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PHYSICAL THERAPY IN GERONTOLOGY: OPPORTUNITIES FOR ENHANCING QUALITY OF LIFE AMID POPULATION AGEING

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This review article examines current approaches to physical therapy in gerontological practice aimed at preserving functional independence and improving quality of life in adults aged 65 and older. Demographic trends toward an increasing proportion of older individuals present healthcare systems with new challenges, notably the prevention of non-communicable diseases, the reduction of fall risk, and the mitigation of rapid functional decline. Regular adaptive physical activity – including aerobic, resistance, balance, and yoga exercises – has been shown to significantly lower the risk of cardiovascular disease, osteoporosis, and type 2 diabetes, while also enhancing cognitive function and psycho emotional well-being (SMD (Standardized Mean Difference) ≈ 0.5 for cognitive reserve; SMD ≈ –0.6 for anxiety reduction). Individualized exercise programs that combine aerobic and strength training yield statistically significant improvements in functional status, reductions in depressive symptoms, and increases in self-esteem. A dedicated section addresses non-pharmacological modalities such as therapeutic massage, physical agents (galvanic current, electrophoresis, ultrasound, magnetotherapy), respiratory and inhalation techniques, short wave diathermy, and low amplitude electrical stimulation. These interventions effectively relieve pain, improve microcirculation, reduce muscle tension, and promote tissue healing in degenerative dystrophic conditions. Significant attention is given to emerging technologies – tele physiotherapy, wearable sensors, virtual reality, biofeedback, and transcranial magnetic stimulation which facilitate remote monitoring, personalize interventions, and expand rehabilitation access for individuals with limited mobility. A multidisciplinary team approach is essential for developing comprehensive plans that address patients' physical, cognitive, and psychosocial needs. The article concludes by emphasizing the need to integrate innovative physiotherapeutic strategies into primary care, strengthen the evidence base, and enhance professional training.

Keywords: *older adults, multidisciplinary rehabilitation, cognitive health, adaptive physical activity, physiotherapeutic technologies.*

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Introduction

Demographic shifts characterized by an increasing proportion of older adults (aged 60 and over) pose new challenges for healthcare systems. According to the World Health Organization, by 2050, more than 2 billion people will be aged over 60, with a significant share living in low and middle-income countries [1]. In this context, ensuring functional independence and quality of life for older adults becomes a strategic priority [2].

Physical therapy is a key component of gerontological care, aimed at preserving strength, flexibility, endurance, and balance in elderly patients [3]. It has been demonstrated that regular engagement in physical therapy reduces the risk of muscle atrophy, falls, chronic pain, and functional decline [4; 5]. Physical activity among older adults contributes, at a moderate to high level, to improvements in both physical and mental health domains. Aerobic, resistance, interval, and yoga exercises have been shown to effectively stimulate cardiorespiratory function, cognitive activity, and emotional well-being [6].

In recent years, the field has seen the growth of telephysiotherapy and the use of wearable devices and virtual reality systems for remote monitoring and rehabilitation, thereby increasing access to care for individuals with limited mobility [7–9]. The 2022 position statement of the American Physical Therapy Association identifies the integration of telemedicine, wearable technologies, and a team-based approach as core principles of best practice in geriatric physical therapy.

Physical therapy is an indispensable component of contemporary gerontological practice. The systematic consolidation of the evidence base regarding effective techniques, the adoption of technological innovations, and the reform of therapeutic approaches constitute essential steps toward ensuring sustainable healthy and active aging.

Physical activity among older adults is an integral component of chronic disease prevention, particularly for cardiovascular conditions, osteoporosis, and motor impairments, and supports the maintenance of independence and high-quality daily functioning. Systematic reviews have shown that even moderate, regular exercise is associated with a reduced risk of falls and disability, as well as improved endurance and lower limb strength in individuals aged over 60 years [10].

Aim of the study was to substantiate the role of physical therapy as a key component of comprehensive gerontological rehabilitation, and to analyze current approaches and the effectiveness of physical and physiotherapeutic interventions in improving the quality of life of older adults in the context of an aging population.

Materials and Methods

This review summarizes current scientific evidence on the role of physical therapy in improving the quality of life of older

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adults in the context of population aging. It includes an analysis of publications related to geriatric physical rehabilitation, adaptive physical activity, physiotherapeutic technologies, and the multidisciplinary approach.

A total of 57 scientific sources were analyzed, retrieved from international databases such as PubMed, Scopus, and Web of Science. The selection criteria included scientific relevance, methodological quality, alignment with the topics of gerontology and physical therapy, and the presence of data on the impact of interventions on the physical, cognitive, and emotional health of older adults. The methodological framework incorporates elements of content analysis, cross-comparison of data from different authors, and systematization of effective rehabilitation strategies for the elderly.

Results

Despite its well-documented benefits, physical activity declines markedly with age. According to the World Health Organization, over one-third of adults (including those aged 60+) do not meet the recommended levels of physical activity, with the greatest reductions observed among older adults and gender vulnerable groups, particularly women [10]. Several large-scale studies illustrate these trends in physical activity, highlighting both age-related declines and gender differences [11–13].

