

# Physical therapy in the prevention of disability in the elderly



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## Abstract

**Introduction:** Societal aging is a widespread phenomenon. Irreversible metabolic changes in old age lead to impaired functional status and often to complete disability.

**Aim:** The aim of the paper is to assess physical therapy and rehabilitation in the elderly.

**Material and Method:** The study assessed a group of 132 patients aged 67 to 83 years, undergoing a three-week outpatient treatment program due to spinal and peripheral joint pain syndromes that hindered their functioning and their ability to perform the activities of daily living. The patients were assessed before and after treatment using the Get Up & Go Test, the Activities of Daily Living scale, the Instrumental Activities of Daily Living scale and the Laitinen pain severity scale.

**Results:** The three-week physical therapy and rehabilitation program conducted in study patients had a very beneficial effect on their condition in all the tests and assessments used in the study.

**Conclusion:** Appropriate physical therapy has a positive influence on the functioning in the elderly in terms of the activities of daily living.

**Keywords:** Old Age; Disability; Physiotherapy

**Abbreviations:** WHO: World Health Organization, ADL: Activity of Daily Living, IADL: Instrumental Activities of Daily Living

## Introduction

Societal aging is a widespread phenomenon. People live longer, with the average lifespan of an individual increasing by almost half over the past century. The proportion of aging and elderly people in the population has been increasing, contributing to a growing interest in the oldest generation, whose economic, health, social and psychological needs have to be met. According to the World Health Organization (WHO), the overall worldwide number of old individuals is approximately 1 billion, constituting approximately 30% of the world's population. The data gathered by Statistics Poland show that the proportion of individuals over the age of 65 years in Poland was 13.6% in 2008 and is predicted to reach 24% in 2030.

Research conducted in Poland in 2002 revealed that approximately 2.2 million people over the age of 65 years required a carer to help them with at least one activity of daily living (ADL). This may result from insufficient geriatric care and limited access to physical therapy and rehabilitation for the elderly. The importance of access to geriatric consultations in the

elderly is compared to the importance of access to pediatric care in children.

More than 50% of people over the age of 75 years have frailty syndrome, with symptoms including weakness and loss of muscle mass and strength, which quickly leads to complete disability [1-6].

Interventions introduced in the elderly should be aimed at maintaining the best functional status possible, which will lead to independence, self-reliance and self-sufficiency [7-12]. Aging is a "natural, irreversible and intensifying process of changes in the metabolism and physicochemical properties of cells, leading to impaired autoregulation of the regeneration of the body and to morphological and functional changes of its tissues and organs." Old age is "the inevitable result of aging, in which biological, mental and social processes start to interact synergistically, leading to a biological and mental imbalance that cannot be prevented, meaning this is the final period of the aging process."

**Aspects of aging**

**Biological aspect:**

- Changes in the functioning of senses,
- Changes in appearance,
- Impaired function of individual organs and systems of the body.

**Various disorders:**

- Diseases that develop at an earlier age but worsen in old age,
- Diseases developing in old age but not directly related to aging,
- Pathological processes caused by aging.

The mental aspect depends mainly on how the individual reacts to the consequences of aging, how prepared they are for old age and what place in their community they are planning to take once they retire. The social aspect is mainly related to the role the individual is going to perform once they retire. These roles constantly change throughout our lives along with changing levels of activity and physical fitness.

**Aim**

The aim of this paper is to assess physical therapy and rehabilitation in elderly patients in terms of disability prevention.

**Material And Methods**

The study assessed a group of 132 patients aged 67 to 83 years (mean age: 75 years), including 47 men and 85 women, who underwent a three-week outpatient treatment program. The physical therapy and rehabilitation used in study patients included the following: cryotherapy, iontophoresis, ultrasound therapy, diadynamic currents, pulsed low-frequency magnetic field therapy, laser therapy, massage, and kinesiotherapy, including

exercise on an ergometer or treadmill. Study patients complained mostly of problems caused by degenerative disease of the spine and peripheral joints with comorbid pain syndromes that affected their functioning and their ability to perform everyday activities. The physical therapy and rehabilitation was adjusted to the condition of the patients. The ability to function independently was assessed before and after treatment using the following tests:

