ISSN: 2754-4745

Journal of Physical Medicine Rehabilitation Studies & Reports

SCIENTIFIC Research and Community

Review Article

Open Access

The Role of Physical Therapy in Enhancing Mobility and Quality of Life for Patients with Dementia and Alzheimer's Disease

Laljibhai Makwana

DPT. Vernon Rehab PT PC, USA

ABSTRACT

Dementia (including Alzheimer's disease, AD) is a progression neurodegenerative disorder characterized by cognitive and memory impairment and impaired motor function. These symptoms limit patients' mobility and QoL, rendering them more dependent upon their caregiver, and exposing them to a greater risk of falls. However, improving mobility, balance, and overall functional independence have become critical nonpharmacological interventions through the use of physical therapy (PT). The evidence-based role of PT in patients with Dementia and AD to enhance motor function, decrease fall risks, and promote psychological well-being is explored in this paper. Aerobic exercise, strength training, balance training, and gait rehabilitation have been shown to be beneficial in measurable ways: improved walking patterns, reduced agitation, and increased participation in normal daily activities. Physical therapy does more than discuss physical impairments; it has been linked to the support of brain activity and cognitive function, as well as aiding emotional health through the stimulation of neuroplasticity. Group-based PT interventions are also an opportunity for engagement with others and reduce the isolation that too often exists in dementia patients. However, patient resistance, limited cognition, and caregiver burden present challenges to the implementation of effective PT programs. These barriers can be overcome by innovations such as virtual reality (VR) therapies, wearable monitoring devices, and telerehabilitation platforms. This paper highlights the importance of PT care to dementia patients' mobility enhances their QoL, and calls for PT to be integrated into multidisciplinary care models. Future research and future healthcare policies must facilitate access to PT, provide PT interventions dependent on the degree of the disease, and provide support to the caregivers in order to maintain the continuity of care.

***Corresponding author's**

Laljibhai Makwana, DPT. Vernon Rehab PT PC, USA.

Received: July 11, 2024; **Accepted:** July 18, 2024; **Published:** July 25, 2024

Keywords: Dementia, Alzheimer's Disease, Physical Therapy, Mobility, Quality of Life, Balance Training, Aerobic Exercise, Fall Prevention, Neuroplasticity, Nonpharmacological Interventions

Introduction

Dementia, which includes Alzheimer's disease (AD), is an urgent global public health challenge that affects millions of individuals around the globe. These neurodegenerative disorders comprise gradual cognitive decline and memory loss, in addition to poor reasoning, that impact patients' everyday functioning and, in general, their degree of independence. Motor dysfunction is a major feature of Dementia, including gait disturbances, balance problems, muscle weakness, and an increased risk of falls, besides cognitive impairments. Due to these physical challenges, patients tend to present with a substantial decline in mobility and quality of life (QoL) that worsens the burden on patients, caregivers, and healthcare systems [1].

There is increasing recognition of physical therapy (PT) as a valuable nonpharmacological intervention for the management of physical and functional limitations associated with Dementia and AD. PT is designed to promote motor function, prevent falls, and assist patients in performing activities of daily living (ADLs) through specific interventions designed through intervention studies and clinical trials, including gait training, balance therapy, aerobic exercise, and strength training. Studies have shown regular physical activity to facilitate neuroplasticity, enhance blood flow to the brain, and delay the progression of cognitive decline and, therefore, afford physical and cognitive benefits [2].

Physical therapy also deals with the psychic and emotional side of physical condition. Participation in PT programs by patients has been associated with less agitation, anxiety, and depression and, by extension, better QoL. In addition, group-based PT sessions help improve social interaction; people with Dementia can feel a sense of community and involvement, while many with dementia experience isolation and loneliness [3].