Regular physical activity also contributes to improvements in cognitive function and psycho emotional well being [14–17]. The Standardized Mean Difference (SMD) is used to quantify the magnitude of physical activity's effect on cognitive and psycho emotional outcomes in older adults. An SMD of approximately 0.5 indicates a moderate positive impact of exercise on cognitive function, whereas an SMD around –0.6 reflects a substantial reduction in anxiety levels. Meta-analytic data demonstrate these effects, with SMD ≈ 0.50 for cognitive outcomes and SMD≈ –0.60 for anxiety symptoms in older populations.

Moreover, physical activity plays a crucial role in the prevention and management of depressive symptoms [18–20]. For example, walking ≥ 7.000 steps per day is associated with a 31 % lower risk of depression in adults.

Physical functioning in older adults has become the focus of active interdisciplinary research, particularly within the framework of the International Classification of Functioning, Disability and Health (ICF) [21]. Recent longitudinal studies have documented statistically significant declines in muscle strength, especially in the hip abductors and knee extensors, as well as worsening functional parameters, including reduced walking speed, impaired dynamic balance, diminished ability to rise from a seated position, and limitations in upper limb function and overall mobility. At the same time, levels of participation in activities of daily living, household independence, and overall physical activity remain relatively stable over the first year of follow-up [22; 23].

Physical interventions in gerontological rehabilitation demonstrate substantial potential for preventing sarcopenia and maintaining functional independence in older adults. In particular, programs incorporating resistance training enhance muscle strength and mass, thereby slowing age-related skeletal muscle atrophy. Aerobic exercise, in turn, improves endurance by increasing capillary density, mitochondrial content, and enzymatic activity within muscle tissue. The combined effects of these training modalities bolster the ability to engage in activities of daily living, an essential factor for sustaining independent functioning among older individuals [24; 25].

A study conducted in an inpatient setting demonstrated that enhanced, individualized exercise programs yield superior functional outcomes in physically frail older

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patients compared to standard care protocols. These findings support the integration of such tailored exercise regimens into clinical practice to improve physical condition, overall well-being, and quality of life among medically vulnerable older adults [26].

Regular physical activity also serves as a powerful preventive measure against noncommunicable diseases. Multiple studies have shown that engaging in exercise is associated with reduced risks of ischemic heart disease, stroke, certain cancers, and type 2 diabetes; prevention of postmenopausal osteoporosis and a lower likelihood of osteoporotic fractures; mitigation of hypokinetic consequences such as diminished cardiorespiratory endurance and autonomic dysfunction; prevention of accidental falls and related injuries; and positive effects on cognitive function, reductions in anxiety and stress levels, and enhancements in self esteem and psycho emotional well being [27; 28].

Physical therapy plays a pivotal role in maintaining and enhancing the quality of life in older individuals, particularly by preserving functional independence and preventing complications. Key areas of influence include improvements in mobility, fall prevention, pain reduction, expedited recovery after illness or surgery, and management of chronic disease symptoms.

Physical therapy has a positive impact on the functional capacity of older adults to perform activities of daily living, thereby sustaining their independence in home environments. Coordination, balance, strength, and flexibility exercises help maintain self-care abilities and encourage ongoing social participation [29].

Fall and Injury Prevention. With advancing age, the risk of falls increases significantly, contributing to higher rates of disability. Physical therapy reduces this risk through balance training, lower limb strengthening, and spatial orientation exercises. Fall-prevention programs have been recognized as an effective means of decreasing hospital admissions and associated healthcare costs [10].

Pain Management. Chronic pain in older adults, particularly due to osteoarthritis, fibromyalgia, and musculoskeletal dysfunction, significantly diminishes quality of life. The adverse effects of pharmacological treatments in this population make physical therapy an essential non-pharmacological component of a comprehensive management approach [30; 31].

Massage in Geriatric Physical Therapy. Clinical Significance and Therapeutic Potential. In gerontological practice, massage is recognized as an effective non-drug intervention aimed at enhancing the functional status of the musculoskeletal system, reducing pain and anxiety, and preventing hypokinesia in older individuals. Therapeutic massage techniques activate local blood and lymphatic circulation, alleviate muscular stiffness, and stimulate the release of neurotransmitters that improve psychoemotional well being. This modality is particularly valuable for patients with limited mobility or comorbid chronic conditions that render active exercise difficult or contraindicated [32].

Clinical studies indicate that regular therapeutic massage in older adults leads to reductions in chronic pain intensity, improvements in sleep quality, decreases in anxiety and depressive symptoms, and enhancements in overall quality of life. For example, a 2022 systematic review demonstrated the positive impact of massage on alleviating osteoarthritis and fibromyalgia symptoms in geriatric patients [33]. Soft, slow, age-adapted techniques (geriatric massage) are preferred, as they deliver therapeutic benefits without the risk of overload or adverse reactions.

Massage can also serve as an alternative to minimal physical activity for bedridden patients and those at high risk of falls. It en-

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hances proprioceptive sensitivity, presserves muscle flexibility, and reduces the risk of orthopedic complications. An individualized approach that takes into account age-related changes, comorbid conditions, and potential contraindications – such as severe vascular disorders, dermatological diseases, or acute infections – is essential.

