

## THE IMPORTANCE OF THE PILATES METHOD IN THE AGING PROCESS: AN INTEGRATIVE REVIEW

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**Abstract:** Population aging is a global reality, affecting both developed and underdeveloped countries. In the Brazilian context, the number of elderly people has shown a rapid increase, highlighting the importance of approaches to promote active aging. The objective of this research is to highlight the therapeutic effects of the Pilates method on the aging process. This integrative review investigates the importance of the Pilates method for elderly people over 60 years of age, as an intervention method, mainly for the active aging factor. For this purpose, a bibliographical search was carried out in the Scielo, LILACS and Pubmed databases. Considering the continuous increase in the elderly population, the results indicate that the pilates method plays a fundamental role and is a valuable tool for each individual, carried out by trained physiotherapists, being beneficial in preventing falls, in addition to improving physical and mental conditioning, being a low-impact alternative that addresses several aspects, such as mobility, flexibility, muscular strength and balance, all of these physical capabilities are important to contribute to physical fitness. The regular practice of exercises, such as Pilates, shows us to have a positive impact on the quality of life, leading to global strengthening, bringing personal autonomy, in addition to contributing to knowledge and its implications. However, it is important to highlight that the research highlighted the need for more studies to understand these long-term effects and modality.

**Keywords:** Pilates; Elderly; Quality of life.

## INTRODUCTION

Population aging is a reality present worldwide, being involuntary and inevitable, it is a physiological process that is part of human development<sup>1</sup>, considering a set of biopsychosocial transformations that end up causing difficulties in carrying out daily activities (ADLs), the which consequently affects their perception of quality of life<sup>2</sup>, given the perspectives that occur with the process of advancing chronological age.

According to the Brazilian Institute of Geography and Statistics (IBGE), the population segment that is growing the most in the Brazilian population is that of elderly people, with growth rates of more than 4% per year for the decade from 2012 to 2022, representing, in the same period, an average increase of more than 1 million elderly people per year. Around 30 million Brazilians are aged 60 or over, which is equivalent to 14% of Brazil's total population. Projections indicate that, in 2030, the elderly will outnumber children and adolescents by 2.28 million, and in 2050, the elderly population will represent 30% while children and adolescents will only make up 14% of the population.<sup>3</sup>

The Pan American Health Organization (PAHO)<sup>8</sup> tells us that healthy aging is a continuous process of optimizing functional ability and opportunities to maintain and improve physical and mental health, promoting independence and quality throughout life. Statistics tell us that the number of elderly people is increasing notably, and many find themselves in complex and uncertain socioeconomic situations. It is estimated that in 2030, 1 in 6 people will be 60 years old or over, and in 2100, it shows us that 36% of the population will be over 60 years old. The proportion of the 15-64 and 65 age groups is expected to decrease to 6% by 2050.<sup>8</sup>

National and international bodies point to the importance of active aging; however,

a large number of these individuals still demonstrate a low level of movement through research, with the majority being considered sedentary elderly people.<sup>1</sup>

The WHO recommendation is that from the age of 65, it must be moderate physical activity, preferably in a group, at least three days a week and at an intensity that varies according to each person's health and mobility conditions. In general, 60 minutes of moderate to vigorous activity per week are sufficient<sup>8</sup>.

The abilities of elderly people to perform ADLs are essential for them to maintain their independence, and for this to happen it is necessary to look for alternative treatments that release endogenous opioids, thereby reducing pain, facilitating muscle strength training, and increasing stability, postural, balance and mobility.<sup>1</sup>

According to Ratamess, et al.<sup>6</sup>, elderly people have many benefits from resistance physical exercises, as increasing muscle strength and volume are vital to improving quality of life and thus postponing the sarcopenia process. The basic training program recommended by the American College of Sports Medicine (ACSM)<sup>6</sup> for active aging has been an effective starting point for professionals. Its indications for muscular strength training, with the aim of hypertrophy and resistance in the elderly, are oriented to be performed bilaterally with free weights, slow to moderate execution speed, always maintaining body control, recommended two or three sessions per week, with significant improvements observed in power, muscular fitness, that is, strength and balance.

The ability to develop muscular strength ends up decreasing with age and hypertrophy training allows the elderly to improve performance in tasks that require these efforts, such as going up and down stairs, instrumental activities of daily living (IADLs), thus being able to minimize the risk of falls.