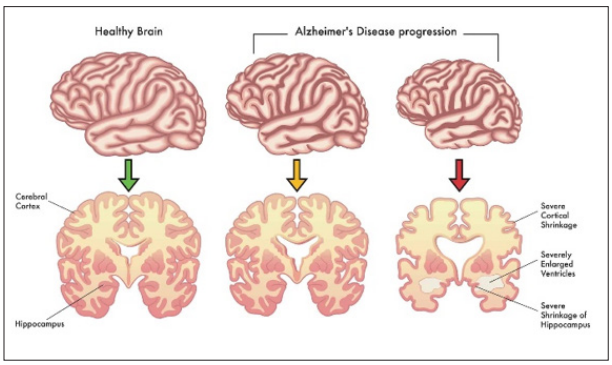

Figure 1: Progression of Brain Atrophy in Alzheimer's Disease, Showing Cortical Shrinkage, Enlarged Ventricles, and Hippocampal Damage

Although the essential concept of physical therapy (PT) for dementia patients has been established, implementing these programs is challenging because of cognitive limitations, behavioral resistance, and caregiver burden. While these barriers exist, innovative new methods of delivering effective and accessible PT interventions, such as virtual reality, wearable technologies, and telerehabilitation, present advancements. This paper delves into physical therapy as a means to increase mobility and QoL in Dementia and AD patients, critically scrutinizing the potential benefits and challenges in this effort, as well as future directions.

The Impact of Dementia and Alzheimer's Disease on Mobility and Quality of Life

The progressive neurological disorder of Dementia with its common variant, Alzheimer's disease (AD), is characterized by both drastic cognitive and physical health decline. The hallmarks of these conditions are memory loss, impaired reasoning, and personality changes, but they also wreak havoc on physical mobility and independence. Dementia is associated with motor decline, including poor balance, reduced gait speed, postural instability, and increased muscle weakness in patients. But in addition to that, they need to gain the sense of being able to link every event in the world with its location in that world. That's spatial awareness. Patients, as the disease progresses, become sedentary and, as a consequence, atrophy the muscles, the joints stiffen, and the cardiovascular deconditioning is accelerated, which further impacts physical limitations [4].

Reduced mobility carries its own substantial risk as falls are the principal cause of injury and hospitalization among the elderly with Dementia. The physical injuries caused by falls are only part of the problem; there are also severe psychological effects - the fear of falling, loss of confidence, and social withdrawal. A vicious cycle related to the lack of inactivity and reduced mobility severely compromising QoL for patients expressly excluding an independent execution of the ADLs such as dressing, bathing, and walking. In addition, the physical deterioration of the patient gives the caregiver a huge job in handling the patient's daily needs [5].

This includes health, but it also includes psychological and emotional well-being. Dementia typically results in agitation, depression, anxiety, and a fading away from any meaningful activity as the cognitive decline associated with it worsens. Together, these ailments show a very pronounced need for interventions that simultaneously improve mental health and mobility deficits. Physical therapy (PT) is becoming the key to such challenges, providing organized, evidence-based ways to bolster motor function, stifle falls, and improve independence [6].

The Role of Physical Therapy in Enhancing Mobility

Nonpharmacological treatment with physical therapy is a cornerstone of treatment in individuals who have Dementia and Alzheimer's. It aims to preserve or improve mobility, maintain functional independence, and reduce the risk of falls. Physical therapists develop an exercise program specific to the patient's abilities, needs, and stage of disease progression. The interventions for these include aerobic exercise, strength training, balance exercise, and gait rehabilitation [7].

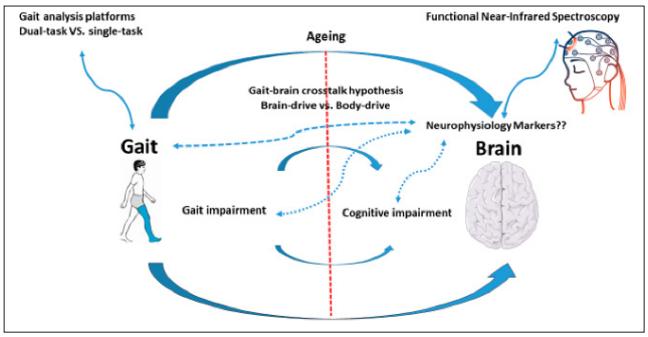

Figure 2: Interaction between Gait Impairment, Cognitive Decline, and Brain Function in Aging