Massage is an effective non-pharmacological intervention for reducing pain, improving mobility, and managing chronic symptoms in older adults. For example, studies have demonstrated that therapeutic massage leads to decreases in pain intensity, as measured by the Visual Analog Scale (VAS), and improvements in the affective component of pain among elderly patients [34; 35].

Application of Physical Therapy Modalities in Geriatric Practice. In geriatric physical rehabilitation, significant emphasis is placed on physical agents with pronounced physiological effects, such as galvanic current therapy, drug electrophoresis, ultrasound, magnetotherapy, and inhalation techniques. Galvanic currents and drug electrophoresis are used to modulate neurovegetative tone, enhance microcirculation, reduce muscle tension, and provide analgesia in the context of chronic degenerative dystrophic conditions characteristic of advanced age [36]. The use of these modalities in older patients requires careful dosing and individualized parameter selection, owing to decreased nervous system reactivity, slowed nerve conduction, and a general reduction in adaptive capacity with aging [37].

When prescribing physical agent-based treatments, it is essential to account for older patients' heightened sensitivity to such modalities. Therefore, therapeutic interventions should begin at minimal intensities, with gradual parameter escalation based on individual tolerance. Procedure durations are typically reduced by [20–30] % compared to programs for middle-aged adults, while the total number of sessions may be increased to compensate for the slower tissue regeneration and functional recovery seen with aging. For electrophoresis, it is advisable to halve the concentration of the medication, and for inhalation mixtures, to reduce the dose by a factor of three to four. These modifications enhance treatment safety and enable clinically meaningful outcomes without overloading the aged and physiologically compromised body.

Application of Additional Physical Therapy Modalities in Geriatric Rehabilitation. Within a comprehensive physical therapy program for older adults, respiratory exercises and inhalation techniques are widely employed to improve pulmonary ventilation, prevent lower airway congestion, and reduce dyspnea in chronic obstructive pulmonary disease. In gerontological practice, diaphragmatic breathing, postural drainage, and device-assisted aerosol therapy using hypoallergenic agents at reduced dosages are particularly recommended [38].

Moreover, pulsed Short Wave Diathermy (SWD) and magnetotherapy serve as effective modalities in the physical rehabilitation of older patients. These techniques exert gentle yet consistent anti-inflammatory, analgesic, and vasotropic effects. SWD enhances tissue trophism by improving local blood flow and reducing chronic inflammation, which is particularly beneficial for degenerative changes in joints and soft tissues. Magnetotherapy, in turn, positively modulates the autonomic nervous system, normalizes blood pressure, and provides an anti-stress effect, as demonstrated in multiple clinical studies within geriatric inpatient settings [39].

Electrical Stimulation in Geriatric Rehabilitation. Special emphasis in the rehabilitation of older adults is placed on electrical stimulation – a method used to prevent muscle atrophy, enhance distal limb circulation, and maintain muscle tone in cases of hypokinesia or partial immobiliza-

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tion. Low-frequency pulsed currents with minimal amplitude settings are most commonly employed, allowing safe stimulation of weakened muscles without overloading the neuromuscular apparatus [40].

The combined application of these modalities within individualized programs helps optimize functional status, reduce symptoms of chronic conditions, and overall enhance the quality of life of geriatric patients.

Innovative Physical Therapy Modalities in Geriatric Practice. Contemporary gerontological physical therapy increasingly incorporates low-level laser therapy, which exerts anti-inflammatory, analgesic, and biostimulatory effects. Laser technologies are utilized for chronic joint pain, osteoarthritis, neuropathies, and post-stroke dysfunction. The technique's precision, pain-free application, and excellent tolerability in older patients have been confirmed by clinical trials [41].

Equally important is thermal therapy, which encompasses paraffin, ozokerite, mineral mud, and thermal water applications. Heat exposure enhances local microcirculation, reduces muscle tone, facilitates the removal of metabolic byproducts, and alleviates joint stiffness. In geriatric populations, thermal treatments have demonstrated positive outcomes for rheumatic conditions, chronic lower back pain, and fibromyalgia [42].

Emerging Biotechnological Interventions in Physical Therapy. Recently, biotechnological methods have been actively integrated into physical therapy, including electrical stimulation with biofeedback, transcranial magnetic stimulation (TMS), and neuromodulation. These technologies are applied not only to restore physical function but also to improve cognitive status in individuals with dementia, Parkinson's disease, and geriatric depressive disorders. Particular emphasis is placed on individualized digital interventions that adapt stimulation levels to each patient's specific neurophysiological parameters [43].

Thus, the fusion of classical and cutting-edge physical therapy technologies enables a high degree of personalized care in gerontology and supports the achievement of durable rehabilitation outcomes.

Occupational Therapy, Balance Training, and Sensory Stimulation in the Physical Rehabilitation of Older Patients. Occupational therapy is an integral component of the multidisciplinary approach in geriatric rehabilitation, as it focuses on preserving or restoring self-care skills, productive activities, and social engagement. Occupational therapy techniques assist patients in adapting their living environments to their functional limitations, enhancing home safety, and reducing reliance on external support. Research has demonstrated that occupational therapy interventions effectively lower the risk of institutionalization and improve quality of life among older adults [44].

Balance and Coordination Training. Balance and coordination training are critical for fall prevention, a leading cause of injury and mortality among individuals aged 65 and older. Employing specialized programs such as the Otago Exercise Programme, Tai Chi, or unstable surface training leads to statistically significant improvements in postural control, lower limb muscle strength, and reductions in accidental falls [45].

