuevan la autonomía mediante la toma de decisiones personales en la actividad física.**
    - **Brindar apoyo y reconocimiento, destacando los progresos individuales en lugar de las comparaciones con otros.**
2. **Diseño de Situaciones de Aprendizaje Adaptativas**
    - **Plantear objetivos orientados al proceso, enfocándose en el esfuerzo y la mejora personal.**
    - **Incorporar variedad en las actividades para evitar la monotonía y mantener el interés.**
    - **Utilizar juegos cooperativos y competitivos según el contexto y las necesidades individuales.**
3. **Uso de Estrategias de Reconocimiento**
    - **Implementar un sistema de refuerzos positivos, como elogios verbales y gestos de reconocimiento.**
    - **Priorizar recompensas que refuercen la motivación intrínseca, evitando el uso excesivo de incentivos materiales.**
4. **Promoción de la Percepción de Competencia**
    - **Establecer metas alcanzables y progresivas para generar confianza en las propias habilidades.**
    - **Enseñar técnicas de autoevaluación para que los participantes reconozcan su progreso.**
5. **Fomento de la Interacción Social**
    - **Favorecer relaciones interpersonales positivas a través del ejercicio grupal.**
    - **Involucrar a los participantes en la toma de decisiones sobre las actividades.**

Impacto en la Salud y el Bienestar

La aplicación de estrategias basadas en la SDT no solo mejora la motivación, sino que también influye positivamente en la salud física y emocional de los adultos mayores. Estudios han demostrado que un ambiente motivador incrementa la adherencia al ejercicio, reduce el estrés y mejora la calidad de vida. Además, el sentimiento de competencia y autonomía contribuye al empoderamiento y bienestar integral de esta población.

Conclusión

El ejercicio físico, combinado con estrategias motivacionales adecuadas, puede ser una herramienta poderosa para mejorar la calidad de vida en adultos mayores. La aplicación de la Teoría de la Autodeterminación proporciona un marco efectivo para diseñar programas de actividad física que promuevan la motivación, la autonomía y el compromiso a largo plazo. De esta manera, se fomenta un envejecimiento activo y saludable, permitiendo que los adultos mayores disfruten de una vida más plena y satisfactoria.

Keynote Lecture 3:

Innovative Strategies for Fall Prevention in Seniors

Keynote Speaker: Estélio H. M. Dantas (UNIRIO/UNIT, Brasil)

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Innovative Strategies for Fall Prevention in Seniors

Introduction/Background:

Falls pose a significant health risk for older adults. Traditional fall prevention strategies often prove insufficient, highlighting a need for innovative approaches combining targeted interventions with comprehensive risk assessments. This quasi-experimental study investigated the efficacy of the MASTERFITTS high-intensity fitness training program and the utility of the FARBE (Falls Risk Assessment Battery for the Elderly) in reducing fall risk. The FARBE assesses balance, gait, visual acuity, fall history, medication use, and environmental risk factors.

Objective:

To evaluate the effectiveness of the MASTERFITTS intervention in reducing fall risk, as measured by the General Falls Risk Index (IGRQ), and to assess the FARBE's ability to identify risk factors contributing to falls in older adults.

Methods:

A quasi-experimental design was employed. Participants, older adults referred from primary care units in Aracaju, Brazil, were enrolled with physician approval.

Inclusion and exclusion criteria were applied, including screening with the Revised Physical Activity Readiness Questionnaire (r-PARQ). A total of 272 older adults completed the 32-week MASTERFITTS program, which consisted of twice-weekly sessions incorporating strength training, aerobic endurance exercises, and stretching work. A key disruptive element of the MASTERFITTS intervention was the incorporation of circuit-based resistance exercises performed at a high intensity, as determined by the participant's perceived exertion using the OMNI-RES scale. Diagnostic assessments using the anamneses and the FARBE were conducted at baseline, and formatively after 16 weeks and summatively after 32 weeks of the intervention. The primary outcome measure was the change in IGRQ scores from baseline to the 32-week summative assessment. A control group, which received standard care, participated in weekly health education sessions and underwent the same BARQ assessments at baseline, mid-point and post-intervention.

Results:

The MASTERFITTS intervention led to a statistically significant reduction in fall risk ($p<0.001$) as measured by the IGRQ (FARBE), while the control group showed no statistically significant change. Summative assessment at 32 weeks revealed an IGRQ score of $\bar{X} = 12.91 \pm 1.3$ for the intervention group, indicating low fall risk and a $\Delta\% = 63.95\%$ decrease from the baseline score of $\bar{X} = 21.14 \pm 2.9$.

Conclusion:

This quasi-experimental study demonstrates the effectiveness of the high-intensity MASTERFITTS exercise program in significantly reducing fall risk ($p<0.001$) in older adults, as measured by the IGRQ, compared to a control group. The FARBE's utility in identifying modifiable risk factors was also confirmed. These results strongly support the implementation of public health policies based on high-intensity exercise interventions and comprehensive fall risk assessments. Such policies could substantially reduce the significant healthcare costs associated with falls among older adults. Further research, including larger-scale randomized controlled trials, is needed to confirm these findings and assess long-term effects..

Keywords: **Fall prevention, older adults, high-intensity exercise, functional mobility.**

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Keynote Lecture 4:

Effects of different type of exercise on physical and mental performance of seniors

Keynote Speaker: Anita Hokelmann

Author's Name: Anita Hokelmann

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Sport, Gymnastic Movement and Dance Reduce the Decline of Critical Cognitive and Physical Functions in healthy Elderly, Elderly with Mild Cognitive Impairment and with Dementia

As the world's population ages, the importance of maintaining health and functionality in older adults becomes increasingly important. Aging is inherently variable, with progressive physiological, motor, and cognitive decline accompanying the process, leading to an increase in "age-related" chronic diseases. Therefore, strategies aimed at extending the health span (the time one lives in optimum health) are receiving growing attention to preserve quality of life and to ease the socioeconomic impact of age-related diseases.

Cognitive decline is a significant challenge faced by the elderly, with conditions ranging from normal age-related forgetfulness to more serious states such as mild cognitive impairment (MCI) and dementia. Age-related cognitive decline and MCI are estimated to affect 1 in 6 people worldwide by 2050. MCI signifies a phase between the expected cognitive decline of normal aging and the more severe dementia, encompassing memory, language, thinking, and judgment difficulties exceeding normal age-related changes. Consequently, preventative strategies that maintain autonomy in the elderly have become vital for managing cognitive decline and MCI.

However, the brain can undergo functional and structural adaptations throughout life, despite age-related degradation processes. Empirical evidence from epidemiological cross-sectional and intervention studies suggests a correlation between physical training and a reduced risk of dementia and mortality. Lifestyle

factors are critical for healthy aging. Activities promoting physical and cognitive health are linked with neuroplasticity and considered protective factors against age-related degradation processes.

We report the effects of randomized controlled trials using a 5- years and a six-month dance and sport intervention on parameters of physical and mental fitness in older adults with MCI. We found increased volume in parahippocampal and middle frontal gyri in the intervention group, changes in concentration of oxygenated hemoglobin and improvement in memory (verbal fluency). Further significant improvements were found in dynamic and static balance (p= 0,004) and in leg strength (p= 0,001).

These results demonstrate, both structurally and functionally, that adults with MCI who participate in sport, gymnastic activities and dance improve both physical and cognitive functions but these gains are lower compared to age-matched healthy, physically active seniors.

Keywords: mild cognitive impairment, seniors, physical activity, cognitive training, aging, intervention

Keynote Lecture 5:

Strength training, quality of life and healthy aging | Treino de força, qualidade de vida e envelhecimento saudável.

Keynote Speaker: Francisco Saavedra

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Strength training, quality of life and healthy aging

Introduction/Background:

Older adults are the fastest-growing age group. Physiological changes associated with primary aging and concurrent chronic disease have an adverse impact on functional capacity, health outcomes, and quality of life (Zaleski, Taylor, Panza, et al., 2016). The normal aging process is characterized by a progression of physiological events throughout the life cycle. Age-related changes occur throughout the body and are most prominent in later years. Advanced age, even if not associated with the development of severe chronic disease, is accompanied by a multiplicity of biological modifications that may contribute to reducing skeletal muscle mass, strength, and function, leading to an overall decline in physiological resilience (capacity to withstand and recover from stressors). It is also related to reduced muscle size (muscle atrophy), motor unit loss, and a decrease in contraction speed, which in turn lead to lower muscle strength, power, and resistance (Arakelian, Goulart, Mendes, et al., 2019; Frontera, Hughes, Fielding, et al., 1985; Traczyk, Kuźba, Chłystek, et al., 2018).

Objective:

The aims and purposes of this study were to: i) provide a summary of existing and relevant research, ii) assess exercise program variables, and iii) give practical evidence-based recommendations for exercise prescription and resistance training in older adults, according to international guidelines.

Methods:

Using an evidence-based approach, we combined scientific data, experts' statements, and end-user concerns to improve references for the interests, values, requirements, and choices of the aging population. We performed a detailed literature search on PubMed, focusing on the last 10 years. We use keywords such as Frailty, Aging, Physical Activity, Functional Capacity, Exercise and Strength Training. We selected all articles whose titles were considered relevant to the review and which were subscribed to by scientific organizations in the areas of Elderly and Physical Activity, Sports Medicine, and Health.

