



## Physiotherapeutic resources used in the prevention of falls in the elderly

### Recursos fisioterapêuticos utilizados na prevenção de quedas em idosos

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#### ABSTRACT

Introduction: The aging process undergoes important physiological changes such as decreased muscle strength, loss of balance, cognitive and functional deficit, which directly affect locomotion, making the elderly person a pre-disposition to falls. Objective: This study aims to use physical therapy resources used to prevent falls in the elderly. Materials and Methods: This is a literature review. Studies published between 2016 and 2021 were chosen. The following databases were



searched: Latin American and Caribbean Literature in Health Sciences (LILACS) via the Virtual Health Library (VHL); Scientific Electronic Library Online (SciELO); Science direct; Cochrane Brazil; Physiotherapy Evidence Database (PEDro) and Pubmed. Results: 455 titles and abstracts were found using the keywords. Therefore, 443 were excluded for fleeing from the theme and design of the study. Twelve studies were selected to be read in full, of these 5 articles were later excluded. Final considerations: Physical therapy is considered essential to prevent falls in the elderly, which includes diversified exercises focused on improving the musculature both on the ground, as well as making the elderly individual better adapted to the environment in which they live and with greater autonomy, and in the aquatic environment, acting to minimize the reduction in functional capacity.

**Keywords:** Elderly, Aging, falls, psysiotherapeutic resources.

## 1 INTRODUCTION

According to the World Health Organization (WHO), in recent years there has been a considerable increase in the population over the age of 60. According to projections, this trend will continue over the coming years, and in forecasting it is possible to admit that in the year 2025 there will be more than 800 million people over the age of 65 years worldwide. (FERRETI, LUNARDI, BRUSCHI,2013).

During the aging process the body undergoes important physiological changes such as decreased muscle strength, loss of balance, cognitive and functional deficits, which directly affect locomotion causing the elderly to have a predisposition to falls (MOREIRA, FERREIRA, SOUZA,2016). In addition to the changes resulting from aging, in this population is seen a high incidence of chronic degenerative diseases such as arthrosis, arthritis and osteoporosis, which leads to damage to health, loss of functionality and fragility in the elderly. Some studies have evidenced that 70% of fall accidents occur in domestic environments.(IBGE,2019).

According to the Ministry of Health, about 28% to 31% of the elderly over 65 years of age suffer falls, and this proportion is increasing every year, reaching 32% to 42%. The increased risk of falls ends up increasing the level of frailty, therefore, 30% to 50% of the elderly suffer falls each year, and 40% of them suffer recurrence of falls due to physical changes that lead to changes in balance, decreased visual and auditory acuity, muscle and bone weakening and also by the decreased production of calcium. (MINISTRY OF HEALTH, 2010).

Physiotherapy plays an important role in preventing falls in the elderly, as it involves a range of activities in which the elderly can adapt their activities of daily living. It is extremely important to evaluate the daily living environment and to check the risks in the home environment.



Thus, this study aims to describe the role of the physical therapist in preventing falls in the elderly and discuss therapy programs to minimize these risks in the home environment to improve the health and quality of life of the elderly.

## **2 METHODOLOGY**

This is a literature review of the physiotherapeutic resources used to prevent falls in the elderly. Initially, a search was conducted in the platform of Descriptors in Health Sciences, the following descriptors were used: elderly, aging, falls, physical therapy, physical therapy resources. The search was conducted in the following databases: Latin American and Caribbean Literature on Health Sciences (LILACS) via Virtual Health Library (VHL); Scientific Electronic Library Online (SciELO); Scienc direct; Cochrane Brazil; Phyiotherapy Evidence Database (PEDro) and Pubmed.

Studies published between 2016 and 2021 in Portuguese, Spanish, and English were selected. Included in the search were randomized clinical trials, controlled trials, before-and-after experimental studies, case studies, and case series studies that presented consistency on the topic addressed. Studies that used other alternative therapies, monographs, theses, and articles not indexed in journals were excluded. The PEDro scale was used, which is a scale that assesses the methodological quality of studies, specific to studies that investigate the effectiveness of interventions, and with this determine a rating. This score can range from 0 to 10 points (SHIWA, 2011).

## **3 RESULTS**

A total of 455 titles and abstracts were found using the key words. Therefore, 443 were excluded because they ran away from the theme and the study design. Twelve studies were selected to be read in full, of these 5 articles were later excluded.