Sensory Stimulation. Sensory stimulation encompasses tactile, vestibular, visual, and auditory inputs aimed at preserving cognitive activity, preventing sensory deprivation, and supporting psycho emotional well being. For example, the use of multisensory "Snoezelen" rooms or simple sensory panels in long-term care facilities is associated with reductions in agitation, anxiety, and aggression in individuals with dementia. Furthermore, sensory interventions enhance spatial orientation abilities

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and help maintain integrative brain function [46].

Integrating occupational therapy, balance training, and sensory stimulation into a comprehensive physical rehabilitation program for older adults allows interventions to be optimally tailored to each patient's individual needs and functional status.

Fall Rehabilitation in Older Adults. Falls in older adults often lead to serious physical, psychological, and social consequences, including fractures, fear of recurrent falls, reduced mobility, and increased dependency on caregivers. According to the World Health Organization, every year, one-third of individuals over 65 experience at least one fall, and approximately 10% sustain serious injuries requiring hospitalization or prolonged recovery [47].

A comprehensive post-fall rehabilitation program should employ a multicomponent approach: targeted exercise to restore muscle strength and balance, psychoemotional support, occupational therapy to enhance activities of daily living, and home environment modifications. Interventions that focus on functional movement training, personalized support, and the gradual progression of intensity have proven particularly effective [48].

Targeted physical therapy following falls not only facilitates physical recovery but also significantly reduces the fear of falling again, a known independent risk factor for reduced activity levels and depression in older adults [49]. Patients who have experienced multiple falls derive particular benefit from supervised group exercise programs that include balance training, stretching, and low-intensity aerobic activity.

Overall, effective post-fall rehabilitation enhances physical function, boosts confidence in one's abilities, improves quality of life, and decreases the likelihood of future hospitalizations.

Adaptive Physical Activity (APA) in gerontology refers to a system of individualized exercise regimens that take into account patients' age, functional capacity, comorbidities, and psychological status. In gerontological practice, APA is a key component for maintaining mobility, preventing falls, and reducing the risk of disability. APA programs may include modified aerobic exercises, balance training, flexibility routines, and strength training tailored to an individual's limitations and needs. Individualization is crucial: incorporating rest intervals between sets, gradual intensity progression, and the use of assistive devices or support. Research has demonstrated that regular participation in APA enhances functional independence, improves cardiovascular health, supports psycho emotional well being, and elevates quality of life in persons aged over 65 years [50].

Role of the Interdisciplinary Team in the Rehabilitation of Older Adults. Effective rehabilitation in gerontology is not possible without the coordinated efforts of an interdisciplinary team comprising physicians (geriatricians, physiatrists), physical therapists, occupational therapists, psychologists, nurses, social workers, and, as needed, nutritionists and speech language pathologists. Coordination among these specialists enables the development of an individualized intervention plan that addresses the patient's physical, cognitive, and emotional status, level of social support, and living environment. This comprehensive approach significantly reduces hospitalization risks, enhances treatment adherence, and promotes sustained improvements in functional outcomes [51].

The multidisciplinary care model is recommended by most international geriatric care guidelines, including those from NICE, WHO, and other leading authorities [52]. This model helps improve the quality of life for older adults.

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Discussion

Physical therapy in geriatric practice exhibits an exceptionally broad range of positive effects, as evidenced by numerous clinical and review studies. Regular physical activity in older adults significantly reduces the risk of major non-communicable diseases, particularly cardiovascular conditions, osteoporosis, and type 2 diabetes, as well as decreases the incidence of falls and resulting disability. Meta-analytic data confirm that individualized exercise programs, especially combined aerobic and resistance training, are associated with statistically significant improvements in functional status, reductions in depressive symptoms, and enhancements in quality of life among older individuals [10; 53; 54].

Equally important is a comprehensive approach that incorporates adaptive physical activity, massage, other physiotherapeutic modalities, and the work of an interdisciplinary team. This strategy, which takes into account age-related changes and the patient's cognitive and emotional status, effectively addresses not only somatic health but also psychosocial adaptation. Recent WHO guidelines emphasize the necessity of integrating rehabilitation interventions into primary healthcare systems for individuals aged 65 and older [55–57].

Despite the existing evidence of effectiveness, several challenges remain: low participation rates in physical activity among older adults, a shortage of specialists in geriatric rehabilitation, and limited resources across many healthcare systems. Consequently, it is essential to further strengthen the evidence base regarding optimal therapy programs and to implement educational strategies aimed at increasing patient motivation and training qualified professionals.