Results:

We highlight that strength training alone or combined with aerobic training is a fundamental part of the primary prevention of many chronic diseases in older adults, in addition to delaying the progression and reducing the symptoms of related chronic conditions. To promote and maintain health, all healthy adults need to accumulate at least 150 minutes/week of moderate-intensity aerobic exercise (60 to 70% of maximum heart rate, or 12 to 13 on a perceived exertion scale of 6 to 20 points), most days of the week or at least 75 minutes of vigorous aerobic activity (70% to 90% of maximum heart rate, or 14 to 16 on a 6 to 20 points perceived exertion scale). Adults should still perform activities that maintain or increase muscle strength at least two non-consecutive days per week. In addition to the minimum levels of aerobic and resistance exercise recommended for adults, elderly people are advised to perform stretching and balance exercises at least 2 to 3 times/week to prevent falls and maintain and improve their autonomy and quality of life.

Conclusion:

Multicomponent exercise programs, especially strength exercises that include muscle power training, are the most effective interventions for buffering the impact of physical disability and other adverse health-related outcomes, even in the oldest old. These programs are also valuable interventions in other frailty domains, such as falls and cognitive decline. Physical exercise and strength training should be adapted to the characteristics and contraindications of each individual and prescribed with a progressive, individualized plan to produce continued benefits, like any other medical treatment.

Keywords: **Aging, Physical Activity, Strength, Wellbeing, Exercise and Health.**

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Keynote Lecture 6:

Autogestão da medicação em Idosos

Keynote Speaker: Ana Advinha

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Medication therapy management by community-dwelling elder: Perspectives to assessment and intervention

Abstract

Introduction/Background:

Nearly 45% of elderly individuals are unable to adhere to their prescribed medication regimens. Medication adherence is a multifaceted behavior that encompasses both the intention to take medications and the ability to do so. It is, therefore, crucial to differentiate between these two aspects. The daily use of medications is a routine and systematic process that can be disrupted by various factors, including not only a lack of knowledge or literacy on the part of the patient but also a gradual decline in functional abilities. Reduced cognitive function, impaired vision, and diminished manual dexterity significantly contribute to unintentional non-adherence, potentially leading to health complications from missed or incorrect medication administration—thereby posing a growing threat to patient safety.

Objective:

To identify and characterize the key challenges and the factors predicting the decline in functional ability for managing medication therapy among the elderly.

Methods:

This cross-sectional study utilized the Portuguese versions of DRUGS-PT and SMAT-PT (Advinha, 2016, 2018) on a sample of 207 community-dwelling individuals aged 65 years or older residing in the Alentejo region. Data were collected through interviews conducted in community pharmacies and recreational day centers. Logistic regression analysis was performed to identify the predictors.

Results:

The elderly participants demonstrated a high capacity for managing their medications. However, any score below the maximum (even if relatively high) revealed some level of difficulty in performing this activity. The study found that managing the actual therapeutic regimen (routine information) was easier than managing a simulated regimen (new information), despite prior presentation and explanation of the simulation. According to the logistic regression model (ROC ≈ 90%), cognitive function emerged as the primary predictor of declining medication management ability. This was evident both in parameters assessed by the MMSE and in those evaluated by the clock-drawing test, highlighting that difficulties in reading, indicating, and interpreting time are significant factors contributing to errors in medication management.

Conclusion:

Improvements in the elderly's ability to manage medications can likely be achieved through the adoption of supportive measures, whether human or technological. Such support should be an integral, transdisciplinary component of the patient care pathway.

Keywords: elderly, functional ability, medication therapy management

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Keynote Lecture 7:

Neural aging, cerebral plasticity and Exercise

Keynote Speaker: Jorge Moreno Collazos

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Neural aging, cerebral plasticity and Exercise

Abstract:

The results included publications that mention the effects of brain plasticity mediated by exercise, using exercise protocols with clinically significant duration, intensity and frequency. Trough the documentary review three sections were determined: Neural Aging: Interrelated physiological processes; Exercise mediated brain plasticity; Exercise to promote healthy neural aging. It was concluded that the physiotherapist, applying exercise protocols, can promote positive changes in brain function, which translates into an improvement in the physical and functional performance of older adults

Introduction/Background:

Exercise has shown effectiveness in promoting brain plasticity in neural aging processes is narrative review of literature aims to analyze the neural effect of exercise to promote brain plasticity in aging.

Objective:

Generate a narrative review of articles that cite the effects of exercise-mediated brain plasticity on neural aging

Methods:

The search path was used: brain aging [Title/Abstract]) AND plasticity [Title/Abstract] AND exercise [Title/Abstract] AND physical therapy [Title/Abstract] and after combining it with the boolean term OR to avoid duplication. Of the total number of eligible publications (Pubmed (53), Medline (53), Scielo (6) and PEDro (5)), articles with poor information on the subject or for which a full text was not found were excluded. In the end, 88 articles were selected and printed references and books were included, for a total of 96 references included in this document.

Results:

Old age brings with it neurobiological changes such as a decrease in cerebral oxygen reserves, brain size (between 10-15%) without affecting the intra-cranial content that remains stable due to a progressive increase in the volume of cerebrospinal fluid; widening of the sulci and ventricles, cortical atrophy and some subcortical nuclei (causing cognitive slowing and dysfunction, low learning capacity and higher rate of forgetting, among others) (Vásquez & Sebastián Villarreal, 2014). After 80 years of age, the brain weighs 20% less in women and 22% less in men. Total cerebral blood flow decreases by 20% and peripheral inflammatory factors released during the ischemic process deteriorate several remote organs, including the brain. Patients with peripheral arterial disease present cognitive dysfunction with cardiovascular risk factors such as smoking, hypertension, diabetes, hypercholesterolemia, obesity and sedentary lifestyle. Specifically, inflammation, oxidative stress, mitochondrial and vascular dysfunction are key factors in the pathophysiology of both peripheral arterial disease and neurodegenerative diseases (Leardini-Tristao et al., 2019)

In a senile brain without pathologies, there is a lower number of neurons in certain regions with atrophic and dystrophic cells, loss of synapses and decreased neurotransmission(Toledano et al., 2014) . Cell loss occurs in regions such as the locus coeruleus and area 8A of the dorsolateral prefrontal cortex with mitochondrial dysfunction that generates reactive oxygen and nitrogen species involved in cell damage, increased oxidative stress and lesions of proteins, lipids and nucleic acids. Selective neuron atrophy leads to progressive dendritic and synaptic loss in the prefrontal and parietal-temporal cortex. The impairment of synaptic transmission is given by changes in gene and protein expression (compromise of calcium channels and GABA receptors, favoring excitatory neurotransmission rather than inhibitory) that promotes cortical damage (Felipe Salech et al., 2012) . Excitotoxic mechanisms linked to stress-associated apoptosis promote cell death in areas rich in glutamatergic neurons

Conclusion:

Consideration should be given to strengthening quality exercise programs aimed at older adults through qualified professionals, such as a physical therapist. These programs can achieve considerable savings for health systems by reducing costs in strokes, falls, heart attacks or the after-effects of neurodegenerative diseases, which are so common in recent times.

Keywords: **brain, aging, exercise, physical therapy.**

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Keynote Lecture 8:

Avaliação fisiológica de pessoas idosas em meio aquático num programa inovador - AQUAFAST

Keynote Speaker: Nuno Batalha

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Physiological assessment of older adults in aquatic environments in an innovative program – AQUAFAST

Abstract

Introduction/Background:

Exercise programs are used as non-pharmacological means that contribute to the quality of life of the elderly population. In this context, aquatic exercise demonstrates advantages compared to land-based exercise in this population.

Objective:

To present physiological assessment data of elderly people in an aquatic environment and compare the acute effects of two exercise sessions in an aquatic environment and one on land.

Methods:

Forty elderly hydrogymnastics practitioners (70.08 ± 5.55 years, 156.3 ± 8.16 cm) performed three exercise sessions: hydrogymnastics (water environment), Aquafast (water environment) and land (land environment). Heart rate (HR) was recorded with Polar® OH1, the Subjective Perceived Exertion was assessed using the Borg Scale and satisfaction was also assessed with the "Physical Activity Enjoyment Scale" (PAECS) questionnaire.

Results:

The Aquafast session recorded a higher percentage of session time (%TS) at HR > 90% of maximum Heart Rate. Aquatic sessions showed a higher %TS at HR > 80% of maximum HR and greater satisfaction.

Conclusion:

HR monitoring during exercise sessions with older adults showed greater effort intensities in aquatic environments compared to land-based program.

Keywords: **Aquatic Exercise; Land-based Exercise; Older adults.**

Keynote Lecture 9:

Exercise for Sustainable Health: Benefits for Physical and Cognitive Frailty – Findings from the PRO-MESCHI Research Protocol

Keynote Speaker: Guilherme E. Furtado

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Exercise for Sustainable Health: Benefits for Physical and Cognitive Frailty – Findings from the PRO-MESCHI Research Protocol

Abstract

Background:

From 2015 to 2022, our research team implemented a study protocol named "Hormonal Mediation of Exercise in Stress, Cognition, and Immunity" - PRO-HMESCI study protocol (Teixeira et al., 2016).

Objective:

Over this period, multiple studies were carried out involving institutionalized frail older adults. These studies aimed to examine how exercise impacts hormonal, immunological, neuroendocrine parameters, and psychobiological stress in frail older women experiencing both physical and cognitive frailty..

Methods:

Stage I of this research involved an observational cross-sectional study designed to characterize the study population, comparing institutionalized adults over 65 across various levels of physical frailty for all assessed variables (Furtado et al., 2019). Participants engaged in a 28-week supervised, chair-based exercise program, during which data on hormonal, immunological, neuroendocrine parameters, and psychobiological stress were collected. Functional fitness, cognitive function, and emotional well-being were also evaluated.