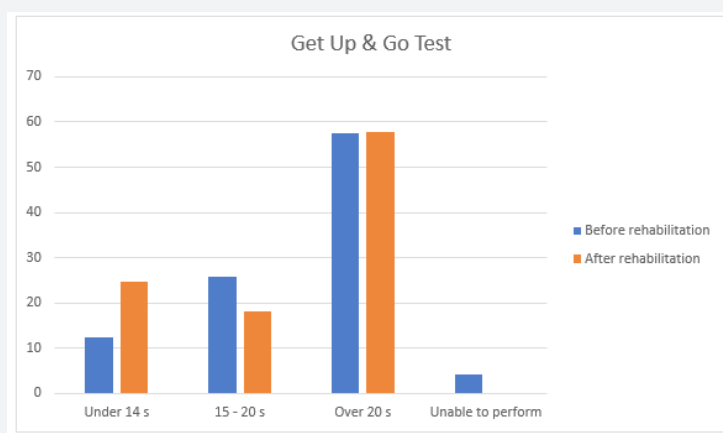
- The Get Up & Go Test, where the patient performs the following sequence of movements: getting up from a chair, walking a distance of 3 meters, making a 180-degree turn, walking back to the chair and assuming the baseline position.
- The Activities of Daily Living (ADL) scale assesses the ability to independently perform activities of daily living, such as dressing, personal hygiene, toileting, continence, feeding, getting up and sitting down.
- The Instrumental Activities of Daily Living (IADL) scale (Lawton scale) assesses the following parameters: ability to use the telephone, housekeeping, doing laundry, shopping, using transportation.
- The Laitinen pain severity scale.

**Results**

The three-week physical therapy and rehabilitation program used in study patients had a very beneficial effect on their condition. The therapy had a very positive effect on the musculoskeletal system, with 86% of study patients experiencing pain reduction or elimination (in the Laitinen scale).

**Results of the Get Up & Go Test**

A result of under 14 seconds was reported for 12.4% of patients before treatment and for 24.6% of patients after treatment. A result of under 20 seconds was reported for 25.7% of patients before treatment and for 18% after treatment. A result of more than 20 seconds was seen in 57.7% of patients both before and after treatment (Figure 1).



**Figure 1:** Vignettes

**Results according to the Activities of Daily Living (ADL) scale**

**Activity assessed: bathing** (Figure 2)

Before treatment 57% of study patients required considerable help with bathing, 33% needed little help and 10% were able to bathe without help.

After treatment 29% of study patients required considerable help with bathing, 50% needed little help and 21% were able to bathe without help.

**Activity Assessed: Dressing** (Figure 3)

Before treatment 37% of study patients were unable to dress independently, 50% needed partial help and 13% dressed without help. After treatment 13% of study patients required considerable help, 27% needed partial help and 60% dressed without help.

**Activity Assessed: Toileting** (Figure 4)

Before treatment 7% of study patients were unable to use the toilet without help, 47% needed partial help and 46% were independent. After treatment only 3% of study patients were unable to use the toilet without help, 37% needed partial help and

60% were independent.

**Activity Assessed: Continence** (Figure 5)

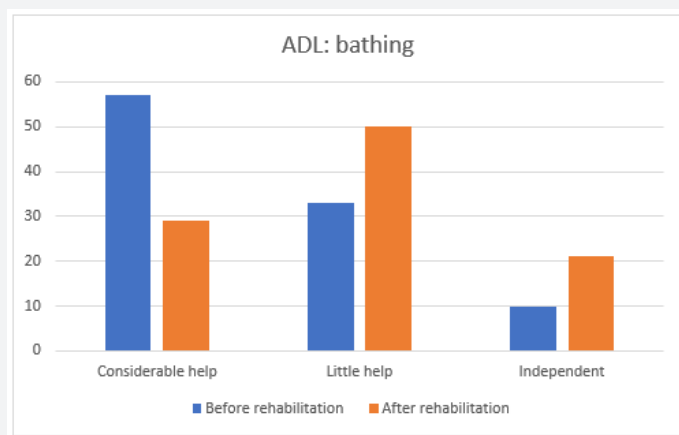
Before treatment 57% of study patients showed partial incontinence, 33% showed complete continence and 10% showed complete incontinence. After treatment 43% of study patients showed partial incontinence, 47% showed complete urinary continence and 5% showed complete incontinence.