Conclusions

Physical therapy is indispensable in geriatric care, as it effectively preserves muscle strength, flexibility, balance, and endurance, thereby maintaining functional independence and reducing the risk of falls, chronic pain, and functional decline. Individualized, multimodal exercise programs – particularly those combining aerobic and resistance training – demonstrate statistically significant benefits for functional status, mental health, and quality of life in adults aged 65 and over. Non-pharmacological modalities, such as therapeutic massage, physical agents (e.g., galvanic currents, electrophoresis, ultrasound, magnetotherapy), and respiratory therapies, offer safe, adjunctive strategies for pain management, inflammation control, and maintenance of cardiopulmonary function in medically vulnerable elderly populations. Emerging technologies (telephysiotherapy, wearable sensors, virtual reality, biofeedback, transcranial magnetic stimulation) broaden access and personalization of rehabilitation, especially for homebound or mobility-limited patients, and warrant integration into standard practice. A multidisciplinary team approach – involving geriatricians, therapists, nurses, psychologists, social workers, and allied health professionals – is critical for designing comprehensive, patient-centered rehabilitation plans that address physical, cognitive, and psychosocial needs. Future priorities include expanding high-quality evidence on optimal intervention protocols, enhancing workforce training in geriatric rehabilitation, and deploying education and motivation strategies to increase sustainable participation in physical activity among older adults.

Conflict of interest is absent.

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References

1. Ageing and health. WHO, 01 Oct 2024. Available at: https://www.who.int/news-room/fact-sheets/detail/ageing-and-health

2. Liu-Ambrose T, Li LC. Physiotherapy for Healthy Aging. Physiother Can. 2022;74(1):1-3. DOI: 10.3138/ptc-2021-0106-gee. PMID: 35185240.

3. Goodarzi Z, Levy A, Whitmore C, Chan T, Mojgani J, Niculescu I, et al. A systematic review and meta-analysis on physical activity for the treatment of anxiety in older adults. Int Psychogeriatr. 2025:100044. DOI: 10.1016/j.inpsyc.2025.100044. PMID: 39952828.

4. Cunningham C, O'Sullivan R, Caserotti P, Tully MA. Consequences of physical inactivity in older adults: A systematic review of reviews and meta-analyses. Scand J Med Sci Sports. 2020;30(5):816-27. DOI: 10.1111/sms.13616. PMID: 32020713.

5. Physical Activity. Fact sheet. World Health Organization, 26 Jun 2024. Available at: https://www.who.int/news-room/fact-sheets/detail/physical-activity

6. Goodarzi S, Teymouri Athar T, Beiky M, Fathi H, Nakhaee Z, Parvizi Omran S, Shafiee A. Effect of physical activity for reducing anxiety symptoms in older adults: a meta-analysis of randomized controlled trials. BMC Sports Sci Med Rehabil. 2024;16:153. DOI: 10.1186/s13102-024-00947-w.

7. Cottrell MA, Galea OA, O'Leary SP, Hill AJ, Russell TG. Real-time telerehabilitation for the treatment of musculoskeletal conditions is effective and comparable to standard practice: a systematic review and meta-analysis. Clin Rehabil. 2017;31(5):625-38. PMID: 27141087. DOI: 10.1177/0269215516645148.

8. Ahmadi Marzaleh M, Peyravi M, Azhdari N, Bahaadinbeigy K, Sarpourian F. Application of Telerehabilitation for Older Adults During the COVID-19 Pandemic: A Systematic Review. Disaster Med Public Health Prep. 2022;17:e402. DOI: 10.1017/dmp.2022.219. PMID: 36004522.

9. Edward H, Nicolau D, Wu J, Smith-Turchyn J. Effectiveness of physiotherapist-led telerehabilitation for older adults with chronic conditions: a systematic review and meta-analysis. Disability and Rehabilitation. 2024;47(11):1-15. DOI: 10.1080/09638288.2024.2423770.

10. Sherrington C, Fairhall NJ, Wallbank GK, Tiedemann A, Michaleff ZA, Howard K, et al. Exercise for preventing falls in older people living in the community. Cochrane Database Syst Rev. 2019;1(1):CD012424. DOI: 10.1002/14651858.CD012424.pub2. PMID: 30703272.

11. Lee YS. Gender differences in physical activity and walking among older adults. J Women Aging. 2005;17(1-2):55-70. DOI: 10.1300/J074v17n01_05. PMID: 15914419.

12. Guthold R, Stevens GA, Riley LM, Bull FC. Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1·9 million participants. Lancet Glob Health. 2018;6(10):e1077-86. DOI: 10.1016/S2214-109X(18)30357-7. PMID: 30193830.

13. WHO. Global Action Plan on Physical Activity 2018–2030: More Active People for a Healthier World. Geneva: World Health Organization; 2018. Available at: https://iris.who.int/bitstream/handle/10665/272722/9789241514187-eng.pdf

14. Northey JM, Cherbuin N, Pumpa KL, Smee DJ, Rattray B. Exercise interventions for cognitive function in adults older than 50: a systematic review with meta-analysis. Br J Sports Med. 2018;52(3):154-60. DOI: 10.1136/bjsports-2016-096587. PMID: 28438770.

15. Young J, Angevaren M, Rusted J, Tabet N. Aerobic exercise to improve cognitive function in older people without known cognitive impairment. Cochrane Database Syst Rev. 2015;2015(4):CD005381. DOI: 10.1002/14651858.CD005381.pub4. PMID: 25900537.

ISSN print 2414-4517, ISSN online 2710-1487, https://ecm.knmu.edu.ua, ecm.journal@knmu.edu.ua

16. McDowell CP, Dishman RK, Gordon BR, Herring MP. Physical Activity and Anxiety: A Systematic Review and Meta-analysis of Prospective Cohort Studies. Am J Prev Med. 2019;57(4):545-56. DOI: 10.1016/j.amepre.2019.05.012. PMID: 31542132.