Results:

Our findings aligned with existing literature, demonstrating that exercise can activate a "Cocktail of Healthy Aging Effect" by influencing levels of cortisol, testosterone, and dehydroepiandrosterone. Others importants results showed that: a) regular exercise resulted in a decrease in pro-inflammatory cytokines and an increase in anti-inflammatory cytokines, indicating a supportive effect on the inflammatory system (Furtado et al., 2020); b) cognitive test improvements observed in participants aligned with the "Exercise Boost Brain Health" effect, accompanied by favorable shifts in alpha-amylase levels (Chupel et al., 2017); c) gains in physical fitness led to the reclassification of participants as robust older adults. Additionally, our findings suggest that the combination of exercise with Taurine supplementation may foster a neuroprotective environment, supporting the emerging "Taurine-Driven Aging" model (Chupel et al., 2021). Conclusion: These results are meaningful for advancing healthy aging and quality of life among frail older women. Integrating regular exercise into healthcare strategies can be crucial for promoting active, resilient, and engaged aging, aligning with the Sustainable Development Goals 3 (Good Health and Well-Being), 5 (Gender Equality), and 11 (Sustainable Cities and Communities).

Keywords: **Frail Older Adults; Multicomponent Exercise; Elastic-Band Muscle-Strength Exercises; Yoga type-flexibility; Sustainable Aging Comunities**

Acknowledgements:

Guilherme Eustáquio Furtado thanks the National funding by FCT- Foundation for Science and Technology, P.I., through the institutional scientific employment program-contract (CEECINST/00077/2021). We would like to thank the SHCS that accepted to participate in this study. This study was integrated as a research project entitled "PRO-HMESCI: Hormonal mediation of exercise on cognition, stress and immunity" [FCT PTDC/DTP-DES/0154/2012] study protocol previous published (Teixeira et al., 2016). Ana Teixeira and José Ferreira are registered at CIDAF (UID/PTD/04213/2020).

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Keynote Lecture 10:

Foot Relaxation and Spine Mobility in Elderly

Keynote Speaker: Monika Wiech

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Foot Relaxation and Spine Mobility in Elderly

Abstract

Introduction/Background:

Anatomy trains-inspired foot massage provides a powerful way to improve both local foot mechanics and whole-body alignment by addressing myofascial chains. The approach not only relieves foot-specific discomfort but also contributes to global postural improvements, better movement efficiency, enhanced relaxation, and overall wellbeing (Myers, 2009; Schleip et al., 2013; Wilke et al., 2016; Killens, 2018; Myers, 2022).

Objective:

The aim of the study was to assess the effect of self-massage of the foot on the range of motion (ROM) in the cervical and lumbar spine.

Methods:

The study group consisted of 31 people, including: 27 women (87%) and 4 men (13%). The age of the subjects ranged from 20 to 85 years. The subjects were divided into 2 experimental groups: students and seniors. Three research methods were used: SFTR system, sit and reach flexibility test (Eurofit Fitness Test Battery) and a diagnostic survey. The leading method was the experiment.

Results:

Foot fascia relaxation affects the entire Superficial Back Line (SBL). One training unit can increase the flexibility by about 4 cm. Foot relaxation also increases the mobility of the cervical and lumbar spine. In relation to the cervical and lumbar spine, the greatest changes were observed in rotations, the results changed on average from 13-21 degrees. Foot relaxation also affects the subjective sensations at the place of impact, as well as in the cervical and lumbar spine.

Conclusion:

Self-massage of the foot area affects the relaxation of the entire SBL, but also the mobility of the cervical and lumbar spine, increases its ranges and affects the subjective assessment of reduced tension in given areas. Relaxation of the foot has the greatest effect on the rotational ranges of the cervical and lumbar spine.

Keywords: **anatomy trains concept, range of motion, foot massage, spine mobility, elderly.**

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Keynote Lecture 11:

Beating Prediabetics: The Right Exercise in the Right Time

Keynote Speaker: Inayat Shah

Author's Name:

- Prof Dr Inayat Shah (Khyber Medical Univeristy and SUIT Peshawar)
- Dr Saman Tauqeer (PhD Scholar IBMS, KMU, Peshawar)

Beating Prediabetics: The Right Exercise at the Right Time

Background:

Prediabetes, a condition marked by elevated blood glucose levels that have not yet reached diabetic thresholds, necessitates recognition as a disease by healthcare systems. Effective early intervention, tailored to cultural and geographical contexts, can prevent or delay the onset of Type 2 Diabetes Mellitus (T2DM). While lifestyle changes, particularly exercise, are known to be beneficial, there is limited research on the optimal timing, intensity, and duration of aerobic exercise for prediabetic adults. This study aims to address this gap by examining how different aerobic exercise regimens affect insulin sensitivity, glucose levels, C-peptide concentrations, and lipid profiles in prediabetic individuals. The goal is to identify exercise protocols that optimize metabolic health and minimize the risk of progression to T2DM.

Methods:

An experimental study involving 25 prediabetic adults (HbA1c 5.7%–6.4%, fasting glucose 100–125 mg/dL) was conducted following ethical approval. Participants underwent anthropometric and body composition assessments before and after the intervention. Over 12 sessions, spaced seven days apart, participants performed aerobic exercises at varying times, intensities, and durations. The initial four sessions examined the effect of exercising 30, 60, 90, and 120 minutes after a meal at 50% of the predicted maximum heart rate (PMHR). The subsequent sessions focused on varying exercise intensities (50%, 60%, 70%, 80% PMHR) 30 minutes post-meal. The final protocol explored different exercise durations (15, 30, 45, and 60 minutes) 30 minutes after eating at 70% PMHR. Blood samples were collected at fasting, pre-exercise, and 30 and 60 minutes post-exercise to analyze cardio-metabolic markers, including diabetic markers, lipid profiles, and miRNA192. Cardiorespiratory fitness markers were also assessed using a breath-by-breath analyzer.

Results:

Significant reductions were observed in weight, BMI, waist circumference, hip circumference, and fat mass post-intervention. Weight decreased from 87.85 kg (±14.56) to 85.98 kg (±14.26) ($p < 0.001$), and BMI reduced from 30.34 kg/m² (±4.27) to 29.72 kg/m² (±4.23) ($p < 0.001$). Waist circumference decreased from 102.16 cm (±12.22) to 98.80 cm (±12.19) ($p < 0.001$), and hip circumference from 105.13 cm (±12.43) to 102.52 cm (±12.49) ($p < 0.001$). While the waist-to-hip ratio remained unchanged ($p = 0.118$), fat mass significantly decreased from 24.74 kg (±7.43) to 24.06 kg (±7.37) ($p < 0.001$). No significant changes were observed in basal metabolic rate (BMR) ($p = 0.151$). Exercising 30 and 60 minutes after a meal significantly reduced postprandial glucose levels, with reductions from 195.6 mg/dL (±7.8) to 121.2 mg/dL (±2.5) and from 194.6 mg/dL (±7.1) to 124.6 mg/dL (±2.8), respectively ($p < 0.001$). Insulin levels also showed significant reductions post-exercise, particularly with a 30-minute waiting period (from 83.7 µU/L ±50.2 to 20.5 µU/L ±7.6; $p = 0.004$). Moderate to high-intensity exercise (70% and 80% PMHR) significantly improved glucose, insulin, and C-peptide levels. Different durations of exercise yielded varied effects on metabolic markers, with a 45-minute session being particularly effective in reducing glucose and insulin levels.

Conclusion

This study demonstrates that the timing, intensity, and duration of exercise significantly impact glycemic control, insulin regulation, and lipid profiles in prediabetic individuals. Exercising 30 minutes post-meal effectively reduces postprandial glucose spikes, while moderate to high-intensity exercise, particularly at 70% PMHR for 45 minutes, enhances insulin sensitivity and lipid parameters. These findings suggest that tailored exercise interventions could be crucial in preventing the progression of prediabetes to T2DM, providing valuable guidance for public health strategies and individual lifestyle modifications.

Keywords: Prediabetes, Timing, Intensity, Duration, Glycemic Control, Aerobic Exercise, Lipid Profile, Respiratory Parameters

Keynote Lecture 12:

Propelling the global advancement in sports science and education. A path to follow into old age

Keynote Speaker: Abdul Waheed Mughal

- **Author's Name:** Prof. Dr. Abdul Waheed Mughal
- **Institutional Affiliation:** Dean, Faculty of Arts, Social Sciences & Education, Sarhad University, Peshawar

Effect of Circuit Training on Maximum Oxygen Uptake (VO2max) in Adolescents

Abstract

Objective:

Circuit training, characterized by a series of exercises conducted, performed and executed in quick succession, has gained popularity as an effective training method to improve overall fitness. However, its specific influence on VO2 max, a crucial indicator of cardiovascular fitness, remains relatively unexplored in the adolescent population. This study aims to fill this knowledge gap by examining the effects of circuit training on the VO2 max levels of adolescents.

Methods:

For this particular study an experimental, pre/post-intervention study design was used. This particular study was conducted at the Government College of Management Sciences in Haripur Khyber Pakhtunkhwa, Pakistan. Twenty-four participants were randomly selected and divided into circuit training group (n=12) and control group (n=12). Prior to intervention, a pre-test was conducted and then experimental group was engaged for twelve (12) weeks circuit training intervention

whereas control group was received no training protocol. At the end of intervention post-test was conducted.

Results: Adolescents between the ages of 16 and 19 witnessed a significant difference in VO2max between the experimental group with an improvement of

(2.83±0.07) and control group with an improvement of (0.45±1.07) in favor of experimental group.

Conclusion: Twelve weeks 12 Circuit training intervention is an effective protocol in increasing VO2max of adolescents aged 16-19 years.

Keynote Lecture 13:

Multi-intensity underwater exercises (MIAE) at moderate intensity.To promote heart and lung health in the elderly.