Aerobic Exercise for Cardiovascular and Motor Function

Mobility in patients with Dementia occurs through aerobic exercise such as walking, stationary bicycling, or treadmill training with supervision. Aerobic activity increases blood flow to the brain, which brings oxygen to the brain and helps stimulate neuroplasticity, the brain's ability to form new connections [8]. Brain perfusion has been shown to slow cognitive decline, which secondarily supports motor function and coordination. There is evidence that dementia patients who participate in regular aerobic exercise will improve their gait speed, endurance, and overall mobility. For example, a clinical trial has shown that patients who participated in walking programs had better balance and fewer falls than sedentary patients [1].

Strength Training for Stability and Independence

A common issue in people with Dementia is general muscle weakness, especially in the lower limbs (which are important for standing, walking, and balance). Strength training exercises with body weight, resistance bands, or light weights to major muscle groups are incorporated in physical therapists.

Figure 3: Group-Based Physical Therapy Exercises for Older Adults, Promoting Mobility, Strength, and Social Engagement

Exercise on strengthening the quadriceps, hamstrings, and calf muscles increases stability, helping patients stand from a chair or a stair with more ease [9]. Progressive resistance training is shown in research to be efficacious at increasing muscle strength and decreasing the risk of falls in older adults with cognitive impairment. Most significantly, even seemingly simple exercises such as sit-to-stand repetitions or leg raises have substantial functional benefits.

Gait and Balance Training to Reduce Fall Risks

Falls occur primarily because of gait disturbances and impaired balance in dementia patients. However, physical therapy helps

to deal with such problems through gait and balance exercises. Guided walking, obstacle navigation, tandem stance exercises, and other techniques can decrease walking patterns and improve postural stability. Also, assistive devices like walkers or canes may be introduced to add support and avoid falling. Studies indicate that balance training greatly improves stability and reduces the fear of falling, which is a common psychological barrier to the mobility of dementia patients [10].

These structured interventions of physical therapy improve physical performance, which gives patients confidence and motivates them to continue with their daily activities and stay active.

Physical Therapy's Impact on Quality of Life

Physical therapy is more than just physical; it's cognitive, emotional, and social. In particular, regular involvement in physical therapy has been correlated to gon improvements in cognitive function, mood, and overall quality of life.

Cognitive and Neuroplastic Benefits

Cognitive health is closely related to physical activity, which stimulates brain activity and helps brain neuroplasticity. In particular, a study has shown that aerobic exercises are able to enhance executive functioning, memory retention, and attention among patients who have Dementia. Additional programs in physical therapy combine movement with brain challenges, such as dual-task exercises, which enhance the function of the brain. For instance, a patient could complete a simple memory task while they are walking or balancing, in which case the cognitive and motor pathways are engaged at the same time [11]. So, they did some studies, and they suggest that when you engage in these dual-task approaches in order for your brain connectivity and your mental resilience, this helps slow down cognitive decline.

Psychological and Emotional Well-Being

Dementia and Alzheimer's disease commonly cause depression, anxiety, and agitation and can also lead to a worsening of the patient's overall health and QoL. Physical therapy may also help reduce psychological elements of MS, as physical activity releases endorphins - natural mood elevators that make you feel better and help to blunt stress and other symptoms of anxiety [1]. Similarly, Group-based therapy lessons furnish the chance for friendly connection, registering down sensations of isolation and desolation. In this way, movement can bring patients joy and purpose, and there are myriad ways to do so: dance-based therapy, rhythmic exercise, or guided group activities. It also provides positive effects on mood and emotional well-being, which helps to overall quality of life [12].

