

## 13 HEALTHY AGING and MENTAL HEALTH IN ELDERLY

**Demet TEKDÖŞ DEMİRCİOĞLU, Berru YARGI ÖZKOÇAK**

The aging process of a human is complex and individual, occurring in biological, psychological, and social domains (Dziechciaż & Filip, 2014). Aging is the progressive deterioration at the cellular, tissue, and organ levels, leading to the loss of homeostasis, reduced adaptability to internal or external stimuli, and increased vulnerability to disease and death.

Health is defined not merely as the absence of disease or infirmity but as a state of complete physical, mental, and social well-being. The World Health Organization (WHO) broadly considers health, yet health assessments often focus on lifespan, pain control, functional abilities, and disability measures. These assessment criteria are insufficient to fully encompass important elements such as quality of life and patient satisfaction (Tsai et al., 2007).

In 1993, the World Health Organization (WHO) defined quality of life as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns." (World Health Organization, 1993). Health-related quality of life typically refers to those aspects of quality of life that are influenced by a person's health status, reflecting the impact of disease and treatment on disability and daily functioning. Additionally, perceived health status reflects an individual's ability to lead a satisfying life (Ahmed and Andrich, 2015).

Quality of life plays an important role in symptom improvement, morbidity, rehabilitation, and patient care. Assessing patients' quality of life can lead to changes in treatment and care processes or demonstrate the effectiveness of a treatment. It also highlights potential problems that may affect healthy individuals in the future. Treatment is directed based on identified problems, and preventive measures are taken against possible issues. This approach prevents the oversight of problems in recovered individuals or those with long-term follow-up needs. Additionally, quality of life is an indicator of treatment success and has prognostic significance, thus it is recommended to be routinely assessed in clinical studies (Haraldstad et al., 2019).

With advancements in healthcare, the elderly population is increasing. By 2050, it is expected that the number of individuals over the age of 60 will reach 2 billion globally, accounting for 20% of the world's population. Decline in functionality and loss of independence are not inevitable consequences of aging (United Nations, 2013). Given the high prevalence and impact of chronic health issues among elderly patients, evidence-based interventions addressing these problems are becoming increasingly important to maximize quality of life. The primary aim of treatment in elderly individuals is to reduce mortality rates and healthcare utilization as well as to improve quality of life. Improvement in quality of life is associated with a decreased risk of developing chronic diseases and reducing complications from chronic

illnesses. Therefore, it is important to consider quality of life and its influencing factors in clinical practice (Eyigör, 2009).

## 13.1 Factors Affecting Quality of Life in Elderly

As age increases, there is generally a decline in quality of life. Among the elderly population, the most common factors affecting quality of life include mobility issues and difficulties in performing daily living activities (Boston Working Group on Improving Health Care Outcomes Through Geriatric Rehabilitation, 1997). While the rates of anxiety and depression tend to decrease with age, mobility, self-care, pain, and usual activities tend to worsen as age progresses. Women's quality of life is generally lower than that of men, with higher pain scores. Factors such as living alone, lack of social support, low educational level, malnutrition, being underweight or overweight, alcohol and tobacco use contribute to a decrease in quality of life (Grund et al., 2020). Smoking, even without lung problems, leads to a decrease in exercise capacity, muscle fiber atrophy, and an increase in glycolytic capacity. This results in alterations in body composition, increased anxiety, and depression, which ultimately leads to a decrease in exercise capacity and quality of life (Pel-Littel, 2021).

During the aging process, impairments in sensory functions negatively affect quality of life. Aging brings about changes such as drooping eyelids, decreased tear production, presbyopia, slower adaptation to ambient light, and reduced contrast sensitivity. Hearing loss, particularly at high frequencies, can lead individuals to isolate themselves in social settings. A decrease in taste and smell can cause nutritional problems. Although the somatosensory system is less affected compared to vision, hearing, taste, and smell, there is a decrease in proprioceptive sense due to aging.

The reduction in quality of life due to impairments in vision is greater than that caused by impairments in hearing. Regular eye examinations should be conducted for elderly individuals, and treatments such as cataract surgery or vascular endothelial growth factor application should be administered when necessary (Assi et al., 2021; Chen et al., 2020; Cavazzana et al., 2018).

Malnutrition and swallowing disorders also significantly impact quality of life. Chewing function, nutritional status, and cognitive condition directly affect quality of life. Severe cognitive impairment can cause problems for individuals who need to use dentures. Having few teeth and being unable to use dentures can lead to chewing difficulties and dysphagia. Furthermore, cognitive impairment can result in difficulties with eating and accessing food, leading to malnutrition (Maresova et al., 2019).

Low educational level, marital status, depression, periodontal diseases, polypharmacy, smoking, denture use, and poor general health are associated with lower oral health-related quality of life. Additionally, factors such as tooth decay and lack of fillings are other risk factors that negatively affect quality of life (Baniasadi, 2021).

## 13.2 Visual Function Changes in Elderly

Aging brings about numerous physiological changes, among the decline in visual function. Presbyopia, cataracts, and dry eye are physiological changes, while glaucoma, age-related macular degeneration and vascular diseases are disorders of visual function that become more prevalent with age (Grossniklaus et al., 2013). The profound impact of visual impairments on quality of life, mobility and overall health is significant, and early detection, intervention and rehabilitation should be ensured (Knudtson et al., 2006).