**Activity Assessed: Feeding** (Figure 6)

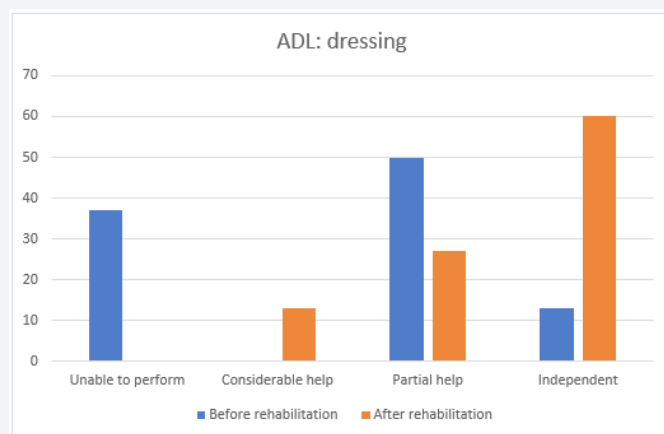
Before treatment 4% of study patients needed to be fed by another person, 84% needed partial help and 12% were independent. After treatment no patients were dependent on their carer, 62% needed partial help and 38% were independent.

**Activity Assessed: Transferring** (Figure 7)

Before treatment 14% of study patients were bedridden, 34% needed help with assuming a lying position and getting up from bed and 52% were independent. After treatment no patients were bedridden, 12% needed partial help and 88% were independent.



**Figure 2:** Results according to the ADL scale: bathing.



**Figure 3:** Results according to the ADL scale: dressing.

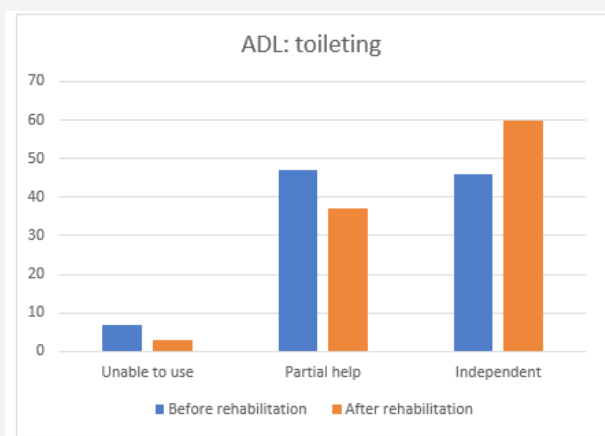


Figure 4: Results according to the ADL scale: toileting.

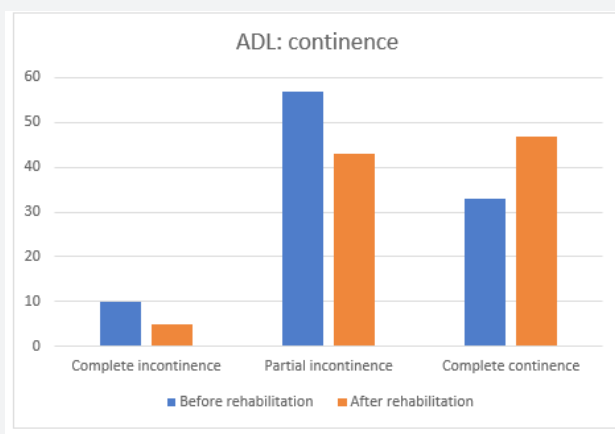


Figure 5: Results according to the ADL scale: continence.

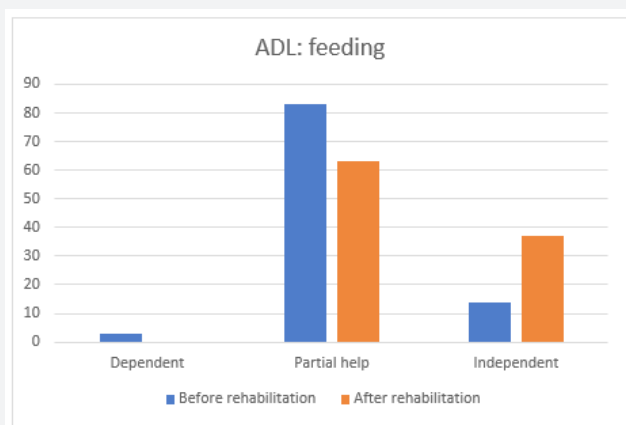


Figure 6: Results according to the ADL scale: feeding.