Enhancing Functional Independence

Physical therapy imparts direct and significant effects on the patient's ability to do the activities of daily living (ADLs), thus necessary for self-sufficiency. A PT (Physical Therapist) helps with balance, strength, and coordination, all of which are critical elements required for functional tasks like walking, dressing, bathing, eating, etc. The improvement of these physical abilities enables patients to become more autonomous and require fewer caregivers[1]. This benefits patients because it improves their independence (not to mention that it frees up caregivers and in so does, helps to create a healthier and more sustainable environment for caregivers) [13].

Barriers to Physical Therapy Implementation

The benefits of physical therapy are clear, but there are many barriers to widespread implementation with Dementia and Alzheimer's patients. One of the main problems here is the cognitive limitation of these conditions. People with advanced Dementia may be unable to follow instructions, refuse to participate, or have behavior problems, such as agitation or aggression. These hurdles force physical therapists to come up with creative patient-centered solutions, including rewording instructions, presenting visual cues, and including real activities to promote involvement [14].

Another crucial factor in physical therapy programs that are successful is caregiver involvement. Despite the importance of caregivers encouraging kids to exercise every day at home, they may need to be properly trained or equipped to do so [15]. There is a gap in providing simple, safe exercises for caregivers to do with their pets, and educating them on these exercises, as well as providing them tools to do these exercises, such as instructional videos, could bridge this gap.

There are also systemic barriers, including lack of access to specialized physical therapists and economics. Belgium has many problems of its own when it comes to delivering a comprehensive rehabilitation program for dementia patients, especially in low-resource settings. Insurance, too, may not cover the cost of physical therapy, which can make it difficult for patients to get consistent care. To address these systemic issues, policymakers, healthcare providers, and advocacy groups must work in concert to make PT services more accessible to dementia patients.

Innovative Approaches and Future Directions

Advancements in technology and newer rehabilitation strategies promise to improve the delivery of physical therapy for dementia patients. For instance, virtual reality (VR) therapies create immersive environments that stimulate both cognitive and motor functions. Virtual walking tours or balance exercises in 'simulated' settings allow patients to engage in therapy as part of someone else's fun. Several studies have demonstrated that VR-based interventions enhance gait, balance, and cognitive performance in older adults with dementia [16].

Yet another innovation that supports physical therapy is wearables, such as motion sensors that can monitor mobility, track exercise adherence, and, in real-time, detect fall risks. They offer feedback to therapists that help these therapists to change treatment according to the progress and needs of the patients. Additionally, Tele-rehabilitation platforms have done particularly well, thanks to the COVID-19 pandemic. Physical therapists can conduct virtual sessions, give instructions to patients remotely, and instruct caregivers to help them rehab at home using telerehabilitation [17].

Future research should focus on developing tailor-made physical therapy programs for different stages of Dementia and Alzheimer's disease. Furthermore, the use of interdisciplinary approaches, including combinations of physical therapy, cognitive rehabilitation, speech therapy, behavioral interventions, and others, will help to exploit all the benefits available to patients. Physical therapy policies also need to change so that they become a standard component of the dementia care plan and there is better funding and accessibility.

Conclusion

Physical therapy is important to increase the mobility, functional independence, and quality of life of people with Dementia and Alzheimer's disease. Physical therapy addresses the motor impairments and falls risks associated with these conditions through targeted interventions such as aerobic exercise, strength

training, balance therapy, and gait rehabilitation. In addition to physical benefits, PT improves cognitive function, reduces the symptoms of depression and anxiety, and helps increase social engagement, leading to a global improvement in quality of life. The implementation of physical therapy programs has been challenging primarily because of limitations in cognitive functions, challenges from caregivers, and systemic problems. Although innovations like virtual reality, wearable devices, and telerehabilitation are promising solutions to tackle these challenges, they can facilitate PT becoming more accessible and effective. Knowing that the global burden of Dementia is increasing, it is fundamental to integrate physical therapy into the multidisciplinary care model in order to care for and sustain the health and well-being of patients and caregivers. Further research, education, and policy work will ensure that physical therapy will continue as an essential element of dementia care to enable patients to live ever more active, independent, and happier lives.