Visual impairments significantly affect the quality of life of older adults. Poor vision can impede mobility, restrict social interactions, and contribute to feelings of isolation and depression. For instance, difficulty reading or recognizing faces can lead to a withdrawal from social activities, which in turn reduces overall well-being. Furthermore, visual impairments are closely associated with an increased risk of falls. Vision plays a crucial role in maintaining balance and navigating the environment. Visual impairments compromise these abilities, making everyday tasks potentially dangerous. Falls are a significant cause of injury and mortality in older individuals, frequently resulting in fractures, head injuries and subsequent loss of independence. These injuries are often associated with hospitalisation, long-term disability and even death. Addressing visual impairments is crucial for the prevention of falls, with the aim of reducing these risks and improving overall health outcomes (Knudtson et al., 2006; Popescu et al., 2011; Aartolahti et al., 2013).

Regular eye examinations are of paramount importance for the early detection and management of visual disorders. The implementation of medical treatments, surgical procedures, or vision rehabilitation at an early stage can prevent the deterioration of vision and enhance the quality of life. Many eye diseases are relatively straightforward to rehabilitate if detected early. For example, cataracts can be effectively treated with surgery, restoring clear vision. Glaucoma and diabetic retinopathy can be managed through the administration of medication and the implementation of lifestyle modifications, thus preventing further vision loss. Timely intervention can prevent the progression of these diseases and maintain visual function. Furthermore, eye examinations can also detect early signs of systemic diseases such as diabetes, hypertension, and neurodegenerative conditions, which are common in advanced age (Yap et al., 2019). These conditions frequently present with ocular manifestations before other symptoms become apparent, thereby facilitating early diagnosis and management. The prevention of complications associated with these systemic diseases enhances overall health and longevity (Edwards et al., 2022). It is of paramount importance to address visual impairments through regular screening, timely intervention, and comprehensive vision rehabilitation in order to improve the quality of life of the elderly population. The early detection and management of conditions can prevent severe vision loss and reduce morbidity and mortality rates by reducing the risk of falls (Aartolahti et al., 2013). Furthermore, ensuring good vision helps older people to maintain their independence and continue to contribute actively to society. Good vision is also crucial for the participation of the elderly population in planned physical rehabilitation programs. Effective rehabilitation often relies on the ability to perform exercises accurately, navigate environments safely, and follow instructions precisely. Clear

vision enhances their capacity to engage actively in physical therapy, allowing them to correctly execute movements, recognize spatial relationships, and monitor their progress, thus ensuring the efficiency and success of rehabilitation efforts (Gleeson et al., 2014). By prioritising eye health, we can enhance the well-being of older adults and extend their life expectancy, thereby fostering a healthier and more vibrant ageing population. It is significant to adopt a holistic approach to the rehabilitation of the elderly population. This comprehensive approach not only improves physical health but also supports mental and emotional well-being, creating a supportive environment for successful aging (Thompson et al., 2023).

### 13.3 Pain in Elderly

Pain in elderly individuals occurs in more than 50% of cases, although it varies across the general population. This situation imposes significant costs on the healthcare system. With the increasing elderly population, hospital admissions and healthcare costs are expected to rise. Chronic pain in elderly individuals can reduce mobility, leading to depression and anxiety, and can disrupt social relationships. Detecting pain in elderly individuals is also challenging; neuromuscular or cognitive impairments can cause communication difficulties, and patients may hide their pain. Pain should not be seen as a natural part of aging and should be managed with appropriate treatment methods to improve the quality of life for individuals (Schwan et al., 2019).

The presence of knee and back pain may indicate a risk of future dependency in daily living activities. Pain increases functional limitations, and functional limitations exacerbate pain. Individuals who are mildly dependent can become fully dependent if not assessed in a timely manner. Early assessment in elderly individuals is crucial to slow down the progression of dependency. Pain should not be perceived as a natural process of aging; it should be treated early, effectively, and with a personalized treatment plan to maintain functionality and quality of life (Maresova et al., 2019).

### 13.4 Falls in Elderly

Falls are common, especially among the elderly, and their significance increases with the growing elderly population. One-third of individuals over the age of 65 and half of those over 80 experiences at least one fall per year. Falls generally occur due to reduced muscle strength, walking, and vision problems. Falls are more frequent in women than in men. Besides female gender, a history of falls, lower extremity weakness, cognitive impairment, advanced age, balance disorders, use of psychotropic medications, history of stroke, arthritis, orthostatic hypotension, vision and hearing impairments, and anaemia are risk factors for falls (Douglas and Kiel, 2022). Falls can result in a wide range of outcomes from minor injuries to death. In addition to physical injuries, psychological effects are also observed; post-fall, fear of falling occurs in 3-92% of cases. Loss of confidence and social isolation develop, leading to a deterioration in quality of life. Seventy percent of falls can be identified and prevented beforehand. Therefore, individuals at risk should be identified, and necessary precautions should be taken to reduce mortality and morbidity before falls occur. It is recommended that

elderly individuals do not get out of bed immediately in the morning but sit on the edge of the bed for the first few minutes to prevent falls (Schoene et al., 2019).

## 13.5 Social Support and Education in Elderly

High social support, participation in cognitive activities, or group events are associated with better quality of life. To improve the quality of life in elderly individuals, strengthening mental activities and social relationships is necessary. It has been shown that elderly individuals with at least one friend have a higher quality of life compared to those without friends. Additionally, individuals living alone report more pain complaints compared to those living with their families. Heating problems and restrictive factors such as stairs in the home environment negatively affect quality of life. Eliminating elements that reduce the quality of life in the primary living area of elderly individuals is important for maintaining their independence and quality of life.