Figure 1: Flow chart of the study

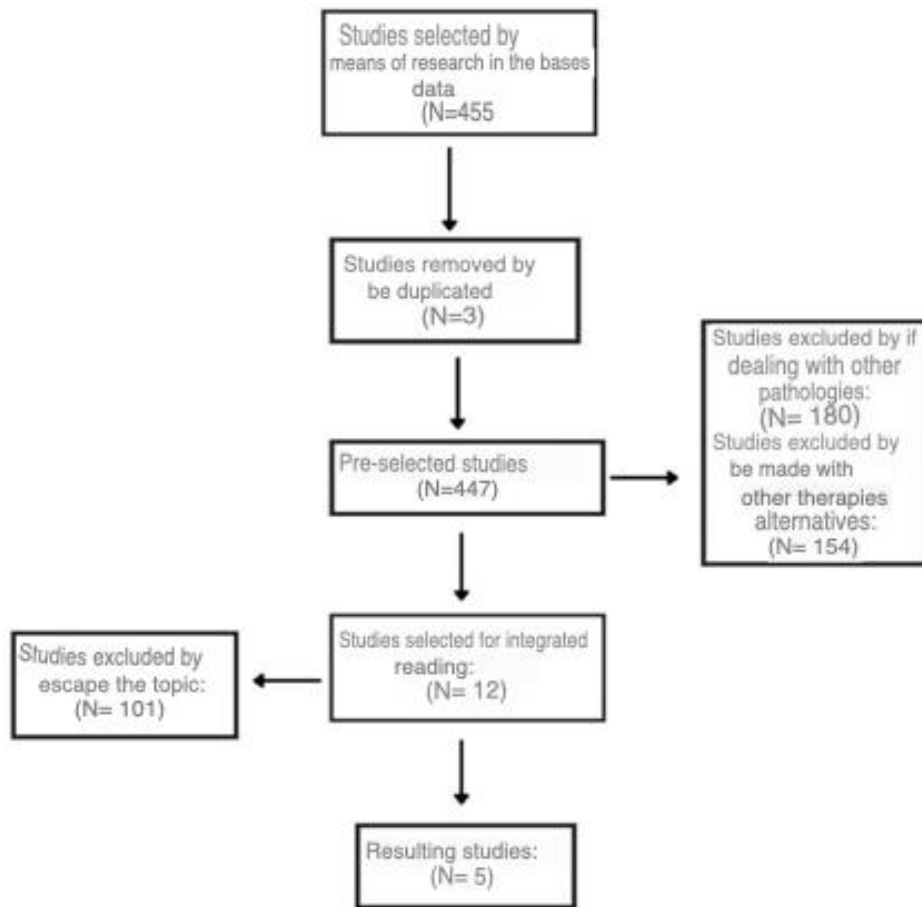


Table 1 shows the main findings of these studies. The general characteristics of the study are observed, including the description of the interventions adopted.

Table 1: Flow chart of the study

AUTHOR/DATE	TYPE OF STUDY	SAMPLE	OUTCOMES	INTERVENTION	RESULTS
Tomikiet al, 2016	Randomized Clinical Trial	30 seniors institutionalized	Timed Up and Go Test (TUGT) and Berg Balance Scale (BBS), to assess dynamic balance and risk of falls.	Group 2: Control Group	Only Group 1 had improved balance, decreasing the risk of falls.
Campos et al, 2021	Randomized Clinical Trial	The final sample consisted of 49 elderly people.	Timed Up and Go, Test (TUGT) and Berg Balance Scale Borg Modified Effort Perception Scale (BORG-CR 10)	Group1 : Aquatic Physical Exercise (GEFA) performed the exercise protocol  Group 2: multi-component duration: 16 weeks	Only group 1 showed better gains in the memory domain risk of falling.

				The group received only monthly calls for general health monitoring.	
Araújo et al, 2021	Randomized controlled clinical trial	Fourteen elderly women participated in the study.	Test (TUGT) and the Berg Balance Test and Scale of Balance scale were evaluated using the Tinetti scale, the risk of falls using the TUG test, and quality of life using the SF-36 questionnaire.	Group 1: Pilates, with a program of exercises and an orientation booklet about the risk of falling, for three months, with the exercises performed three times a week.  Group 2: Control, where only the booklet was distributed	Only in group 1 was there a significant improvement in the balance of the elderly women submitted to Pilates.
Cezar et al, 2021	Randomized controlled clinical trial	40 elderly people	Timed Up and Go Berg Balance Scale and functionality (Direct Assessment of Functional Status and Activities of Daily Living Questionnaire-ADL-Q).	Group 1 performed exercises focused on functionality, muscle strength, balance, aerobic endurance, and motor and cognitive dual tasking at home for 16 weeks, three times a week.  The CG did not perform any intervention.	Only group 1 improved performance between times by and showed a reduction in the risk of falls and the severity of functional impairment.
Ferreira et al, 2021	Randomized controlled clinical trial	52 institutionalized elderly	Timed and Go (TUG) simple and associated with dual task; and postural stability through stabilometric data obtained by the force platform. Modified Borg Rating Scale (BORG-CR 10) (0 to 10 points).  Modified Borg Perceived Exertion Scale Muscle strength was assessed with the 5-fold sit-up test.	Group 1 Aquatic Training performed the aquatic training that lasted for 16 weeks.  Group 2: Control	Only group 1 had a higher mean velocity of the average lateral displacement of the center of pressure in the upright posture, eyes open, and feet in tandem at the two evaluation moments.