Keynote Speaker: Khaled Abdelkarem / Imad Samir Mahmoud

- **Author's Name:** [Khaled Mohammed Abdelkarem Mohammed] [Imad Samir Mahmoud]
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Khaled

Imad

Multy –intensity underwater exercises (MIAE)at moderat intensety to promote heart and lung health in the edelry

Abstract

Introduction/Background:

the deep-water exercises have particular characteristics that strengthen the motivation and engagement factors, resulting in greater adherence and benefits, Multimodal water exercise programs that contain resistance and water balance exercises are as effective as the corresponding multimodal land exercises and actually have a more positive effect on balance. Also Water exercise is a method that improves physical function and quality of life for patients with neurological disorders. Water aerobics is preferred in the elderly, highlighting the following aspects: reduced impact on joints, reduced risk of muscle/joint injuries, muscle strengthening, balance with water support, prevention of falls during practice, as well as enhanced socialization, and thus improved compliance.it is associated with better functional ability for the elderly.in this research we introduce some of underwater exercise develop some of physiological variables such as heart and lung for elderly people.

Objective:

the aim of the study was to assess the effects of Apnea underwater training at Multy –intensity on physiological characteristics, based Scuba diving Skills, fins swimming endurance, and breathe hold time for elderly to can establish underwater fitness with scuba diving equipment.

Methods:

The data was collected from randomly selected (20 mal) healthy elderly in Egypt 2023.The physiological variables during tow Apnea methods Subject were tested on two separate times with spirometer and E.C.G. and diving skills consist of CESA, Swimming endurance tests. Control value¬¬¬¬ for each parameter was calculated as an average value mean and standard deviation ±SD from apnea

Results:

The relative changes were calculated for each subject, an individual mean value from the three last apneas in each condition was calculated for all parameters. The improvement of apneic time values was compared between, before and after, underwater Apnea program. Diving and swimming Skills variables were also compared between Apnea methods using paired t-test. The level used for accepting significance was *P< 0.05., heart rate, systolic blood pressure, diastolic blood pressure, cardiac output, heart stork volume, Oxygen Uptake, Carbon Dioxide Excretion, Static apnea.

Conclusions:

The ventilator and cardiology parameters observed after Apnea workouts better and heart rat valuables, the apnea performance, diving and Swimming skills. These results became more significant, indicating the positive effect of Apnea method on performance.

Conclusion:

Using underwater Apnea exercise with SCUBA diving equipment can improve breath holding, SCUBA diving skills and improve apnea time for elderly people.

Keywords: Breath holding, SCUBA Diving, Underwater fitness, Parkinson's disease, elderly sport.

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Closing Keynote: Programa integral de bienestar TIGREFIT para población mayor sedentaria y con sobrepeso

Keynote Speaker: José Leandro Tristán Rodriguez

•**Author's Name:** José Tristán, Ruben Ramirez Nava, Jeanette López Walle and Argenis Vergara Torres

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TIGREFIT Comprehensive Wellness Program for Overweight and Sedentary Senior Population

Abstract

Introduction/Background:

Obesity and overweight are among the leading causes of death globally and are primary risk factors for chronic diseases. Recent studies highlight the professional football club environment as a powerful "attractor" for engaging overweight and obese individuals, particularly women and men at high risk of poor health outcomes across diverse socioeconomic backgrounds.

Objective:

To evaluate the impact of a 12-week soccer wellness program on overweight and obese fans associated with a professional soccer club.

Methods:

Methods: A randomized controlled trial was conducted with a sample of 40 participants (20 women and 20 men) recruited through a professional soccer club. All participants had a body mass index (BMI) ≥ 28 kg/m². The 12-week intervention consisted of three weekly one-hour soccer fitness sessions, one 40-minute free

training day, and a 30-minute psychoeducational and nutritional talk each week. The "Teaching with Quality in Physical Education and Sport" methodology was applied to structure the training sessions. Assessments included psychological measures (basic psychological needs, motivation, and well-being), anthropometric measurements (height, weight, BMI, waist and hip circumference), and physical performance tests (hand grip strength, Abalakov jump test, and Rockport mile walk test).

Results:

The program demonstrated significant benefits, including improved weight control, enhanced muscular strength and endurance, and the promotion of meaningful social connections among participants. Additionally, it improved mood and reduced stress, anxiety, and symptoms of depression.

Conclusion:

The TIGREFIT program represents a holistic and effective intervention for improving the overall health and well-being of overweight and obese individuals. By addressing multiple dimensions of wellness, including physical fitness, social engagement, and mental health, the program fosters a comprehensive approach to sustainable health improvements.

Keywords: **Intervention, Soccer Fitness, Overweight, Wellness Program**

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PART 2. THEMATIC PANELS PRESENTATIONS

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HOW MOTIVATION AND RESILIENCE CAN FIGHT DEPRESSION IN OLD AGE

Abstract

Introduction/Background:

Depression in older adults is a prevalent condition with significant public health impacts, directly affecting quality of life and compromising essential aspects of physical, mental, and emotional health. Aging is often accompanied by physiological changes, such as reduced functional capacity and increased susceptibility to chronic diseases, which can negatively impact the well-being and autonomy of the elderly. These physiological challenges are frequently exacerbated by emotional changes, including loss of social roles, grief, and social isolation, all of which are common with advancing age. The decline in daily activities and the fragility of support networks increase the vulnerability of older adults to depressive disorders, creating a cycle of withdrawal that progressively hinders the maintenance of an active and healthy life. In this context, it becomes essential to explore preventive and interventional approaches, such as physical exercise, which can mitigate depressive symptoms and promote resilience, thereby strengthening both mental and physical health in later life.

Objective:

This study aimed to evaluate the impact of a supervised physical exercise program on reducing depressive symptoms, enhancing resilience, and significantly increasing motivation among older adults. Through an intervention, the study sought to investigate whether regular physical activities, combined with health education programs and social activities, could create a virtuous cycle for improving depressive symptoms, fostering greater engagement, autonomy, and motivation among elderly participants.

Methods:

The present study employed a quasi-experimental design, conducted with a group of 242 participants aged 60 years or older, recruited from community and health centers specialized in elderly care. Participants were selected based on inclusion criteria, such as minimum age and absence of medical contraindications for physical activity. The study was conducted in four phases: diagnostic evaluation, intervention, formative evaluation, and summative evaluation (not yet conducted). Assessments included anamnesis, the CES-D Depression Scale, and the Wagnild and Young Resilience Scale for physical activities. The intervention consisted of a supervised exercise program, tailored and overseen by qualified professionals, lasting 16 weeks and conducted twice a week. Activities included aerobic exercises, stretching, and muscle-strengthening activities adapted to the participants' age group. After a two-week adaptation period, participants engaged in higher-intensity exercises, monitored using perceived exertion scales: Borg for aerobic endurance, OMNI-Res for muscular strength, and NormalFlex for flexibility. Data were analyzed statistically using non-parametric tests, including McNemar's test, to verify the significance of changes in depressive symptoms and resilience levels, with a significance level of $p < 0.05$. This design allowed for the evaluation of the program's effects on mental health and resilience among older adults, highlighting the potential of physical activities and interdisciplinary lectures as preventive and therapeutic interventions for promoting well-being during aging.

Results:

The results, at the current stage, indicated a significant reduction in depressive symptoms and an improvement in resilience levels, alongside increased motivation among the elderly after participating in the exercise program. Initially, 59.7% of participants had a low risk of depressive symptoms; by the end of the intervention, this number increased to 65.3%, demonstrating a reduction in depression among participants. This change was confirmed by McNemar's test, which showed statistical significance for the change in depression levels ($X^2 = 4.26$; $p = 0.039$). Resilience levels also showed consistent improvements: percentile 25% ($\Delta\% = 8.39\%$, $p = 0.002$); percentile 50% ($\Delta\% = 6.33\%$, $p = 0.001$); and percentile 75% ($\Delta\% = 3.57\%$, $p = 0.003$). These data indicate that the intervention was effective in increasing participants' engagement and readiness for regular physical activities, reflecting greater motivation for self-care. The levels of resilience also demonstrated a significant improvement ($\Delta\% = 16.73\%$, $p = 0.001$), suggesting that the program contributed to participants' capacity to handle

emotional and social challenges, thereby fostering autonomy and control over their lives. These findings reinforce the role of supervised physical exercises, social activities, and interdisciplinary lectures as an effective strategy for reducing depressive symptoms, strengthening resilience, and increasing motivation in older adults, significantly contributing to their physical and mental well-being.

Conclusion:

The findings of this study underscore the importance of regular physical exercises and interdisciplinary lectures as an effective strategy for promoting mental and physical well-being in older adults. Participation in the physical activity program resulted in a reduction of depressive symptoms and an increase in resilience levels, significantly motivating participants. These results highlight the relevance of physical activity programs, combined with lectures, specifically aimed at the elderly population, fostering healthier and more active aging.

Keywords: Psychological Resilience, Depression, Motivation, Physical Exercise, Elderly.

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Thematic Panel 1.1 (Room 1):

Falls in elderly

Keynote Speaker: Nelson Valente

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CAUSAS E CONSEQUÊNCIAS DE QUEDAS NOS IDOSOS

Abstract:

As quedas entre os idosos representam uma preocupação significativa de saúde pública, caracterizada por uma complexa interação de fatores intrínsecos e extrínsecos que contribuem para a sua prevalência e gravidade. A questão das quedas entre os idosos é um desafio multifacetado que abrange uma variedade de consequências físicas, psicológicas, sociais, ambientais e económicas. As repercussões físicas são frequentemente as mais visíveis, com lesões como fraturas e traumatismos cranianos a conduzirem a uma morbilidade e mortalidade significativas. Estas lesões não só afetam a saúde física dos idosos, como também contribuem para um declínio nas suas capacidades funcionais gerais e independência.