Low educational level causes two main problems for individuals: first, an increased burden of disease associated with low education level; second, decreased quality of life due to health problems. A correlation between low educational level and low quality of life has been identified (Mielck et al., 2013).

## 13.6 Measurement and Evaluation Methods in Geriatric Individuals

With advancing age, multiple chronic diseases, and geriatric syndromes (dementia, delirium, depression, incontinence, falls, polypharmacy, malnutrition, frailty, sarcopenia, pain) lead to a decrease and loss in the functional capacities of elderly individuals (Charlotte et al., 2015). Therefore, there is a need for a coordinated multidisciplinary assessment to clarify the diagnosis and management plans for elderly individuals. This need is met by Comprehensive Geriatric Assessment (CGA). CGA encompasses many areas. It includes the evaluation of physical symptoms, pain, and musculoskeletal symptoms, as well as balance and mobility. Continence, mood, cognitive functions, and sarcopenia are evaluated. Assessment of frailty and activities of daily living (ADL) is also important. In addition to hearing and vision functions, the nutritional status, management of multimorbidity, the condition of the caregiver, and the living environment are evaluated. Finally, the assessment of social support networks and future expectations is also part of the comprehensive geriatric assessment process.

### 1. Evaluation of Balance and Mobility

Approximately one-third of individuals over 65 years old and half of those over 80 years old experience at least one falls each year. Falls result in fractures in about 5% of cases (Racey et al., 2021). Additionally, falls are a significant problem that can lead to other medical complications such as dehydration, pneumonia, urinary retention, and infections, which can further confine the elderly to bed. Falls can occur for various reasons, including vision impairment, neurological or vestibular diseases, postural hypotension, muscle mass reduction, joint diseases, and foot disorders. Elderly adults with dementia fall 2-3 times more frequently

than cognitively healthy elderly adults, and 60-80% of those with dementia fall each year (Lamb et al., 2005).

In the assessment of balance and mobility, falls within the last six months are inquired about. Those who answer affirmatively should undergo balance and mobility scales. If there is a history of a single fall in the last six months, a Timed Up and Go test is performed. If there are multiple falls, further assessment is conducted.

### ***Static Tests***

**\*Romberg Test:** The individual is asked to stand with feet together, eyes open for 30 seconds, then with eyes closed. Excessive swaying, loss of balance, or stepping during the test indicates a positive result (Campbell, 2013).

**\*Tandem Romberg Test:** This test is similar to the Romberg Test but with feet positioned in a straight line, making balance disorders more noticeable. The individual stands with one foot's toe touching the heel of the other foot, arms at the sides, for 60 seconds. The average score from four measurements is recorded (Campbell, 2013).

**\*Single Leg Stance Test:** This test measures balance and static standing ability. The individual is asked to stand on one leg for 30 seconds while the other leg is in slight flexion. The test is terminated if the foot touches the ground, there is excessive swaying, or the individual jumps. The test is conducted on both lower extremities, and the average of five measurements is taken. Values below 30 seconds indicate impaired balance, below 10 seconds indicate balance disorder, and below 5 seconds indicate a high risk of falling (Vellas et al., 1997).

### ***Dynamic Tests***

**\*Tinetti Balance and Gait Test:** This test assesses the risk of falls in the elderly. It includes 13 items for balance and 9 items for gait, each scored from 0-1-2. The total score (balance + gait) is 35 (Tinetti, 1986).

**\*Timed Up and Go Test:** This test evaluates mobility, gait, and balance. The participant is asked to rise from a chair, walk 3 meters, turn around, walk back, and sit down again without using the armrests. The time taken is measured. Completing the test in more than 12 seconds indicates a risk of falling (Tinetti, 1986).

**\*Berg Balance Test:** This test evaluates balance and determines the risk of falling through 14 directives, with performance scored from 0-4. A total score of 0-20 indicates balance disorder, 21-40 indicates acceptable balance, and 41-56 indicates good balance (Gleeson et al., 2014).

**\*Six-Minute Walk Test:** This test evaluates walking patterns and speed over a 10-meter linear path. The time between 2 and 8 meters is recorded. Walking slower than 0.8 m/s is associated with sarcopenia, hospital admission, mortality, and fall risk (Andrews et al., 2023).



**\*30-Second Chair Stand Test:** This test evaluates lower extremity muscle strength and dynamic balance by counting the number of sit-to-stand repetitions in 30 seconds. The patient sits in a chair with a seat height of 44 cm, arms crossed over the chest and is asked to stand up and sit down without using their hands. Less than 10 repetitions in 30 seconds indicates lower extremity muscle weakness (Wilkison and Harper, 2021).

### ***Performance-Based Tests***

**\*Four Square Step Test:** This test evaluates the ability to step forward, backward, and sideways, and the stability during these movements. The time to complete the sequence without touching the poles is recorded. The individual stands facing square 2, and steps in the sequence 2-3-4-1-4-3-2-1 as quickly as possible without touching the poles. Completion in more than 15 seconds indicates a fall risk (Işık et al., 2015).