The methodological quality of the studies found was evaluated using the PEDro scale, noting that the scores ranged from 0 to 7, according to the criteria noted in Table 2.

Table 2: PEDro scale

Criteria	Tomiki et al, 2021	Campos et al, 2021	Araújo et al, 2021	Cezar et al, 2016	Ferreira et al, 2021
1. The eligibility criteria were specified.	Yes	Yes	Yes	Yes	Yes
2. Subjects were randomly assigned to groups (in a crossover study, subjects were randomly assigned to groups according to the treatment they received).	Yes	Yes	Yes	Yes	Yes
3. The allocation of subjects was secret.	Yes	No	No	Yes	Yes
4. Initially, the groups were similar with respect to the most important prognostic indicators.	Yes	Yes	Yes	Yes	Yes
5. All subjects participated unblinded in the study	No	not	No	No	No
6. All therapists who administered the therapy did so in a blinded manner.	No	No	No	No	No
7. All raters who measured at least one key outcome did so in a blinded fashion.	Yes	No	No	Yes	Yes
8. Measurements of at least one key outcome were obtained in more than 85% of the subjects initially assigned to the groups.	No	No	No	No	No
9. All subjects from whom outcome measures were presented received the treatment or control condition as allocated or, when this was not the case, data analysis was performed for at least one of the key outcomes by "intention to treat"	Yes	No	Yes	Yes	Yes
10. The results of the intergroup statistical comparisons were described for at least one key outcome.	Yes	Yes	Yes	Yes	Yes
11. The study presents both measures of precision and measures of variability for at least one key outcome.	Yes	Yes	Yes	Yes	Yes



Score:	8	5	6	7	8
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Source: Adaptation of the PEDro scale, collection of the author, 2020.

#### 4 DISCUSSION

Aging favors the incidence of chronic degenerative diseases, which increase the risk of falls in the elderly. These, in turn, occur at least once a year in about 30 to 40% of the elderly, and are multifactorial affections with a strong link to morbidity and mortality, thus constituting a public health problem. The physiotherapist acts on the disorders that can result in falls and other damages to the elderly's health. Kinesiotherapeutic resources and hydrotherapy are the most used and effective techniques in preventing falls in the elderly (Teixeira,2019).

In the study by Tomiki et al (2016), they performed exercises common to daily activities in the elderly, such as: sitting to standing position, standing without support, and sitting without back support but with feet supported on the floor or on a stool. After the intervention, it was possible to observe a significant improvement in body balance and a reduction in the risk of falls in the elderly.

After the physical exercise program, it was possible to see an improvement in the maintenance of body balance and in the performance of functional tasks. The consequences indicate that the proposed program aimed to stimulate the cognitive and motor factors of the elderly through resistance exercises, stretching, recreational activities, games, circuits, dancing and relaxation, being effective in reducing the risk of falls (TOMIKI et al,2016).

A study applied Pilates in elderly people, observing that there was an improvement in posture, strength, endurance, flexibility, and balance. The ability to perform daily activities depends on many variables, being a delicate process of capturing and interpreting sensory commands and motor responses, which can be affected by the aging process and cause limitations in neuropsychomotor performance. Being a complete activity, Pilates acts in strengthening and stretching simultaneously, generating greater body awareness (ARAÚJO et al, 2021).

In addition to physiotherapeutic approaches on the ground, aquatic physiotherapy favors improvement in the functionality of the elderly, having the stimulus of physical exercise using the physical principles of water, such as buoyancy and buoyancy, viscosity, hydrostatic pressure, surface tension, turbulence, and temperature (CAMPOS et al, 2021).

Still in this perspective, Ferreira et al (2021) says that aquatic physical exercises can be an alternative to reduce the risk of falls, considering that the properties of water, which include buoyancy, resistance and temperature, combined with physical exercises can help alleviate many



physiological problems of natural aging. The aquatic environment provides the lowest risk of acute injury and fear of falling while improving grip.

According to Cezar et al (2021), the reduction of physical components of functional capacity such as decreased balance, muscle strength of upper and lower limbs, agility, motor coordination and functional mobility and also reduced grip strength, and less ability to perform activities. Having changes that make you dependent on a caregiver. This may increase the risk of injury, institutionalization, hospitalization, morbidity, and death.

According to the PeDRo scale, of the 5 articles, 4 obtained scores above 6, considering articles of good quality. Only the article Campos et al did not blindly approach all subjects in the study. Therefore, it is necessary to conduct more studies with better methodological quality to search for evidence of physical therapy to prevent falls in the elderly.

## 5 CONCLUSION

Physiotherapy is considered essential to prevent falls in the elderly, which includes diversified exercises focused on improving the muscles both on the ground, making the elderly better adapted to the environment in which they live and with greater autonomy, and in the aquatic environment, acting to minimize the reduction of functional capacity. Therefore, the role of physical therapy within a multidisciplinary program for the elderly is of great importance, consequently preventing the risk of falls.



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