

Hydrotherapy for Fall Prevention In Elderly Individuals

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Abstract

Falls and fall-related injuries of elderly individuals are an important health problem that threatens their lives. Particularly, regressions related to aging in postural control and challenging dual tasks cause falls. It has been reported that physical training and exercises related to balance are effective in reducing falls in elderly individuals. However, there are inherent difficulties for the elderly in making these exercises effective. Especially as the number of chronic diseases increases, this difficulty increases even more. For this reason, it is important to create alternative methods for performing exercises that increase balance in a more effective and safe environment. As one of these alternatives, hydrotherapy can play a fall-preventing role for elderly individuals with the properties of water that support the balance. With the reduction of the fear of falling in water, the motivation of elderly individuals to exercise may increase. They may also feel more confident when performing balance, motor, and cognitive tasks. With hydrotherapy; It is also possible to provide biomechanical and psychological well-being by making use of the buoyancy, resistance and temperature properties of water. Hydrotherapy and balance training protocols tailored to the individual needs of the elderly population are seen as an effective approach in preventing falls.

Key Words: *Hydrotherapy, Elderly Individuals, Fall Prevention.*

Introduction

The rapid increase in the elderly population all over the world and in our country has made it important to plan and implement health measures related to the elderly population (1). It is expected that the world's elderly population will cover approximately 17% of the total population by 2050 (2). In our country, according to the data of TÜİK for 2021, the elderly population exceeded 8 million and reached 9.7% of the total population. It is estimated that this increase will increase to 11.0% in 2025 and to 16.3% in 2040, increasing in our country as well as in the rest of the world (3).

Aging; it is a period in which changes that continue from birth to death are experienced (4). It refers to a physical, psychological and social multidimensional process that includes changes in physical shape and physiological function of tissues and organs, changes in perception, learning, problem solving, personality traits, as well as changes in function and behavior in social life (4). Biological changes seen with aging increase the susceptibility to fall directly or with different factors (5, 6).

The inclusion of changes in cognitive and sensory areas that cause balance disorders in the natural aging process causes relapses (7). In addition, the probability of recurrent falls doubles after the first fall, which would qualify such an elderly individual as a high-risk patient (8). It is known that falls occur due to many factors. Impairment of postural control is an important factor that can lead to falls and fall-related injuries. Postural control is the ability to maintain balance and spatial orientation in standing upright with the inhibition of gravitational forces. Postural control is necessary to maintain daily activities such as walking and balance (9). Finding effective ways to prevent falls in the elderly population can reduce disability from falls and fall-related injuries. It can also increase the life expectancy of these individuals.

Cause of Falls In The Elderly Individuals

Definition of Falls

Falling is defined as the inactivity of the individual below the level he/she is at for different reasons (10). The World Health Organization defines a fall as “an individual lying on the ground or at a level lower than his/her own level due to carelessness or accident” (11). Falls, which increase with age, are an important condition that causes high mortality and morbidity in the elderly (12, 13). Problems such as decrease in visual perception level, difficulty in fixed posture, immobilization, orthostatic hypotension, weakness in the lower extremities, and dizziness that occur with aging increase the risk of falling (13).

Falling in elderly individuals; It occurs due to intrinsic (self-induced) and extrinsic (environmental) reasons (12,13). Intrinsically caused falls; It generally occurs due to age-related physiological changes, cognitive disorders, gait, strength and balance disorders, sensory disorders, acute and chronic diseases, preferences and behaviors of the individual (12,13). Extrinsic-caused falls are; It occurs due to reasons such as the use of multiple drugs, the wrong choice of shoes, the use of walking aids, and the wrong design of the furniture in the house. Extrinsic falls mostly occur when the elderly walk or change position. Minimizing the factors that cause falls is important in terms of preventing falls. Elderly individuals often think that falls are inevitable with aging, and they underestimate their personal risks or they are not aware of it (10,13).

Postural Control Changes

For the human body, the trunk and upper extremities constitute more than half of its mass (14). This is a challenging task for most individuals, especially elderly individuals, for the control of balance. About 33% of older adults fall, which causes moderate to severe injuries (8, 15). Therefore, falls have become an important public health problem (16). Postural control is a complex skill maintained by multiple sensorimotor systems (14, 17). Factors responsible for postural control include higher central processing, control of dynamics, spatial orientation, biomechanical factors, sensory and movement strategies (17). This complex mechanism that provides postural control tends to decrease with aging, and this decrease causes an increase in the prevalence of falls in the elderly population (16, 17).

The natural course of aging adversely affects balance performance in dynamic and static postural control, and causes accidents related to falls and changes neuromuscular and sensorimotor systems (18). These changes cause deterioration of the postural control of the elderly individual. Disturbance in the postural control system or exposure to a perturbation results in impaired standing upright balance and subsequent fall (1).