**\*Functional Reach Test:** This test measures how far an individual can reach forward without stepping. It assesses dynamic balance and is performed with three trials, taking the average of the last two. The individual stands against a wall with one arm extended at shoulder height and reaches forward as far as possible without taking a step. The difference between the start and end positions of the 3rd metacarpal is measured. A reach distance below 15 cm indicates an increased risk of falling (Lin et al., 2012).

**\*Falls Efficacy Scale:** This scale evaluates the perception of balance, stability during daily activities, and fear of falling. It consists of 10 items scored from 1 to 10. A score above 70 indicates a fear of falling. This detailed assessment framework ensures a comprehensive evaluation of balance and mobility in elderly individuals, allowing for early identification of fall risks and implementation of appropriate preventive measures (Tinetti et al., 1990).

## **2. Evaluation of Mental Functions**

### ***Mini Mental State Examination (MMSE)***

The Mini-Mental State Examination (MMSE) is a standardized measure used to assess an individual's cognitive status. This test is widely used to detect cognitive impairments, monitor mental disorders, and identify changes in cognitive function, especially prevalent in the elderly population. The MMSE evaluates performance across various cognitive domains, including memory, attention, language, calculation skills, and spatial abilities. Administration of the Mini-Mental State Examination typically takes about 5 to 10 minutes. The MMSE is scored on a range of 30 points, with higher scores indicating better cognitive function. However, it is important to note that the MMSE alone is not sufficient for diagnosing dementia; additional tests and comprehensive evaluations are usually required. The Mini-Mental State Examination is used to measure cognitive impairment in older adults. It can be used to screen for cognitive impairment, estimate the severity of cognitive impairment at a specific point in time, track changes in cognitive function over time, and document a person's response to treatment. It assesses different subsets of cognitive status, such as attention, language, memory, orientation, and visuospatial competence. The MMSE is specific and takes about 10-15 minutes to administer. MMSE scores range from 0 to 30. Scores of 25 and above are

considered normal, scores below 10 indicate severe impairment, scores between 10 and 19 indicate moderate dementia, and scores between 19 and 24 suggest early-stage dementia.

### ***Montreal Cognitive Assessment (MoCA)***

The MoCA was developed as a quick screening test for mild cognitive impairment. The MoCA assesses various cognitive functions and is a popular screening tool used to determine the presence of cognitive impairment. It takes approximately ten minutes to complete and evaluates visuospatial abilities, attention, language, abstract reasoning, delayed recall, executive function, and orientation. The MoCA covers more domains than the MMSE and, as a result, has higher sensitivity and specificity. Cognitive assessments are quick, easy-to-use, and accurate methods to help diagnose, assess, and manage many cognitive disorders. The MoCA is useful in determining a patient's level of understanding and skill. The MoCA takes about 10 minutes to administer, and the highest possible score is 30, with scores of 21 and above considered normal.

### ***Clock Drawing Test***

This test quickly assesses visuospatial perception and skill levels. It is one of the tests impaired in the early stages of dementia. Its advantages include being quick and easy to administer with a high negative predictive value, while its disadvantages are subjective scoring and a high false-negative rate. The "clock drawing test" and the "three-item recall" method are quick and easy screening tests. If the patient can draw a complete clock and recall the three items stated, dementia is ruled out. These tests can be particularly useful in uneducated individuals and non-English speaking patients.

## **13.7 Therapeutic Approaches and Promotion of Healthy Ageing in Geriatric Individuals**

Appropriate physiotherapeutic approaches for healthy aging include methods such as gymnastics exercises, music-dance therapy, and cognitive exercises. When determining these approaches, a balance should be maintained between the elderly individual's current clinical condition and physical activity level. When assessing the clinical condition of the elderly, physical and mental health should be checked to ensure there are no diseases or disorders.

Social discrimination based on chronological or assumed age is common in social life and is more pronounced in active living, resulting in the aging process becoming more severe. Viewing signs of aging and increasing illnesses as normal aging indicates a passive approach and acceptance. The goal should be active aging rather than normal aging, which requires an active individual life, healthy eating habits, and changes in social and community policies. Social isolation, feelings of loneliness, depression, and loss of peers can lead to physical inactivity and sedentary living in the elderly. Besides physiological changes, inactivity and self-limitation in daily life activities can negatively affect physical health. Physical activity levels should also be assessed for healthy aging.



Exercise aims to increase muscle strength and flexibility, improve cardiovascular and respiratory system functions, meet daily energy and motivation needs, enable socialization, and improve mood. Therefore, elderly adults can spend their elderly periods healthier and happier. Healthy aging is possible with good physical and mental health. To maintain and improve physical health, increase mobility, and prevent inactivity, calisthenic exercise approaches and light stretching exercises are recommended. Submaximal aerobic and calisthenic exercises can improve physical fitness, cognitive performance, and quality of life. It is recommended to be performed under the supervision of a physiotherapist for an average of 45-50 minutes, three days a week for four months. Gymnastic exercises have been shown to provide significant improvements, especially in immediate memory and learning functions (Picture 1).

Physical exercise improves spatial learning in healthy individuals and has a protective effect against cognitive decline that comes with aging. Individuals with higher levels of physical fitness can use their cognitive abilities more flexibly to meet environmental demands. It has been stated that regular physical exercise can reverse declines in cognitive processes. The increase in brain-derived neurotrophic factor (BDNF) with physical exercise is thought to be one of the main reasons for its positive effect on the cognitive characteristics of the elderly. BDNF is an important protein that positively affects structural and functional plasticity in the central nervous system and is vital for cognitive performance and adaptations in brain morphology (Kara, 2001; Tollanen, 2015; Neeper, 1995; Birinci et al., 2019).