17. Hou1 B, Wu Y, Huang Y. Physical exercise and mental health among older adults: the mediating role of social competence Front Public Health. 2024;12. DOI: 10.3389/fpubh.2024. 1385166.

18. Zhang S, Xiang K, Li Sh, Pan H-F. Physical activity and depression in older adults: the knowns and unknowns. Psychiatry Research. 2021;297:113738. DOI: 10.1016/j.psychres.2021. 113738.

19. Schuch FB, Vancampfort D, Firth J, Rosenbaum S, Ward PB, Silva ES, et al. Physical Activity and Incident Depression: A Meta-Analysis of Prospective Cohort Studies. Am J Psychiatry. 2018;175(7):631-48. DOI: 10.1176/appi.ajp.2018.17111194. PMID: 29690792.

20. Mammen G, Faulkner G. Physical activity and the prevention of depression: a systematic review of prospective studies. Am J Prev Med. 2013;45(5):649-57. DOI: 10.1016/j.amepre. 2013.08.001. PMID: 24139780.

21. World Health Organization (WHO). International Classification of Functioning, Disability and Health: ICF. Geneva: WHO; 2001. 299 p. Available at: https://www.who.int/standards/classifications/international-classification-of-functioning-disability-and-health

22. Cruz-Jentoft AJ, Bahat G, Bauer J, Boirie Y, Bruyere O, Cederholm T, et al; Writing Group for the European Working Group on Sarcopenia in Older People 2 (EWGSOP2), and the Extended Group for EWGSOP2. Sarcopenia: revised European consensus on definition and diagnosis. Age Ageing. 2019;48(1):16-31. DOI: 10.1093/ageing/afy169. PMID: 30312372.

23. Shen Y, Shi Q, Nong K, Li S, Yue J, Huang J, et al. Exercise for sarcopenia in older people: A systematic review and network meta-analysis. J Cachexia Sarcopenia Muscle. 2023; 14(3):1199-211. DOI: 10.1002/jcsm.13225. PMID: 37057640.

24. Papa EV, Dong X, Hassan M. Resistance training for activity limitations in older adults with skeletal muscle function deficits: a systematic review. lin Interv Aging. 2017;12:955-61. DOI: 10.2147/CIA.S104674. PMID: 28670114.

25. Govindasamy K, Rao CR, Chandrasekaran B, Parpa K, Granacher U. Effects of Resistance Training on Sarcopenia Risk Among Healthy Older Adults: A Scoping Review of Physiological Mechanisms. Life (Basel). 2025;15(5):688. DOI: 10.3390/life15050688. PMID: 40430117.

26. Caicedo-Pareja M, Espinosa D, Jaramillo-Losada J, Ordoñez-Mora LT. Physical Exercise Intervention Characteristics and Outcomes in Frail and Pre-Frail Older Adults. Health Faculty, Physiotherapy Program Universidad Santiago de Cali, Cali 760035, Colombia. Geriatrics. 2024;9(6):163. DOI: 10.3390/geriatrics9060163.

27. WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020. 104 p. Available at: https://www.who.int/publications/i/item/9789240015128

28. Volders E, de Groot RHM, Bolman CAW, Lechner L. The longitudinal associations between change in physical activity and cognitive functioning in older adults with chronic illness (es). BMC Geriatr. 2021;21:478. DOI: 10.1186/s12877-021-02429-x.

29. Al-Shehri A, Al-Toriri N, Shamsi Sh, Khan Sh. Role of Physical Therapy in Improving Function in Elderly Population. Journal of Advances and Scholarly Researches in Allied Education. 2019;16(5):200-2. Available at: https://www.researchgate.net/publication/343097914

ISSN print 2414-4517, ISSN online 2710-1487, https://ecm.knmu.edu.ua, ecm.journal@knmu.edu.ua

30. Bennell KL, Ahamed Y, Bryant C, Jull G, Hunt MA, Forbes AB, et al. Physical therapist delivered pain coping skills training and exercise for knee osteoarthritis: randomized controlled trial. Arthritis Care Res (Hoboken). 2016;68(5):590-602. DOI: 10.1002/acr.22744. PMID: 26417720.

31. Geneen LJ, Moore RA, Clarke C, Martin D, Colvin LA, Smith BH. Physical activity and exercise for chronic pain in adults: an overview of Cochrane Reviews. Cochrane Database Syst Rev. 2017;4(4):CD011279. DOI: 10.1002/14651858.CD011279.pub3. PMID: 28436583.

32. Crawford C, Boyd C, Paat CF, Price A, Xenakis L, Yang E, Zhang W; Evidence for Massage Therapy (EMT) Working Group. The Impact of Massage Therapy on Function in Pain Populations-A Systematic Review and Meta-Analysis of Randomized Controlled Trials: Part I, Patients Experiencing Pain in the General Population. Pain Med. 2016;17(7):1353-75. DOI: 10.1093/pm/pnw099. PMID: 27165971.

33. Kopf D. Massage and touch-based therapy: Clinical evidence, neurobiology and applications in older patients with psychiatric symptoms. Z Gerontol Geriatr. 2021;54(8):753-8. DOI: 10.1007/s00391-021-01995-4. PMID: 34812896.