Introduction/Background:

Com o envelhecimento da população global, projeta-se que a incidência de quedas aumente, levando a maior morbidade, mortalidade e custos de saúde associados a lesões relacionadas com quedas. Para abordar eficazmente a questão das quedas em idosos, é necessária uma abordagem abrangente. Isto inclui a implementação de intervenções direcionadas que se concentrem na saúde física, bem-estar psicológico e modificações ambientais. Ao reconhecer a interconexão destes fatores, podemos desenvolver estratégias de prevenção de quedas mais eficazes, que não só reduzam a incidência de quedas, como também melhorem a qualidade de vida geral dos idosos. É imperativo que se dê prioridade à investigação, educação e envolvimento comunitário para criar ambientes mais seguros e capacitar os idosos a manterem a sua independência e dignidade à medida que envelhecem.

Objective:

The objective was to carry out a systemic review on the consequences of falls in the elderly with an impact on a multifactorial approach. Methods: For the research, the Web of Science, Pubmed and SPORTDiscus databases were accessed using the primary keywords elderly and elderly people associated with the secondary keywords: falls, stability, articular mobility. After evaluation, 52 articles were considered for analysis.

Results:

Causas e consequências das quedas em idosos. Fisiológicas: As quedas entre os idosos são uma questão multifacetada, profundamente enraizada em várias mudanças fisiológicas que ocorrem com o envelhecimento. Compreender esses fatores fisiológicos é crucial para desenvolver estratégias de prevenção eficazes. À medida que as pessoas envelhecem, ocorre um declínio em múltiplas funções

corporais, o que aumenta significativamente a sua suscetibilidade a quedas. Esse declínio abrange a massa muscular, a força, o equilíbrio e a perceção sensorial, todos desempenhando papéis críticos na manutenção da estabilidade e mobilidade. Uma das principais razões fisiológicas para quedas em idosos é a sarcopenia, a perda de massa muscular e força relacionada com a idade. A pesquisa indica que a sarcopenia leva a uma diminuição da funcionalidade muscular, que está diretamente correlacionada com um aumento do risco de quedas (Zhang et al., 2022). À medida que a força muscular diminui, a capacidade de realizar atividades diárias e manter o equilíbrio fica comprometida. Este declínio na massa muscular é frequentemente acompanhado por uma redução na atividade física, exacerbando ainda mais o risco de quedas (Smee et al., 2012). Além disso, estudos mostram que idosos com menor força muscular são mais propensos a sofrer quedas, destacando a importância de manter a saúde muscular através de treino de resistência e atividade física (Sousa & Mendes, 2015). Psicológicas: Um dos fatores psicológicos mais prevalentes associados às quedas em idosos é o medo de cair (FOF). Este medo geralmente surge após uma primeira queda, levando a uma maior ansiedade e a comportamentos de evitação. A investigação indica que aproximadamente 41-50% dos idosos relatam medo de cair, o que pode resultar numa redução da atividade física e do envolvimento social (Liu et al., 2023). A depressão é outro fator psicológico crítico que contribui para o risco de quedas entre os idosos. Estudos mostram que os sintomas depressivos estão independentemente associados a uma maior probabilidade de quedas (Grenier et al., 2014). A depressão pode prejudicar a função cognitiva, reduzir a motivação e levar a uma diminuição da atividade física, o que pode aumentar o risco de quedas (Bergen et al., 2019). Em adição, O isolamento social e a solidão também podem desempenhar um papel nas causas psicológicas das quedas. Idosos que experienciam isolamento social podem ser menos propensos a participar em atividades físicas, o que pode levar a declínios na força e no equilíbrio (Sheikh, 2023). Ambientais: Compreender estas causas ambientais é crucial para o desenvolvimento de estratégias de prevenção eficazes. O ambiente doméstico, onde os idosos passam uma parte considerável do seu tempo, é particularmente crítico neste contexto. Vários elementos dentro de casa podem criar perigos que levam a quedas, incluindo os tipos de pisos, a disposição dos móveis, as condições de iluminação e a presença de obstáculos. A presença de tapetes ou carpetes também pode ser problemática; se não estiverem devidamente fixados, podem deslizar ou enrugar-se, criando riscos de tropeço (Boonkhao, 2024). Um estudo realizado enfatiza que superfícies irregulares, especialmente nas escadas, podem aumentar significativamente a probabilidade de quedas entre os idosos (Boonkhao, 2024). A investigação indica que a iluminação inadequada é um fator de risco significativo para quedas, particularmente durante a noite, quando os idosos podem precisar de se movimentar pela casa (Fong et al., 2014). Instalar luzes mais brilhantes, usar luzes noturnas e garantir que os interruptores estejam facilmente acessíveis pode ajudar a mitigar este risco. Além disso, o uso de cores contrastantes para degraus e bordas pode melhorar a visibilidade e alertar para possíveis perigos (Fong et al., 2014). Os perigos ambientais estendem se além da própria casa; o ambiente externo circundante também pode representar riscos de quedas. Passeios irregulares, lancis e áreas externas mal conservadas podem criar desafios adicionais para os idosos (Pfortmueller et al., 2014). Físicas: A consequência mais imediata e evidente das quedas nos idosos é a lesão física. As quedas frequentemente resultam em fraturas, sendo as fraturas da anca das mais comuns

e graves (Bouzid et al., 2022). Aproximadamente 25-35% dos indivíduos com 65 anos ou mais experienciam uma queda a cada ano e, daqueles que caem, cerca de 20-30% sofrem lesões moderadas a graves, incluindo fraturas e traumatismos cranianos (Dolinak, 2012). O risco de sofrer uma fratura aumenta com a idade devido a fatores como a diminuição da densidade óssea e da força muscular, que são prevalentes nos idosos (Rudy et al., 2021). Além disso, as lesões resultantes de quedas podem levar a hospitalizações prolongadas, intervenções cirúrgicas e reabilitação, afetando significativamente a saúde física e a mobilidade do indivíduo (Thiem et al., 2014). Além das fraturas, as quedas podem resultar em outras lesões graves, como lesões cerebrais traumáticas (LCTs). Os idosos são particularmente vulneráveis a LCTs devido à maior probabilidade de quedas e ao potencial de que estas ocorram em situações onde os reflexos protetores estão diminuídos (Zhao et al., 2023). As consequências das LCTs podem ser severas, levando a défices cognitivos a longo prazo, perda de independência e aumento das taxas de mortalidade (Bouzid et al., 2022). Além disso, mesmo lesões menores podem levar a declínios significativos na função física, uma vez que os idosos podem desenvolver medo de cair novamente, reduzindo os níveis de atividade e agravando ainda mais a sua saúde física (Diab & Moore, 2022). Sociais: As quedas também podem ter consequências sociais significativas para os idosos. A perda de mobilidade e independência devido às lesões resultantes das quedas pode levar a uma maior dependência de cuidadores e membros da família (Nurhidayah, 2017). Esta mudança pode causar tensão nas relações e gerar sentimentos de culpa ou frustração tanto para o idoso como para os seus cuidadores. Além disso, o medo de cair pode levar ao isolamento social, pois os idosos podem afastar-se de atividades sociais e do envolvimento na comunidade (Amphansap et al., 2022). A redução nas interações sociais pode agravar os sentimentos de solidão e depressão, impactando ainda mais a saúde mental e o bem-estar. Económicas: Os custos diretos associados a lesões relacionadas com quedas incluem despesas médicas com cuidados de emergência, hospitalização, reabilitação e cuidados a longo prazo (Thiem et al., 2014). Estima-se que as quedas entre os idosos custem ao sistema de saúde dos EUA aproximadamente 50 mil milhões de dólares por ano, com a expectativa de que estes custos aumentem à medida que a população envelhece (Ng et al., 2020). Além disso, os custos indiretos, como a perda de produtividade e a necessidade de maior apoio em cuidados, contribuem para o fardo económico global (Widiastuti et al., 2021). Conclusion: As quedas entre os idosos são uma preocupação significativa de saúde pública, levando a uma ampla gama de consequências que podem impactar gravemente a sua saúde, qualidade de vida e independência. As repercussões das quedas podem ser classificadas em consequências físicas, psicológicas, sociais e económicas, cada uma das quais contribui para o peso geral enfrentado pelos idosos e pelos sistemas de saúde.

Keywords: Idoso; Quedas; Sarcopenia; Qualidade vida nos idosos.

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Alfabetización física intergeneracional de los niños al adulto mayor

La alfabetización física es un concepto que cada vez está recibiendo más atención por parte de la comunidad científica. Existen numerosos instrumentos para evaluar la alfabetización física en distintas poblaciones, desde niños, adolescentes, universitarios y adulto mayor. La mayoría de los cuestionarios desarrollados son administrados a través de un formato tradicional en papel. Sin embargo, cada vez es más habitual el uso de otro tipo de formatos como el de aplicaciones móviles.

Tras una revisión de la literatura y la realización de un grupo focal con expertos en alfabetización física se está llevando a cabo una propuesta de cuestionarios de evaluación de la alfabetización física y de los factores contextuales que influyen la alfabetización física, a través de una app móvil. En esta propuesta se adopta una perspectiva intergeneracional. Presentamos dicha propuesta con la idea de darla a conocer a la comunidad científica y obtener una crítica constructiva que permita su mejora.

Palabras clave: Alfabetización física, Aplicación móvil.