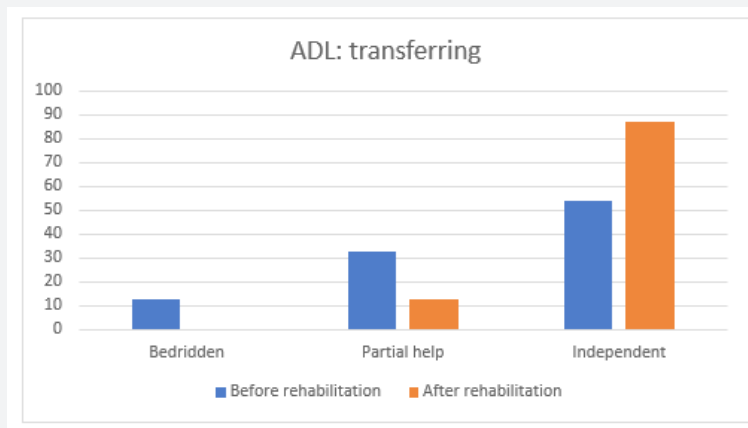


Figure 7: Results according to the ADL scale: transferring.

### Results according to the Instrumental Activities of Daily Living (IADL) scale

- The results were markedly improved after treatment. Improvements were seen in such activities as
  - Doing laundry (23.3%),
  - Using the telephone (12%),
  - shopping (3.9%),
  - Preparing food (3.8%).
- Study patients did not show complete improvements with respect to the following activities: housekeeping, using transportation, handling medication, handling finances.
- The test measures very complex activities, which is why treatment duration was too short to notice improvements in the quality of those activities.

### Discussion

An increase in human lifespan and societal aging are ongoing and pose a significant challenge for healthcare systems. One in six people in Poland is over the age of 60 years and this number is predicted to increase by another 8.7% by 2020. Involution changes occur in the human body over the years, including limitations in the functional status and the ability to perform many activities of daily living and self-care activities. The elderly show deteriorated cognitive and motor function, reduced motor coordination and a lower level of overall fitness. They exercise less and prefer a sedentary lifestyle. The skeletal muscles become weaker during the process of aging and muscle strength is reduced. Loss of muscle mass and strength mainly in the lower limbs and the trunk as well as a reduced ability to achieve normal muscle tone are some of the most important risk factors for posture instability and

falls. The strength of isometric muscle contractions in people over the age of 60 years is reduced by half [13-15].

With age patients show a reduced range of motion in the joints and increased lower limb stiffness, which contributes to the loss of muscle strength. The increased bone mass remodeling seen in the elderly shows mostly resorption, contributes to loss of structural skeletal stability and may lead to an increased risk of fractures. Connective tissue changes include loss of water as well as loss of the resilience and flexibility of tendons, ligaments, and muscles, which leads to slower movements and the development of coordination and balance abnormalities [14,15]. Aging is associated with degenerative changes throughout the body. The functional limitations worsen with the development of comorbidities.

Reasons motivating the elderly to take up rehabilitation are closely related to functional status deterioration, balance and gait impairment, reduced muscle strength and loss of independence. Self-assessment of one's health and the will to improve one's functional status are the main motivating factors that help achieve this goal. The level of activity and physical fitness and the functional status in the elderly are increasingly often studied in the literature [16,17]. Rehabilitation in the elderly is associated with various limitations. When planning a rehabilitation program for this age group, one needs to consider the risk factors related to age and comorbidities [17-20].

The rehabilitation program should be individually adjusted to each patient, and its duration should depend on the functional status of the patient and their condition. Comprehensive physical therapy and rehabilitation conducted over a period of three weeks resulted in a remarkable improvement in the condition of study patients. Pain was eliminated in 87% of study patients. The results of the Get Up & Go Test were very positive. Remarkable

improvements were seen in the ability to function, including the ability to bathe, dress, prepare food and perform other activities of daily living independently. Complete independence was reported in 88% of study patients after treatment. Therapeutic rehabilitation should be an inherent part of medical care in the elderly. Regular active participation in physical therapy and rehabilitation programs helps elderly patients maintain the best possible fitness and functional status for as long as possible.

## Conclusion

1. Appropriate physical therapy has a positive influence on the functioning in the elderly in terms of the activities of daily living.
2. Physiotherapy procedures have the highest influence on improvements in functional status and the ability to remain independent and self-reliant.

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