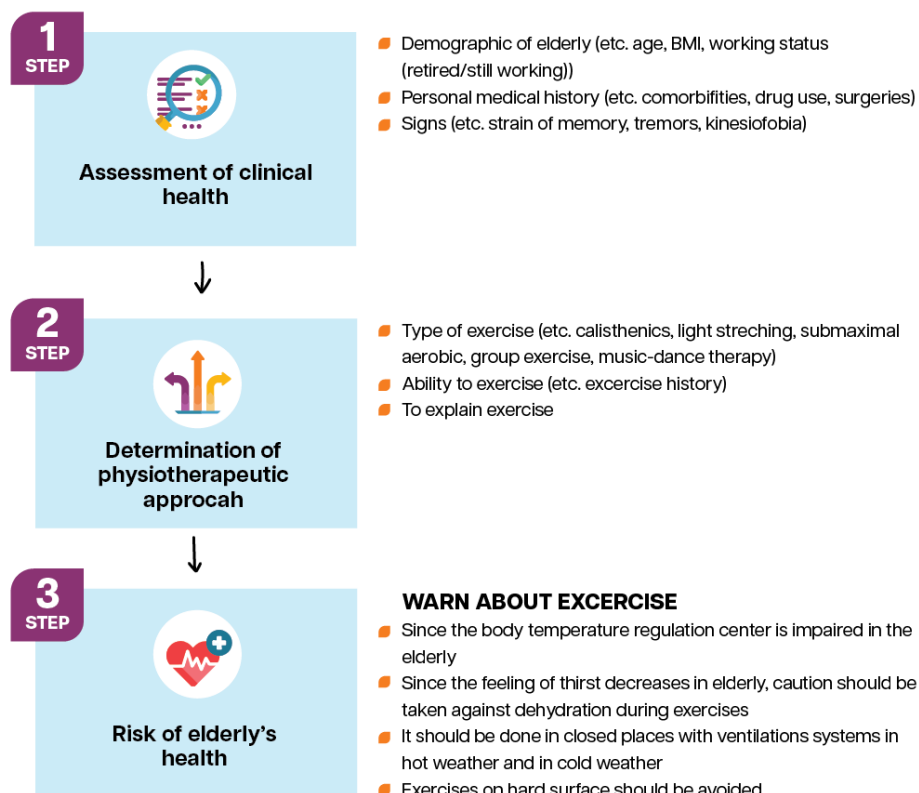


Figure 1 Considerations in physiotherapy and rehabilitation approaches in geriatric individuals.

*Figure 1:* Aging is a dynamic and irreversible physiological process occurring over time in the individual development of living organisms. Aging, a universal phenomenon from birth, according to most biologists, begins in the fourth decade of life and ends with death, the end of biological life. The human aging process is a complex and individual process occurring in biological, psychological, and social domains. Genetic code, along with external biological and psychosocial factors, is accepted as the fundamental etiological-pathological mechanism of aging. Biological factors include physical inactivity, improper nutrition, psychomotor load, acute and chronic medical conditions; psychosocial factors include environmental changes, isolation, loneliness, and lack of preparation for old age. Old age is defined as the final stage of the aging process resulting in death. Biologists and physicians define old age as the stage of life after maturity when there is a decline in body functions and various changes in systems and organs.

Old age can be considered from different perspectives: chronological (determined by age); biological (functional, determined by individual characteristics); legal (legal retirement age limit); economic (lack of activity, decrease in income); social (related to loss of prestige and social roles); psychological (determined by mental function studies). Changes in the functioning of individual organs with age affect mood, attitude towards the environment, physical condition, and social activity, determining the place of the elderly in the family and society. However, psychosocial aging largely depends on how a person prepares for old age and shows its effect over time. It is claimed that the quality of our previous life determines the kind of person we will be in old age. Mental aging expresses human consciousness and its adaptation to the aging process. Acceptance of old age contributes to the feeling of happiness and life satisfaction, while it lacks causes feelings of loneliness and physical pain. Adapting to new situations becomes more difficult as one ages, leading to negative changes in cognitive and intellectual areas (Pedich, 2007; Kocemba, 2007; Szarota, 2004).

The assumption of various roles by the elderly in the social aging process is important for the continuity of social relationships and societal participation. Social aging expresses how a person perceives the aging process and how this shapes their relationship with society. Every individual living in society has defined roles, and with aging, some roles disappear, change, or new roles emerge. This situation is important for elderly individuals to adapt to new roles and show active social participation. Loss of health can reduce life satisfaction, leading to a loss of interest and feelings of loneliness. Retirement often brings significant lifestyle changes, which can result in social isolation and impoverishment.

One of the most important forms of active aging is contact with family, relatives, and neighbours, which leads to a sense of usefulness and dignity. Elderly individuals are in a natural environment where they expect spiritual, physical, or material support from their families. Social aging expresses how an individual perceives the aging process and their relationship with the society they live in. Everyone enters this process with an individual vision of old age, which is shaped by various factors such as closely observing older people, existing stereotypes about old age, and expectations from past experiences.