PART 3. PRACTICAL WORKSHOPS PRESENTATIONS

Vila Viçosa
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ESCOLA DE SAÚDE
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Theoretical/Practical Workshop: Agilidade para a vida. Movimento auto consciente autónomo para adultos e seniores

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Agy∞. *Agilidade para a Vida.*

A Agilidade Autoconsciente autónoma para adultos e anciões.

Abstract:

O programa Agy∞. Agilidade para a Vida. - A Agilidade Autoconsciente autónoma para adultos e anciões é apresentado numa obra de sustentação conceptual, tanto dos conceitos subjacentes à sua justificação teórica, científica bem como a um edifício de práticas que pretendem ser um método de alteração comportamental para adultos, seniores e anciãos inativos.

Introduction/Background:

Agilidade é o conceito que ao longo do trabalho vai ser justificado como o somatório e a conjugação potenciada de tudo o que o nosso corpo pode produzir.

O movimento humano, o nosso corpo em movimento é o fator principal que nos permite executar coisas, viver o dia-a-dia, criar, trabalhar, relacionar, produzir e reproduzir o nosso pensamento de uma forma corporal. Através do movimento do

nosso corpo criamos as condições para que as nossas necessidades sejam satisfeitas, os nossos desejos atendidos e as nossas ideias experimentadas.

Pelo Movimento, e como é do senso comum "Movimento é Vida", sentimo-nos mais ou menos Vivos, mais ou menos Capazes, mais ou menos Saudáveis, mais ou menos Enérgicos, mais ou menos Leves, Fluidos ou Ágeis.

Ser capaz de executar uma tarefa, compreender uma ideia, elaborar um pensamento complexo, ou coordenar um movimento através do nosso corpo, é de igual forma no senso comum "Ser Ágil". É deste ponto de partida que, como professor de Ginástica e formador de Ginástica de Base, me levou a ver o contexto maior da atividade física, do exercício físico, do exercício gímnico, ou da Ginástica (como acho que se pode englobar todo o movimento de qualidade nela), pelo que o comum dos mortais sente no dia-a-dia relativamente à sua capacidade de produzir o seu movimento. Movimento esse, que o seu corpo, pela inatividade (que é o mesmo que dizer, pelo Não Movimento) vai deixando de conseguir produzir. E esta Agilidade é o que mais interessa a todos os seres humanos, para serem capazes de utilizar o seu corpo de uma forma mais fácil.

Objective:

Criar um programa de movimentos com a execução de 1 exercício por dia durante um ano (366 dias). Sistematizar o método de prática com o incremento da complexidade de forma que os executantes reconstruam a sua coordenação motora.

Methods:

Estrutura de exercícios organizada em semanas (7 exercícios por semana, que culmina no movimento final ao domingo). Ao longo do ano o programa apresenta as seguinte estrutura: 4 semanas iniciais focadas em exercícios de respiração (1 semana); exercícios de andar (1 semana); exercícios de mobilização (1 semana) ; e finalmente, exercícios de consciência corporal com contrações específicas (1 semana). Nas restantes 48 semanas do ano, estas apresentam 4 ciclos de 12 semanas, as quais se revolvem em 4 semanas com o foco na força, 4 semanas com o foco na flexibilidade e 4 semanas com o foco na agilidade. Durante estas 4 semanas, o foco vai sendo colocado em cada uma delas, em diferentes regiões musculares, nomeadamente, Ombros/braços (1 semana) , Costas (1 semana), core (1 semana)e pernas (1 semana). Desta forma, o corpo em movimento vai reganhando coordenação, força, flexibilidade e resistência, todas estas capacidades se organizando numa Agilidade mais rica.

Results:

Sem aplicação efetiva com resultados a apresentar. Aplicação com sucesso em workshops, minicursos e palestras.

Conclusion: Sem resultados decorrentes de estudos, a apresentar.

Keywords: Agilidade. Exercício, Movimento, Qualidade, Adultos, Seniores, Envelhecimento ativo.

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APA 7 EDITION

Apresentação Agility for Living

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Sensorimotor Training in Pre-Retired and Retired Populations: Enhancing Physical Function and Quality of Life through a Practical Workshop

Abstract:

Introduction/Background:

Demographic aging is a defining challenge of the 21st century, with a projected increase in the elderly population from 2.1 to 2.8 million in Portugal between 2015 and 2080 [1]. Aging is associated with declines in physical and cognitive function, leading to greater dependency [2]. The World Health Organization recommends at least 150 minutes of moderate or 75 minutes of vigorous physical activity (PA) weekly for health benefits [3]. Sensorimotor training, which enhances joint stability and balance, has shown promise in improving physical function in older adults [4,5].

Objective:

To evaluate the effects of sensorimotor training on strength, balance, agility, and flexibility in pre-retired and retired individuals.

Methods:

This study conducted pre- and post-assessments of pre-retired and retired participants in a 45-minute intervention program combining sensorimotor training with breathing and mindfulness exercises. Sessions included six circuits with eight exercises emphasizing balance, coordination, and stability [6]. A guided visualization technique by Martha Beck was incorporated to help participants set goals and values. Physical abilities were assessed using the Rikli and Jones [7] protocol to measure functional fitness pre- and post-intervention.

Results:

Post-intervention assessments are expected to show statistically significant improvements across all analyzed variables (p<0.005), indicating gains in strength, flexibility, agility, and balance. This supports sensorimotor training as an effective method to enhance physical function in pre-retired and retired populations.

Conclusion:

Sensorimotor training effectively enhances physical function in aging adults, promoting independence and reducing injury risk. This study highlights the importance of tailored PA programs to improve quality of life and mitigate age-related physical and cognitive declines. Developing accessible, adaptable exercise programs can greatly support healthy aging.

Keywords: **Aging; Sensorimotor training; Physical activity; Balance; Quality of life**

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Theoretical/Practical Workshop: Square Step

Facilitator: Soraia Ferreira

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Square Stepping Exercise in older adults - practical workshop to enhance quality of life in older adults

Introduction:

Population aging has been increasing over the last decades due to rising life expectancy and declining birth rates (World Health Organization, 2014). According to the United Nations, by 2030, the number of older adults over the age of 60 is expected to increase by 34%, with an estimated 1.4 billion elderly individuals by 2030 (Department of Economic and Social Affairs, Population Division, 2020). Aging is an inevitable biological process characterized by cognitive, physical, functional, psychosocial, and physiological changes (Balcombe & Sinclair, 2001; Ghironzi et al., 2017; Spirduso et al., 2004; Murman, 2015). However, it is known that aging can be positively influenced by engaging in physical activity (Eckstrom et al., 2020), allowing individuals to live longer with a better quality of life.

Objectives:

To understand the effects of applying the Square Stepping Exercise (SSE) on functional and cognitive variables in older adults living in the community or in institutional settings.

Methods:

The Square Stepping Exercise (SSE) (Shigematsu & Okura, 2006) is performed on a mat divided into 40 squares, each measuring 25 cm per side. Participants must step on the squares without stepping on the dividing white lines, following predefined movement patterns. Participants may step laterally, forward, backward, and diagonally, with various patterns representing different levels of difficulty. Initially, 119 distinct stepping patterns were developed and categorized by difficulty levels. The SSE's goal is for participants to complete a predefined step pattern until reaching the end of the mat in an orderly and structured manner. Originally, the SSE was developed as an exercise to aid in fall prevention; however, it has also been used to train variables such as agility, leg power, and balance (Shigematsu et al., 2008). More recently, some studies have employed dual-task methodologies to examine the effects of SSE combined with dual tasks on the quality of life of older adults (Parraça et al., 2023; Yoshida et al., 2024).

(Expected) Results:

The Square Stepping Exercise provides a dynamic and enjoyable approach, with expected improvements in cognitive, physical, physiological, and social aspects. Throughout the intervention, and with increasing pattern complexity and dual-task challenges, positive outcomes are anticipated across various variables. In addition to these results, it is known that SSE reduces the risk of falls.

Conclusion:

Through simple and dynamic exercises requiring minimal equipment, it is possible to implement a diverse intervention for older adults. Consequently, participants can continue performing these exercises at home, as they can easily replicate the required materials.

Keywords: elderly; Square Stepping Exercise; cognition; physical function; quality of life.

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Theoretical/Practical Workshop: Reforma “ATIVA” + Square Step + Relax Mayores

Facilitator: Soraia Ferreira; Carolina Cabo; Sara Santos

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Soraia Ferreira

Sara Santos

Carolina Cabo

A perfect day” Mindfulness technique following Sensorimotor Training – practical workshop to Enhance Physical Function and Quality of Life

Abstract:

Introduction/Background:

Stress and depression are significant issues among elderly individuals, often stemming from life changes such as retirement, loss of loved ones, declining

health, or social isolation. These mental health challenges can lead to reduced quality of life, impaired cognitive function, and a greater risk of chronic illnesses [1,2]. The broader societal relevance lies in the aging global population, with more elderly people experiencing mental health issues but often lacking access to adequate support systems [3,4]. This issue is set against the backdrop of an aging population and evolving societal structures, such as smaller family units and reduced community engagement, which can increase isolation among elderly individuals [3,4]. Mental health services are often less accessible to older adults due to stigma, lack of awareness, or limited resources [5]. Non-pharmacological interventions, such as Martha Beck's meditation exercises, provide an accessible, empowering, and low-cost approach to improving mental well-being among the elderly [6,7].

Objective:

By using simple and engaging practices like "A Perfect Day" mindfulness exercise, older adults can reconnect with positive emotions, foster a sense of control, and cultivate a more optimistic outlook, which are crucial for mitigating the effects of stress and depression.