Regression in the sensorimotor system in the elderly; it may be a result of muscle weakness, loss of sensation, and cognitive dysfunction (18). These deficiencies are directly related to immobilization and negatively affect stair climbing, walking and activities of daily living (19). Proprioception is an important aspect of postural control and balance, especially in the elderly population. Since proprioception decreases in the elderly, it makes it more prone to loss of balance and falls (20). One of the main problems in the elderly is the difficulty in controlling the timing of muscle contraction during multiple joint movements. This is related to age-related decreases in proprioceptive feedback and paves the way for physical inactivity (20).

Balance and Dual Task Changes:

Balance deficits are the most common risk factor contributing to falls in the elderly (8). Elderly people are 5.4 times more likely to fall while performing poor balance and cognitive functions (8, 17). They also experience falls when performing two activities at the same time. dual mission; It involves performing one task (postural control task) while completing a second task (cognitive or motor task) at the same time (8). Some individuals in the geriatric population have limited cognitive function abilities due to neurological deficiencies. Therefore, the existing cognitive function network may be insufficient to control posture (17). The high number of falls due to dual-task activities has led to an increase in research on this subject (7). It has been reported that especially verbal tasks cause more loss of postural control and falls (21).

Balance Training And Hydrotherapy In Fall Prevention

Balance Training

Balance control and education in the elderly are necessary to maintain basic daily living activities (17, 22). Static and dynamic balance training can improve postural control and reduce the risk of falls for the geriatric population (23). Balance training on fall prevention aims to improve postural control by opposing the alignment of the individual's body center of gravity with respect to the support surface (24). The dose-response relationship is important in a balance training. Multiple balance training protocols can be 91-120 minutes of balance training per week, with a training period of 6-12 weeks, frequency of three sessions per week, 31-45 minutes in a single session, 36-40 training sessions in total. This training is an exemplary protocol recommended for improving balance (18).

Hydrotherapy

While most land-based exercises are effective, they have their own inherent complications and physical challenges that hinder successful training for older individuals. This increases the need for alternative forms of balance training for the elderly in a safe and efficient way.

For older individuals, there are risk factors leading to falls such as age, previous fall history, lower extremity weakness, environmental conditions, proprioceptive deficits, and fear of falling. Safe physical activity is recommended to reduce these risk factors (25). Fall prevention exercise programs have been created and implemented for elderly individuals. However, these land-based exercises can be difficult for the elderly due to joint pain and muscle weakness (26). Hydrotherapy is the use of various exercises while the body is in water (25). Hydrotherapy is frequently used in therapeutic areas for injury rehabilitation, improving muscle strength, maintaining balance and cardiovascular compliance (25).

Water's properties such as buoyancy, resistance, and temperature, when combined with physical exercise, can help alleviate many of the physiological problems of natural aging and promote

physical activity (27). The aquatic environment is considered safe and efficient for the rehabilitation of the elderly. Water also provides a supportive, low-risk exercise environment that can reduce the likelihood of acute injury and fear of falling, while improving participation and compliance with the rehabilitation program (27, 28). Less feeling of weight with the buoyancy of the water provides less painful and softer movements caused by the temperature of the water. Thus, it can help reduce many fall risk factors (19). Weightless physical activity through hydrotherapy has been shown to improve motor tasks and cognitive processes while in a safe environment for the elderly (29). In addition, exercises performed in water prevent falls and reduce the fear of falling, while creating a safe environment for balance training (30).

In-water exercise program for elderly individuals provides a motivation-enhancing environment. Motivation contributes to the development of psychosocial aspects by increasing the adaptation of the individual. In addition, a more positive attitude was observed in the participants after the exercise program (31).

There is limited literature on the efficacy of hydrotherapy with regard to dual-task. However, it has been reported that more improvement is achieved in balance tests, postural control and weight-bearing exercises when performing single-task activities in water (32).

Conclusion:

As individuals age, postural stability decreases due to many factors that complicate rehabilitation and exercise. For healthcare professionals, for clinical practice purposes, hydrotherapy is a safe, effective form of rehabilitation and exercise for the elderly. Hydrotherapy programs are appropriate exercises to reduce the number of falls and instill confidence in patients. It can provide a safe environment for the elderly to improve their balance and coordination. Therefore, hydrotherapy is a possible method that can be recommended to increase balance and prevent falls in the elderly.

Especially in our country, it can be applied in limited environments due to the lack of clinics and facilities for hydrotherapy. Considering the benefits of in-water exercises, especially for the elderly population, it is important that the use of hydrotherapy becomes widespread. Hydrotherapy offers a successful alternative balance training method in preventing falls and fall-related injuries in elderly individuals.

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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