34. Wang YY, Wang XX, Chen L, Liu Y, Li YR. A systematic review and network meta-analysis comparing various non-pharmacological treatments for older people with mild cognitive impairment. Asian J Psychiatr. 2023;86:103635. DOI: 10.1016/j.ajp.2023.103635. PMID: 37270875.

35. Utli H. Effects of massage therapy on clinical symptoms of older people. J Educ Res Nurs. 2022;19(1):103-7. DOI: 10.5152/jern.2021.09327.

36. Meusel H. Grundlagen der Bewegungstherapie in der geriatrischen Rehabilitation [Basic principles of exercise therapy in geriatric rehabilitation]. Z Gerontol Geriatr. 2000;33(Suppl 1):35-44. DOI: 10.1007/s003910070006. PMID: 10768265. [In German].

37. Iannitti T, Fistetto G, Esposito A, Rottigni V, Palmieri B. Pulsed electromagnetic field therapy for management of osteoarthritis-related pain, stiffness and physical function: clinical experience in the elderly. Clin Interv Aging. 2013;8:1289-93. DOI: 10.2147/CIA.S35926. PMID: 24106421.

38. Cichocki M, Quehenberger V, Zeiler M, Adamcik T, Manousek M, Stamm T, Krajic K. Effectiveness of a low-threshold physical activity intervention in residential aged care--results of a randomized controlled trial. Clin Interv Aging. 2015;10:885-95. DOI: 10.2147/CIA.S79360. PMID: 26056438.

39. Stewart GM, Wheatley-Guy CM, Johnson BD, Shen WK, Kim CH. Impact of pulsed electromagnetic field therapy on vascular function and blood pressure in hypertensive individuals. J Clin Hypertens (Greenwich). 2020;22(6):1083-9. DOI: 10.1111/jch.13877. PMID: 32401418.

40. Tanaka S, Kamiya K, Matsue Y, Yonezawa R, Saito H, Hamazaki N, et al. Effects of electrical muscle stimulation on physical function in frail older patients with acute heart failure: a randomized controlled trial. Eur J Prev Cardiol. 2022;29(8):e286-8. DOI: 10.1093/eurjpc/zwac022. PMID: 35137047.

41. Dompe C, Moncrieff L, Matys J, Grzech-Lesniak K, Kocherova I, Bryja A, et al. Photobiomodulation-Underlying Mechanism and Clinical Applications. J Clin Med. 2020;9(6):1724. DOI: 10.3390/jcm9061724. PMID: 32503238.

42. Verhagen AP, Cardoso JR, Bierma-Zeinstra SM. Aquatic exercise & balneotherapy in musculoskeletal conditions. Best Pract Res Clin Rheumatol. 2012;26(3):335-43. DOI: 10.1016/j.berh.2012.05.008. PMID: 22867930.

ISSN print 2414-4517, ISSN online 2710-1487, https://ecm.knmu.edu.ua, ecm.journal@knmu.edu.ua

43. Gomez-Soria I, Iguacel I, Aguilar-Latorre A, Peralta-Marrupe P, Latorre E, Zaldivar JNC, Calatayud E. Cognitive stimulation and cognitive results in older adults: A systematic review and meta-analysis. Arch Gerontol Geriatr. 2023;104:104807. DOI: 10.1016/j.archger.2022.104807. PMID: 36116285.

44. Gitlin LN, Marx K, Stanley IH, Hodgson N. Translating Evidence-Based Dementia Caregiving Interventions into Practice: State-of-the-Science and Next Steps. Gerontologist. 2015; 55(2):210-26. DOI: 10.1093/geront/gnu123. PMID: 26035597.

45. Liu-Ambrose T, Davis JC, Best JR, Dian L, Madden K, Cook W, et al. Effect of a Home-Based Exercise Program on Subsequent Falls Among Community-Dwelling High-Risk Older Adults After a Fall: A Randomized Clinical Trial. JAMA. 2019;321(21):2092-100. DOI: 10.1001/jama.2019.5795. Erratum in: JAMA. 2019;322(2):174. DOI: 10.1001/jama.2019.9011. PMID: 31162569.

46. Silva R, Cardoso D, Apóstolo J. Effectiveness of multisensory stimulation in managing neuropsychiatric symptoms in older adults with major neurocognitive disorder: a systematic review protocol. JBI Database System Rev Implement Rep. 2016;14(4):85-95. DOI: 10.11124/JBISRIR-2016-2638. PMID: 27532313.

47. World Health Organization. Falls. 2021. Available at: https://www.who.int/news-room/fact-sheets/detail/falls

48. Hopewell S, Adedire O, Copsey BJ, Boniface GJ, Sherrington C, Clemson L, et al. Multifactorial and multiple component interventions for preventing falls in older people living in the community. Cochrane Database Syst Rev. 2018;7(7):CD012221. DOI: 10.1002/14651858.CD012221.pub2. PMID: 30035305.

49. Kumar A, Delbaere K, Zijlstra GA, Carpenter H, Iliffe S, Masud T, et al. Exercise for reducing fear of falling in older people living in the community: Cochrane systematic review and meta-analysis. Age Ageing. 2016;45(3):345-52. DOI: 10.1093/ageing/afw036. PMID: 27121683.