Methods:

Sensorimotor training includes six circuits with eight exercises emphasizing balance, coordination, and stability [8]. Martha Beck's "A Perfect Day" exercise is a guided visualization technique designed to help individuals gain clarity about their desires, goals, and values by envisioning their ideal day. It is a practice rooted in self-reflection and mindfulness, encouraging participants to focus on what truly brings them joy and fulfillment [7].

(Expected) Results:

The "A Perfect Day" exercise aims to: 1) Identify core desires: Uncover what a "perfect day" looks like for the participant, free of external pressures or constraints. 2) Connect with inner wisdom: Explore the authentic self and align daily life with true priorities and passions. 3)Foster clarity and motivation: Inspire actionable changes in life based on the insights gained during the meditation.

Conclusion:

By using simple and engaging practices like "A Perfect Day" meditation, older adults can reconnect with positive emotions, foster a sense of control, and cultivate a more optimistic outlook, which are crucial for mitigating the effects of stress and depression.

Keywords: **stress; depression; elderly; low-cost interventions; mindfulness.**

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Part 4. Oral Communications

Vila Viçosa
Câmara Municipal
UNIVERSIDADE DE ÉVORA
ESCOLA DE SAÚDE
E DESENVOLVIMENTO HUMANO
Interreg
España – Portugal
Cofinanciado por la Unión Europea
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Oral communication 1:

Multimodal effects of dance training in older adults
Speaker: Ulrich Thiel, Anita Hökelmann

Author's Name: Ulrich Thiel, Anita Hökelmann

Institutional Affiliation: Otto-von-Guericke University Magdeburg, Germany

Anita Hökelmann

Ulrich Thiel

Multimodal effects of dance training in older adults

Preserving physical and cognitive fitness is a key component of successful aging. Sedentary older adults show increased frailty, risking for example cardiovascular diseases or injuries through falling and thus burdening health systems around the globe. Different exercise interventions combat the aforementioned problems. Especially dance training, as a multimodal exercise approach, can influence multiple physiological systems, that may also correlate with each other. This study investigates the effect of a six-month dance intervention on physical fitness and balance in older adults with mild cognitive impairment. A total of 55 participants were randomly assigned to either an intervention group, receiving 90 minutes of dance training accompanied by music twice per week, or a control group adhering to their usual lifestyle. The duration of the intervention was six months. Different parameters of physical fitness and balance were recorded before and after the intervention, the effects of the intervention on older adults were analyzed and possible correlations between the systems calculated. Mixed analysis of variance (time x group) showed a significant improvement in cardiorespiratory fitness

(VO2max) in the intervention group when compared to the control group. Other parameters of physical fitness and balance did not show significant changes following the intervention. A correlation analysis between physical fitness, balance and measurements of muscle architecture and muscular contractile properties displayed some potentially spurious correlations. The results of this study can partially support the positive influence of dance training in older adults, that is commonly seen in existing literature. While only cardiorespiratory fitness showed a statistically significant effect of the intervention, other parameters showed positive trends or performance stabilization, which is considered important in terms of healthy aging. For future work, the influence of dance training on cognition should be assessed and possible links between physical fitness and cognitive performance investigated.

Keywords: **Geriatrics, Healthy aging, Physical activity, Physical fitness, Balance**

Funding:

The project was supported by the European Regional Development Fund provided by the Investitionsbank Sachsen-Anhalt (ZS/2019/07/99755).

Oral communication 2:

Effects of a 16-week high-speed resistance training program on cellular health and cell integrity in older adults

Speaker: Alexandre Duarte Martins

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Effects of a 16-week high-speed resistance training program on cellular health and cell integrity in older adults

Abstract

Objective:

Aging process includes body composition changes, such as an increase in fat mass and a decrease in fat-free mass. Exercise training programs are considered effective strategies to mitigate or prevent those body composition changes. Therefore, this study analysed the effects of a 16-week High-Speed Resistance Training (HSRT) program on body composition parameters in older adults. Methodology: This non-randomized controlled study, registered on clinicaltrial.gov (NCT05586087), included 79 older adults, who were divided into two groups: intervention group (IG, N=40, age, 68.50 ± 3.54 years) and control group (CG, N=39, age, 72.08 ± 5.89 years). The IG participated in supervised HSRT sessions, three times weekly, with 5–6 exercises, 2–3 sets, and 6–10 repetitions,

lasting 60–70 minutes. Intensity was progressively increased considering movement velocity (>1.3 to 0.75 m/s), representing approximately 10% to 65% of one repetition maximum. Exercises were performed rapidly during the concentric phase, monitored via a BEAST™ sensor (Beast Technologies, Brescia, Italy), and controlled during the eccentric phase (2–3 second). The CG maintained daily activities, tracked by the IPAQ Questionnaire. Body composition parameters were assessed using a multifrequency tetrapolar bioelectrical impedance analyzer (InBody® S10). Results: The analysis showed significant effects of the group factor favouring IG on phase angle ($F_{(1)}$= 14.39, p< 0.001, η^2_p= 0.159). Additionally, results from Δ changes revealed small and medium effects in favour to IG for body cell mass (p= 0.230, d_{unb}= 0.27 [-0.17, 0.71]) and phase angle (p= 0.006, d_{unb}= 0.63 [0.18, 1.08]), respectively. Conclusions: The HSRT could effectively prevent the decline in cellular health and cell integrity in older adults, as evidenced by the significant improvements in the phase angle.

Keywords: Strength training, Aged, Exercise, Electric impedance, Body composition.

Funding

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Oral communication 3:

Inter-Communication Technology (ICT) Rollator for Seniors with Dementia to Facilitate Physical Activity

Speaker: Niharika Bandaru, Anita Hökelmann

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Anita Hökelmann

Niharika Bandaru

Inter-Communication Technology (ICT) Rollator for Seniors with Dementia to Facilitate Physical Activity

Abstract

Background & Objective:

According to the World Health Organization (WHO), 55 million people live with dementia, and there are 10 million new cases every year. The Alzheimer's Association declared that 10-15% of individuals with MCI develop dementia each year on average. The current study investigated the impact of a digitalized dance intervention, which integrates with an ICT rollator, on enhancing the physical abilities of individuals with dementia. The ICT Rollator serves the elderly for cognitive-motor testing and offers physical rehabilitation training through dance and gymnastics.

Methods:

The study is a longitudinal and randomized trial, involving six subjects in the intervention group and six in the control group with Alzheimer's or vascular dementia. Participants engaged in twice-a-week, one-hour sessions (15 minutes dance + 5 minutes break) x 3 over three months. We measured blood pressure before and after each dance session. The intervention involves a video-based dance intervention using a dance and sport rollator. We analyzed mini-mental state examinations (MMSE), mobility, balance, gait, and other cognitive-motor abilities during pre-testing and post-testing. During post-testing, we analyzed the feasibility and acceptance rates of the ICT-Rollator using customized questionnaires.

Results:

The gait speed (Optogait), stride length, balance (Berg Balance Score), and mobility (Timed-Up-Go Test) showed improvements. However, few participants experienced declines in hand grip strength. Overall, participants reported high satisfaction levels and no adverse events, indicating the safety and efficacy of the intervention. The research results underscore the potential of digitalized interventions to improve the physical performance of seniors with dementia. However, they also identify significant obstacles, including maintaining upper body strength and individual variability in response to technology-based activities.

Conclusion:

Incorporating additional technological capabilities into an intercommunication technology rollator can facilitate a physical activity intervention for elderly individuals with dementia. The present intervention enhances physical outcomes in individuals with dementia. The ICT-Rollator could reduce the manual stress associated with Mild Cognitive Impairment (MCI) or dementia by limiting the evolution of MCI and serving as a rehabilitation tool for older individuals with dementia.

Keywords: **Inter-Communication Technology Rollator, Digitalized Dance Intervention, Dementia, Physical Rehabilitation, Cognitive-Motor Testing.**

Funded by: **BMBF (Funding Code 01DH21023A)**

Oral communication 4:

The mediating effect of physical fitness on the relationship of an intervention with augmented reality with global cognition in older adults

Speaker: Soraia Ferreira

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The mediating effect of physical fitness on the relationship of an intervention with augmented reality with global cognition in older adults

Introduction:

Ageing is associated with a reduction in cognitive function (Sabia et al., 2012), which is subsequently associated with a decrease in quality of life and a higher risk of disability and mortality (Plassman et al., 2010). This study aimed to explore the mediating role of physical fitness in the relationship between a multimodal intervention with augmented reality and global cognition in community-dwelling elderly. Methods: Forty-three community-dwelling older adults participated in this study. They were divided into two groups: a control group of 22 participants and an experimental group with 21 participants, which received multimodal training with augmented reality. Assessments were conducted for all participants at the program's start and after 12 weeks (at the program's conclusion). The experimental group engaged in 60-minute exercise sessions thrice weekly, while

the control group maintained regular daily activities. Global cognition was assessed with the Mini Mental State Examination, cardiorespiratory fitness, upper and lower limbs strength, agility, and upper and lower limbs strength were assessed with Rikli and Jones Battery, and balance was assessed with Fullerton Advanced Balance Scale. Mediation effects were estimated using R Package for Causal Mediation Analysis. Results: The mediation analysis revealed an indirect effect of the augmented reality intervention only through balance (0.017; 95% CI = 0.168; 2.14). There was no indirect effect on the other variables, but there was a total effect on cardiorespiratory fitness, balance, agility, upper limb strength, and upper and lower limb flexibility.

Conclusions: These results suggest that balance is associated with better results in global cognition.

Keywords: elderly; augmented reality training; causal mediation; global cognition.