References

1. SS Hernandez, FG Coelho, S Gobbi, F Stella (2010) Effects of physical activity on cognitive functions, balance and risk of falls in elderly patients with Alzheimer's dementia. Brazilian Journal of Physical Therapy 14: 68-74.
2. K Hoffmann (2013) Preserving cognition, quality of life, physical health and functional ability in Alzheimer's disease: the effect of physical exercise (ADEX trial): rationale and design. Neuroepidemiology 41: 198-207.
3. A Vreugdenhil, J Cannell, A Davies, G Razay (2012) A community-based exercise program to improve functional ability in people with Alzheimer's disease: A randomized controlled trial. Scandinavian Journal of caring sciences 26: 12-19.
4. W Zhang, LF Low, M Schwenk, N Mills, JD Gwynn, et al. (2019) Review of gait, cognition, and fall risks with implications for fall prevention in older adults with dementia. Dementia and geriatric cognitive disorders 48: 17-29.
5. M Dorfman, A Mirelman, JM Hausdorff, N Giladi (2014) Gait disorders in patients with cognitive impairment or dementia. Movement disorders in dementias17-44.
6. FE Shaw (2002) Falls in cognitive impairment and dementia. Clinics in geriatric medicine 18: 159-173.
7. K Pitkälä, N Savikko, M Poysti, T Strandberg, ML Laakkonen (2013) Efficacy of physical exercise intervention on mobility and physical functioning in older people with dementia: a systematic review. Experimental Gerontology 48: 85-93.
8. NA Sobol, Kristine Hoffmann, Kristian Steen Frederiksen, Asmus Vogel, Karsten Vestergaard, et al. (2016) Effect of aerobic exercise on physical performance in patients with Alzheimer's disease. Alzheimer's & Dementia 12: 1207-1215.
9. CJ Borba Pinheiro, Nébia Maria Almeida De Figueiredo, André Walsh Monteiro, Carlos Soares Pernambuco, Marco Aurélio Oliveira, et al. (2013) Resistance training program on functional independence of an elderly man with frontotemporal dementia: a case report. Journal of Human Sport and Exercise 8: S47-S53.
10. LZ Gras, SF Kanaan, JM McDowd, YM Colgrove, J Burns, et al. (2015) Balance and gait of adults with very mild Alzheimer's disease. Journal of Geriatric Physical Therapy 38: 1-7.
11. J Longhurst, J Phan, E Chen, S Jackson, MR Landers (2020) Physical therapy for gait, balance, and cognition in individuals with cognitive impairment: a retrospective analysis. Rehabilitation research and practice 2020: 8861004.
12. SM Abd El Kader, OH Al Jiffri (2016) Aerobic exercise improves the quality of life, psychological well-being, and systemic inflammation in subjects with Alzheimer's disease. African Health Sciences 16: 1045-1055.
13. IT Liu, WJ Lee, SY Lin, ST Chang, CL Kao, et al. (2020) Therapeutic effects of exercise training on elderly patients with dementia: a randomized controlled trial. Archives of Physical Medicine and Rehabilitation 101: 762-769.
14. M Yokogawa, Y Taniguchi, Y Yoneda (2022) Physical therapy processes-interactions between a physical therapist and an older client with dementia. Physiotherapy Theory and Practice 38: 2149-2159.
15. D Borello France, Kathryn L Burgio, Patricia S Goode, Alayne D Markland, Kimberly Kenton, et al. (2010) Adherence to behavioral interventions for urge incontinence when combined with drug therapy: adherence rates, barriers, and predictors. Physical therapy 90: 1493-1505.
16. GM Doniger, Michal Schnaider Beeri, Amihai Gottlieb, Hagar Kenan, Abigail Livny, et al. (2018) Virtual reality-based cognitive-motor training for middle-aged adults at high Alzheimer's disease risk: A randomized controlled trial. Alzheimer's & Dementia: Translational Research & Clinical Interventions 4: 118-129.
17. W Lahti (2021) Virtual Reality Exercises for Alzheimer's or Dementia. Archives of Physical Medicine and Rehabilitation 102: e80.