Disorders in functional capacity led to a decrease in quality of life. Globally, functional limitations are observed at a rate of about 15%. Some studies have shown that disability leads to deterioration in cognitive functions, adversely affecting the quality of life. Additionally, disability can lead to social isolation, causing depression and further worsening the quality of life. Participation in social activities contributes to the maintenance of mental and physical health, leading to an increase in the quality of life. Disability has been particularly associated with advanced age, being frail or overweight, weakness, depression, lack of exercise, health problems, and comorbid conditions. It is more frequently observed in lower socioeconomic levels compared to higher socioeconomic communities. It is more common in women than men, particularly showing a marked increase in those over the age of 80. Disability negatively affects independent living and leads to deterioration in the quality of life (Zhang et al., 2022).

Supporting healthy aging requires a balanced approach encompassing physical, cognitive, and emotional well-being for geriatric individuals. Exercises aiming to improve balance and coordination include tai chi, yoga, and balance exercises. These activities help elderly individuals move safely by reducing the risk of falls. Additionally, strengthening exercises increase muscle strength, contributing to maintaining independence and overall mobility. Cognitive exercises include activities such as puzzles, memory games, and social interactions to maintain mental sharpness. Combining these elements provides a comprehensive approach to healthy aging. Signs such as persistent pain, excessive fatigue, or fainting during exercises indicate that the individual is exceeding their limits and require immediate consultation with a healthcare professional.

Optimal nutrition and physical activity play a crucial role in supporting healthy aging. Elderly individuals should be encouraged to follow a balanced and nutritionally rich diet regimen that includes various food items. Additionally, incorporating a variety of exercise methods such as aerobic exercises, resistance training, balance-enhancing exercises, and flexibility routines into their daily regimen is crucial. This comprehensive approach is effective in maintaining the physical and cognitive well-being of the elderly, reducing the onset and progression of various age-related health issues, and facilitating an active and happy lifestyle in the later years.

## 13.8 Exercise Approaches in Geriatric Individuals

### 1. Aerobic Exercises

At least 150-300 minutes of moderate-intensity aerobic physical activity or at least 75-150 minutes of vigorous-intensity aerobic physical activity or an equivalent combination of moderate-intensity and vigorous-intensity activity during the week is recommended for significant health benefits. Geriatric individuals should engage in at least 30 minutes of aerobic exercise (e.g. walking, swimming, water exercise and stationary cycling) most, if not every day.

## 2. Strength Exercises

For geriatric individuals, moderate or higher intensity muscle-strengthening activities involving all major muscle groups 2 or more days per week provide additional health benefits. Gradual increases in resistance are recommended in addition to strength training 2 to 3 days a week and a day of rest between training sessions. This helps geriatric individuals maintain bone and muscle strength. It is important to regularly increase the intensity (weight) of exercise to continue to strengthen muscles and bones.

## 3. Yoga

Yoga helps geriatric individuals to develop physically while maintaining body-mind integrity. In addition, thanks to yoga exercises performed in groups, communication with peers is provided. Chair yoga, restorative yoga and Hatha can be preferred for geriatric individuals. Yoga poses such as Mountain Pose, Butterfly Pose, Savasana, Cat-Cow Pose, Sphinx Pose, Legs on the Wall Pose, Child Pose are recommended. Geriatric individuals should be counselled and monitored during the exercises and progress in exercise. It is important to perform the exercises within the physical limits of the movement without causing any problems in the musculoskeletal system and without straining the functional level of the person.

## 4. Dance Therapy

Dance therapy may consist of dance-based movements including upper limb flexion, extension, forearm pronation and supination to music. In addition, rhythmic movements with arm swinging, stepping, lower limb movements and back and forth movements can be included to improve weight transfer and increase muscle strength around the knee, ankle, and hip. Warm-up and cool-down periods can be supplemented with stretching exercises and breathing exercises for the neck muscles, posterior-anterior shoulder capsule, trunk extensors, hamstring, and gastrocnemius muscles. Sessions lasting 45 minutes each are recommended to be performed at least once a week for at least six weeks. Research has shown that dance movement therapy improves parameters such as flexibility, muscle strength and endurance, balance, cardiovascular endurance, and cognitive function in elderly individuals (Picture 2-3).



*Figure 2 Dance Therapy*



*Figure 3 Dance Therapy*

## 5. Dual Task Training

Dual/task exercises can be performed in a healthy geriatric population. These exercises include activities that require the individual to perform two different tasks simultaneously. Such exercises can be used to cope with difficulties encountered during activities of daily living, maintain balance, reduce the risk of falls, and improve cognitive functions. Especially in older individuals, the simultaneous use of motor skills and cognitive functions is very important in daily life. Dual-task exercises may include activities such as talking while walking, maintaining balance while carrying an object, or performing more than one task at the same time (Pashler, 1994).

Individuals frequently encounter activities that require dual task performance in their daily lives. In situations requiring manual dexterity such as writing messages while walking, carrying plates while talking, taking notes while talking on the phone, taking money out of the wallet while calculating, cleaning while singing and cooking while chatting, motor function should be carried out simultaneously with an additional motor or cognitive function with minimal interaction. Due to the small number of functions involving a single motor task in daily life, it is necessary to evaluate the interaction between motor and cognitive function to accurately analyse the functional status in activities of daily living. When the literature is examined, it is seen that dual task method is used in studies investigating the interaction between motor and cognitive processes (O'Shea et al., 2002; Marchese et al., 2003).