Oral communication 5:

“Get fit seniors” a service-Learning Fitness Program for Older Adults (2013/2024)

Speaker: Miguel Ángel Narváez, Garrett Peltonen, Takahiro Sato

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Miguel Narváez

Garret Peltonen

Takahiro Sato

“Get Fit Seniors Program”

Abstract

The “Get Fit Seniors” program is a community-based (CBL) physical activity program for older adults that extends for six weeks and provides an academic setting where students can offer a service to the community as they apply their knowledge and skills to assist this population. The purpose of this project was to examine the effects of participation in a six-week exercise program on senior citizens’ multidimensional well-being and cardiometabolic health. Fitness components were assessed with the Senior Fitness Test pre- and post-intervention as well as adherence, physical self-description via the Short-Version of Physical Self-Description Questionnaire, and Metabolic Health, assessed by measuring circulating plasma lipids and glucose, and determination of blood pressure. Physical activity was assessed by accelerometer (Fitbit) during the six-week exercise program and for two weeks following cessation of the exercise program. Adherence to exercise sessions was 85%. Paired sample t-tests revealed significant increases between Pre and Post in the both SFT (Chair Stand, Arm Curl,

8-Foot Up-and-Go, and 6-Min Walk) and PSDQ-S (Coordination, Activity, Body Fat, Global Physical, Strength, Flexibility, and Endurance) subscales. Moreover, here were significant connections between the participants' perceived and objective improvements, particularly between 8-Foot Up-and-Go and Health, and between Arm Curl and Appearance. These results support that a personalized, community-based, six-week, exercise-training program for older adults increases physical activity levels and improves components of physical fitness and cardiometabolic health.

Introduction/Background:

The W.I.L.L. "Get Fit Seniors" is a community-based (CBL) physical activity program that extends for six weeks, offers two one-hour sessions per week and it is offered twice a semester since its inception. Its purpose is to positively impact the overall health of older adults, and to provide an academic setting where students can offer a service to the community as they apply their knowledge and skills to assist this population. Emphasis of the intervention is placed on cardiovascular endurance, muscle strength, muscle endurance and flexibility. Community-based Learning is a collaborative enterprise between professors, students and community members which "validates multiple sources of knowledge and promotes the use of multiple methods of discovery and dissemination of the knowledge produced" and "Has as its goal social action and social change for the purpose of achieving social justice" (Ward, & Wolf-Wendel, 2000), (Baker & Brownson, 1998). Moreover, the older adult population continues to grow and needs health services. The demand of health professionals specialized in this group is increasing, thus, it is the responsibility of academic programs to prepare their students to serve this particular population.

Objective:

The purpose of this study was to examine the effects of participation in a six-week exercise program on senior citizens' multidimensional well-being and cardiometabolic health.

Methods:

Various fitness components were assessed pre- and post-intervention for a group of older adults. Tests included Adherence, calculated as the percentages of exercise classes attended. Fitness components using the Senior Fitness Test (SFT; Rikli & Jones, 2001), physical self-description via the Short-Version of Physical Self-Description Questionnaire (PSDQ-S; Marsh, et al., 2010), and Metabolic Health, assessed by measuring circulating plasma lipids and glucose, and determination of blood pressure. Lastly, physical activity was assessed by accelerometer (Fitbit) during the six-week exercise program and for two weeks following cessation of the exercise program.

Results:

Adherence to exercise sessions was 85%. Paired sample t-tests revealed significant increases between Pre and Post in the both SFT (Chair Stand, Arm Curl, 8-Foot Up-and-Go, and 6-Min Walk) and PSDQ-S (Coordination, Activity, Body Fat, Global Physical, Strength, Flexibility, and Endurance) subscales. There were significant connections between the participants' perceived and objective improvements, particularly between 8-Foot Up-and-Go and Health, and between Arm Curl and Appearance.

Conclusion:

Results support that a personalized, community-based, six-week, exercise-training program for senior citizens increases physical activity levels and improves components of physical fitness and cardiometabolic health.

There were no changes in circulating plasma lipids or glucose.

Keywords: Three to five keywords that help classify and locate the work within the field.

Older adults, Community-based learning, Senior Fitness Testing,

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Oral communication 6:

THE RELATIONSHIP BETWEEN HB1AC AND DIABETIC FOOT TEMPERATURE IN ELDERLY

Speaker: Parraça, Carla[1]; Gaspar, Maria Catarina[2]; Silva, Vanda[2]

Carla Parraça

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THE RELATIONSHIP BETWEEN HB1AC AND DIABETIC FOOT TEMPERATURE IN ELDERLY

Introduction

Diabetic foot is a severe complication of diabetes mellitus, often leading to ulcers, infections, and even amputations. Poor glycemic control contributes to microvascular and autonomic dysfunction, which may alter peripheral temperature regulation. Infrared thermography (IT) has been increasingly explored as a non-invasive tool for early detection of temperature abnormalities associated with diabetic foot. Identifying thermal patterns may provide insights into the

relationship between hyperglycemia and peripheral temperature changes, aiding in prevention and management strategies.

Objectives

This study aimed to characterize the thermographic profile of diabetic foot in an elderly population and assess the relationship between glycated hemoglobin (HbA1c) levels and foot temperature, focusing on different anatomical regions.

Methods

A total of 73 individuals diagnosed with diabetes mellitus participated in the study. Body composition measurements, HbA1c levels, and infrared thermographic imaging of six foot regions (toes, plantar surface, and heels of both feet) were collected. Thermographic images were obtained using an FLIR E60 infrared camera in a controlled environment (20°C, 40% humidity) after a 20-minute acclimatization period. Statistical analysis included Spearman's correlation to examine associations between HbA1c and temperature variations, as well as a univariate general linear model to explore trends in temperature changes relative to HbA1c levels.

Results and Discussion

Spearman's correlation analysis revealed significant but low-magnitude positive correlations between HbA1c and the temperature of the toes (right: $r = .248$, $p < .05$; left: $r = .228$, $p < .05$) and heels (right: $r = .244$, $p < .05$; left: $r = .272$, $p < .05$). Although statistical significance was not reached, a trend was observed in the general linear model, indicating that each unit increase in HbA1c (%) was associated with a rise in foot temperature, particularly in the right toe (+0.81ºC, $p = .094$) and left heel (+0.78ºC, $p = .097$). These findings suggest that hyperglycemia may contribute to increased foot temperature, possibly due to altered microvascular function. The results are consistent with prior literature indicating that thermographic changes may reflect early neuropathic and vascular dysfunction in diabetes. However, the small effect sizes highlight the need for additional studies with larger sample sizes and improved control of confounding variables.

Conclusions

The study suggests a potential association between hyperglycemia and increased foot temperature, reinforcing the role of IT in diabetic foot risk assessment. While IT presents advantages such as being non-invasive, rapid, and contact-free, further validation is required to establish it as a reliable diagnostic tool. Future research should incorporate longitudinal analyses and clinical follow-ups to determine the predictive value of IT in preventing diabetic foot complications. Despite its cost, IT could contribute to early intervention strategies, potentially reducing long-term healthcare burdens associated with diabetic foot ulcers.

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Part 5. Book launch

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Well-being with neuroscience: a scientific journey of self-knowledge

Abstract:

The search for well-being is a constant in human life and neuroscience has opened new ways to achieve this condition. In the book “Well-being with neuroscience: a scientific journey of self-knowledge”, that will be launched at the Congress, a revolutionary view on how we can improve life quality and well being through science will be offered and extensively discussed.

Introduction/Background:

The human brain is complex, but it is far from perfect: we cannot regulate our emotions well, we prefer instant gratification, we suffer from relationships, we feel depression and anxiety and we prefer drugs to changing behavior. Are we condemned to not feeling well throughout our lives? Can our brains really change? Viewing the brain as a machine blinds us to the physical realities of mental functions and how we can improve them. We ignore that the brain is a product of evolution, the chemical nature of everything we do, how happiness is a habit and how simple practices can change our mental state. This book is not

just about what the brain is, but mainly about how this self-knowledge can improve our quality of life. In addition to fascinating descriptions of how the brain works, in this book you will learn scientifically proven strategies for reshaping your brain and behavior, and experiencing greater well-being.

Objective and Methods:

To inform the audience on how the book explores neuroplasticity, neurotransmitters, happiness and the importance of practices such as exercise and breathing for mental health. The role of emotions and love is also discussed, as well as current topics such as depression and new psychopharmacology, including the therapeutic use of psychedelics. In short, the book combines science and practice in order to provide a guide for those seeking to better understand how the brain can be optimized.

Conclusion:

The author offers a work that is both informative and inspiring, an invitation to embark on a journey of self-knowledge and personal transformation.

Keywords: **Book, neuroscience, well-being.**

PART 6. AWARDS IHMN 2024

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FREE FEES FOR 1 PUBLICATION in the SPECIAL ISSUE:

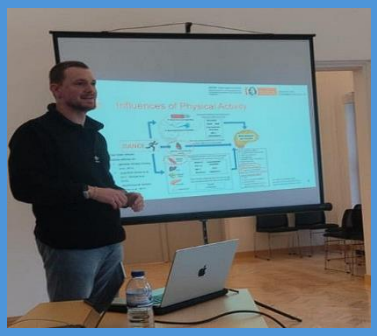
The Role of Physical Activity in Falls and Injury Prevention Among Older Adults **(International Journal of Environmental Research and Public Health)**

1 - Best Investigator 2024 (Presented in the IHMN Congress 2024)

- Niharika Bandaru

2 - Best Oral Communication (Presented in the IHMN Congress 2024) - Soraia Ferreira

3 - Best Interdisciplinary Contribution Presented in the IHMN Congress 2024 - Ulrich Thiel



INNOVATIVE APPROACHES IN ENHANCING PHYSICAL ACTIVITY AND QUALITY OF LIFE IN THE OLDER ADULTS: A Scientific Perspective Course

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