50. Cadore EL, Rodriguez-Mañas L, Sinclair A, Izquierdo M. Effects of different exercise interventions on risk of falls, gait ability, and balance in physically frail older adults: a systematic review. Rejuvenation Res. 2013;16(2):105-14. DOI: 10.1089/rej.2012.1397. PMID: 23327448.

51. Ellis G, Whitehead MA, O'Neill D, Langhorne P, Robinson D. Comprehensive geriatric assessment for older adults admitted to hospital. Cochrane Database Syst Rev. 2011;(7): CD006211. DOI: 10.1002/14651858.CD006211.pub2. Update in: Cochrane Database Syst Rev. 2017;9:CD006211. DOI: 10.1002/14651858.CD006211.pub3. PMID: 21735403.

52. Integrated care for older people (ICOPE): guidance for person-centred assessment and pathways in primary care. Geneva: World Health Organization; 2019. 52 p. Available at: https://www.who.int/publications/i/item/9789241515993

53. Warburton DER, Bredin SSD. Health benefits of physical activity: a systematic review of current systematic reviews. Curr Opin Cardiol. 2017;32(5):541-56. DOI: 10.1097/HCO.0000000000000437. PMID: 28708630.

54. Sherrington C, Fairhall NJ, Wallbank GK, Tiedemann A, Michaleff ZA, Howard K, et al. Exercise for preventing falls in older people living in the community. Cochrane Database Syst Rev. 2019;1(1):CD012424. DOI: 10.1002/14651858.CD012424.pub2. PMID: 30703272.

55. Global recommendations on physical activity for health. Geneva: World Health Organization; 2010. 60 p. Available at: https://www.who.int/publications/i/item/9789241599979

ISSN print 2414-4517, ISSN online 2710-1487, https://ecm.knmu.edu.ua, ecm.journal@knmu.edu.ua

56. Zhang S, Huang X, Zhao X, Li B, Cai Y, Liang X, Wan Q. Effect of exercise on bone mineral density among patients with osteoporosis and osteopenia: A systematic review and network meta-analysis. J Clin Nurs. 2022;31(15-16):2100-11. DOI: 10.1111/jocn.16101. PMID: 34725872.

57. Martinez-Velilla N, Casas-Herrero A, Zambom-Ferraresi F, Saez de Asteasu ML, Lucia A, Galbete A, García-Baztan A, et al. Effect of Exercise Intervention on Functional Decline in Very Elderly Patients During Acute Hospitalization: A Randomized Clinical Trial. JAMA Intern Med. 2019 Jan 1;179(1):28-36. DOI: 10.1001/jamainternmed.2018.4869. Erratum in: JAMA Intern Med. 2019;179(1):127. DOI: 10.1001/jamainternmed.2018.7586. PMID: 30419096.

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ФІЗИЧНА ТЕРАПІЯ У ГЕРОНТОЛОГІЇ: МОЖЛИВОСТІ ПОКРАЩЕННЯ ЯКОСТІ ЖИТТЯ В УМОВАХ СТАРІННЯ НАСЕЛЕННЯ

У статті проведено огляд сучасних підходів до фізичної терапії в геронтологічній практиці з метою збереження функціональної незалежності та підвищення якості життя осіб віком 65 та більше років. Старіння населення збільшує значення профілактики неінфекційних захворювань, ризику падінь та швидкої втрати функціональних можливостей. Автори підкреслюють, що регулярна адаптивна фізична активність достовірно знижує ризик серцево судинних захворювань, остеопорозу, цукрового діабету, а також поліпшує когнітивні функції і психоемоційний стан (SMD (Standardized Mean Difference, стандартизовані середні різниці) ≈ 0,5 для когнітивного резерву, ≈ –0,6 для зниження тривожності). Індивідуалізовані програми вправ, що поєднують аеробіку та силові тренування, демонструють статистично значущі поліпшення функціонального статусу, зниження депресивних симптомів і підвищення самооцінки. Окремий розділ присвячено немедикаментозним методам: лікувальному масажу, фізичним агентам (гальванізація, електрофорез, ультразвук, магнітотерапія), дихальним і інгаляційним технікам, УВЧ та магнітотерапії, електростимуляції з мінімальною амплітудою. Ці методики ефективно зменшують біль, покращують мікроциркуляцію, знижують м’язову напругу й стимулюють відновлення тканин при дегенеративно-дистрофічних процесах. Велику увагу приділено інноваційним технологіям: телефізіотерапії, носимим пристроям, віртуальній реальності, біозворотному зв’язку та транскраніальній магнітній стимуляції, які забезпечують віддалений моніторинг, персоналізацію втручань та розширюють доступ до реабілітації для маломобільних пацієнтів. Мультидисциплінарний підхід є ключовим для розробки комплексних планів, що враховують фізичний, когнітивний і психосоціальний статус людини. Підкреслено необхідність інтеграції фізіотерапевтичних інновацій у первинну медичну ланку, розвитку доказової бази та навчанні фахівців.

Ключові слова: *похилий вік, мультидисциплінарна реабілітація, когнітивне здоров’я, адаптивна фізична активність, фізіотерапевтичні технології.*

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