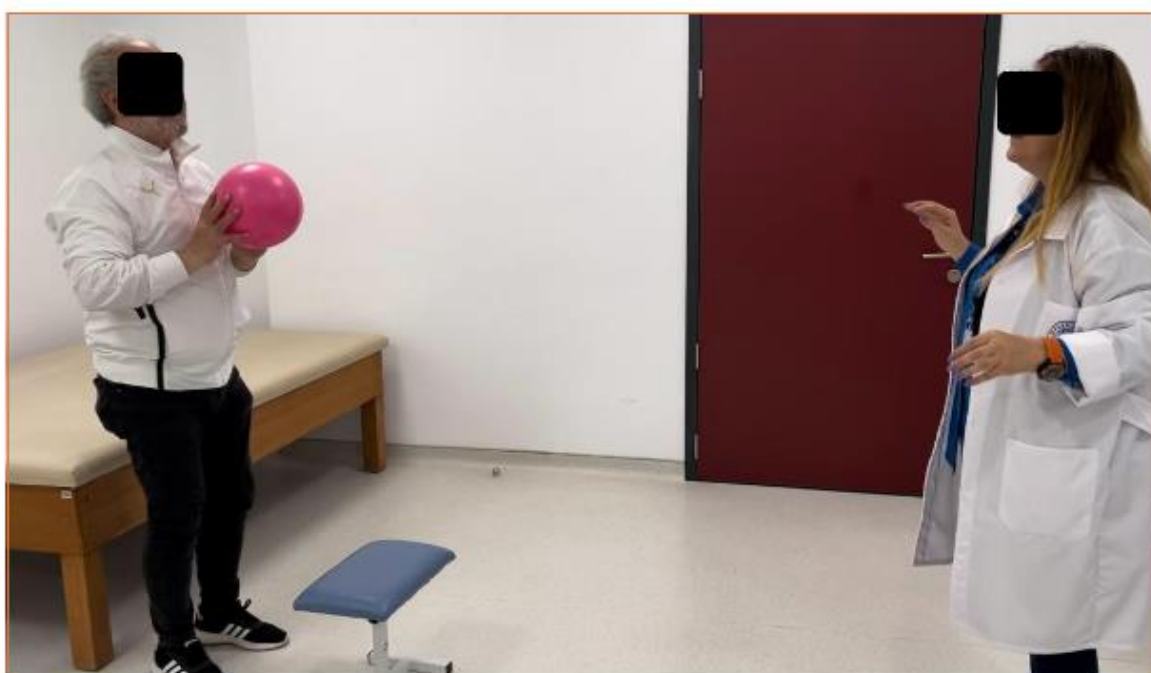
Dual task training is applied by combining the exercises given in single task training with cognitive tasks:

- Recalling a sequence of numbers given with standing (semi-tandem and tandem)
- Standing on one foot and writing predetermined letters or words with the other foot
- Saying a number that comes before a number between 1-100 given with walking by narrowing the level of support (e.g. saying the number 24 if the researcher says 25)
- Making a simple addition with side walking
- Counting from 1 to 100 in increments of one with backward walking
- Throwing and holding a ball with one foot on the step and the other on the ground (Picture 4-5)
- Counting backwards from 100 by decreasing by one with forward reaching
- Saying a number that comes after a number between 1-100 given with side reaching (Weightman and McCulloch, 2014).





*Figure 4 Dual Task Training*



*Figure 5 Dual Task Training*

## 13.9 Exercises in Geriatric Rehabilitation

### 1. Balance and Coordination Exercises

Using mirrors during exercises provides benefits in terms of improved postural control and visual feedback to neurocognitive processes. Emphasising bilateral execution of exercises is crucial for systematic training of both upper and lower limbs. Initial difficulties in exercise performance are normal. It is essential to persevere with the exercise routine, recognising that the body's adaptation processes take time and that even trying one movement can provide significant physiological benefits (Picture 6).



*Figure 6 Balance and Coordination Exercise*

### 2. Sit-to-Stand Exercise

This exercise involves transition from a sitting to a standing position and targets lower limb muscle strength, balance, and co-ordination. It is also a basic skill for activities of daily living. Sit to stand exercise provides functional benefits. The exercise is as follows: sit upright on a chair with feet shoulder-width apart. Move towards the front of the chair. In this position, the feet are pulled back, ensuring that the heels are behind the knees. Hands can be held at the sides. Special techniques and variations can be included in the programme to improve balance and coordination during the exercise. To make the exercise more challenging, the exercise can be intensified by crossing the arms over the chest and leaning slightly forward from the hips. Then, move to a standing position with equal weight on both feet. The ankles, knees and hips should be completely in line. Then return to the sitting position. Also, rotational movements should be avoided during the exercise. A higher chair can be used to facilitate this exercise (Figure 7-8).



*Figure 7 Sit to Stand Exercise*



*Figure 8 Sit to Stand Exercise*

### 3. Chair Squats

Chair squat/squat exercise can be used in neuro-geriatric individuals. Neurological diseases such as stroke, Parkinson's disease, or multiple sclerosis, as well as ageing, can cause difficulties with muscle control, balance, and co-ordination. Therefore, exercises such as chair squats should be modified to suit the individual's specific needs and physical condition.

Depending on the individual's physical fitness, it is important to initially start with a smaller number of controlled chair squats. During this exercise the individual should be supported and kept safe with a support aid, balance bar or supervised by a physiotherapist. If a full squat is not possible, a more limited range of movement can be used (Picture 9-10).



*Figure 9 Chair Squats*



*Figure 10 Chair Squats*

#### 4. Bridge Exercise

The bridge exercise is widely used in geriatric rehabilitation. In this exercise, the person lies on their back, lifts their hips off the bed and keeps their hips and knees bent while maintaining spinal alignment. The 'bridge' exercise encompasses a few benefits including strengthening core muscles, correcting posture, improving balance and coordination, and increasing core stabilisation. Neurological geriatric conditions often lead to physical limitations such as muscle weakness, imbalance, and coordination problems. Physiotherapists can create specific exercise programmes according to the individual needs of these patients and provide appropriate guidance.



*Figure 11 Bridge Exercise*

#### 5. Ipsilateral-contralateral ROM exercises with metronome

Such exercises can be applied to neurologically elderly individuals but should be customised taking into account the health status and individual needs of the individual. Since the use of a metronome facilitates movement in a certain rhythm and tempo, moving with a metronome in these exercises can increase the coordination of the individual and make the movements more regular. Whether the exercises are performed ipsilaterally or contralaterally depends on the individual's specific health status, goals and physical abilities. The physiotherapist creates an exercise programme suitable for the needs of the individual.

**Ipsilateral Exercises:** Ipsilateral exercises refer to exercises in which both sides of the body work at the same time. An example of this is when the right or left upper and lower extremities perform a certain movement at the same time.

**Contralateral Exercises:** In contralateral exercises, the movement of one side is coordinated with the movement of the other side. Completing a movement with the left leg while the right arm is moving is an example of contralateral exercises.





*Figure 12 Ipsilateral ROM exercises with metronome*



*Figure13 Contralateral ROM exercises with metronome*

## 6. Hip Marches

The 'Hip Walk' exercise is generally considered a fitness routine suitable for the healthy aging process. This exercise is designed to strengthen the hip and lower limb muscles, increase coordination, and improve balance. The typical steps involved in the Hip Walk exercise are as follows:

- Stand in an upright position with your feet shoulder-width apart.
- Lift each leg upwards in turn, making a hip flexion movement.
- Slowly lower the legs to return to the starting position.
- Repeat the same movement with the other leg.

The Hip Walk exercise is effective in increasing lower limb muscle strength. However, the physiotherapist should consider the general health status, mobility, and special needs of the individual when prescribing this exercise (Figure 14).



*Figure 14 Hip Marches*

## 7. Standing Hip Abductions

This exercise aims to strengthen the hip abductor muscles and improve balance at the same time. During the standing hip abductor exercise, the feet should be positioned in an upright posture, either together or hip-width apart. The hip abduction movement is initiated by lifting one leg to the side. Care should be taken to maintain the knee extension position and the lifted leg should be kept in a high position for a short time. Lower the legs slowly to return to the starting position. The same sequence is repeated with the opposite leg. Care should be taken to avoid bending the trunk to the side during the movement (Figure 15).



*Figure 15: Standing Hip Abduction*

## 8. Stretching Exercises

Stretching exercises are beneficial for the geriatric population in terms of physical health and general well-being. Flexibility exercises give muscles and joints a greater range of movement, increase mobility, reduce muscle tension, relieve muscle pain, improve oxygenation of muscles by increasing blood circulation, support posture, prevent injuries and strengthen the connection between mind and body. By incorporating flexibility exercises into the daily routine, overall body health and well-being can be improved. Stretching exercises for the lumbar extensors, hamstrings, hip flexors and pectorals can be included in the programme (Figure 16-17).



*Figure 16: Stretching Exercise*



*Figure 17 Stretching Exercise*

## 9. Cognitive Exercises

As an example of cognitive exercises, Pegboard Box Exercise is widely used to improve cognitive functions in geriatric individuals. It is used to observe mental changes and cognitive performance in elderly individuals and aims to improve cognitive skills. The Box and Block Test is useful in the geriatric population as it assesses visual-motor coordination, planning, spatial perception and problem-solving abilities. For this exercise, coloured blocks and a box are usually used. The blocks can be of different colours and can be arranged in various ways. The individual's aim is to place the blocks in the box to create a specific pattern or arrangement. The pattern is usually provided through a model or picture and the older person is expected to arrange the blocks to fit this pattern (Figure 18).



*Figure 18 Cognitive Exercise*

### Conclusion:

Physiotherapists design individualized exercises that enhance muscle mass and strength and provide flexibility for maintaining and improving the health of elderly individuals. Flexibility exercises optimize performance in daily activities by increasing joint range of motion and muscle flexibility. Balance and coordination exercises reduce the risk of falls and support safe movement. Rehabilitation programs aim to preserve and enhance the independence of elderly individuals and include functional movement analyses and improvement strategies that increase overall quality of life.

In treating musculoskeletal issues, physiotherapists apply exercise-based interventions for conditions such as osteoarthritis and use manual therapy and therapeutic exercises to

maintain joint health. Additionally, approaches such as group therapies provide social support and motivation, positively impacting individuals' psychosocial well-being.

Physiotherapists play a critical role in protecting and improving the health of older people through science-based approaches. These interventions are implemented through personalised treatment plans according to the specific needs of each individual. As a result, these holistic and individualised approaches make significant contributions to improving the quality of life of older people and promoting healthy ageing.



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