ACSM<sup>6</sup>, the principles of the pilates method created by Joseph Pilates indicated that the method can be a valuable tool for each individual, as it is an exercise system described as low to moderate intensity, which presents as principles the control of breathing, mobility, flexibility, muscular strength and balance, with objective of promoting the well-being of the practitioner<sup>5</sup>, meeting what guides the ACSM.<sup>6</sup> The Pilates method, carried out by trained physiotherapists, promotes better physical and mental conditioning of the individual and, as a consequence, increases the quality of life, therefore becoming an alternative low-impact physical activity for the elderly, providing active aging.<sup>1,4</sup>

Considering that the problem is about the importance of the Pilates method in old age and its relevance, as a form of prevention and as a tool to promote active aging. Therefore, the objective of this integrative review is to describe the main therapeutic responses of the Pilates method in the elderly population, with attention to the action on joint mobility and flexibility, muscle strength and balance.

## MATERIALS AND METHODS

The study is an integrative review, using the PRISMA method guidelines for systematic reviews, with a focus on randomized clinical trials. To select articles, the PICO method was used (P=Elderly; I=Pilates; C=Control; O=Results) and the following question was asked: How important is the Pilates method for elderly people?

To search for articles, the electronic databases Latin American and Caribbean Literature in Health Sciences (LILACS), Scientific Electronic Library (SciELO) and PubMed were used. The descriptors used in Portuguese and English were: "Pilates" AND "Elderly" AND "Quality of life". Studies from the last 5 years, from 2018 to 2023, were selected.

The inclusion criteria were randomized clinical trials, without language restrictions, studies involving elderly patients over 60 years of age, who had the Pilates method as a treatment intervention. The exclusion criteria were: duplicate articles, prior to 2018, review articles, paid articles, incomplete articles and articles that did not respond to the study proposal.

## RESULTS

In the first search, 31 articles were found and after reading the titles, 8 articles were excluded and 23 articles remained for review reading. Finally, 13 articles were selected for full reading and in the end, 8 articles remained that were included in the systematic review, as shown in figure 1.

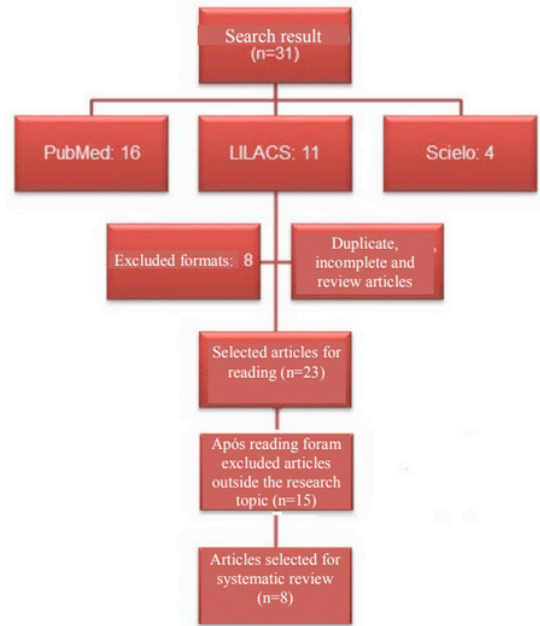


FIGURE 1: Flowchart of the article selection process

Table 1 presents the summaries of the articles that were included in the present systematic review.

Author/Year	Title	Goal	Methodology	Results
FERNANDES, et al., 2022	Does 8-Week Resistance Training with Slow Movement Cadenced by Pilates Breathing Affects Muscle Strength and Balance of Older Adults? An Age-Matched Controlled Trial.	The objective of the study was to investigate balance and dorsiflexion strength in elderly people.	ERC Elderly (n=44) Resistance Training (RT): n=22 Pilates Group (GP): n=22 Intervention = 8 weeks. Assessment instruments • Falls Efficacy Scale FES-I) • Manual dynamometer • BTrackS Balance Plate (Balance Tracking System).	The pilates group had a more satisfactory response in relation to balance.
PATTI, et al., 2021	Physical exercise and prevention of falls. Effects of a Pilates training method compared with a general physical activity program: A randomized controlled trial.	The objective of the study was to compare a general physical activity program with Pilates for the elderly and evaluate the effects on balance and reducing the risk of falls.	ECR Elderly (n=41) Pilates Group (GP): n=18 Non-specific physical activity group n=23 Intervention = 13 weeks. Assessment instruments • Handgrip test • Berg balance scale (EEBERG) • Posturographic analysis.	Through evaluation of the BBS and EEBERG scale, it was shown that physical activity improves balance and strength. GP had a greater effect on these physical capabilities.
PUCCI, et al., 2021	Effect of Resistance Training and Pilates on Quality of Life Elderly women: a randomized clinical trial.	The objective of this study was to compare the effects of resistance training (RT) and Pilates on the quality of life (QOL) of elderly women.	ECR Sedentary elderly Pilates Group (GP) n=13 Resistance training group (GTR) n=14 Control group (CG) n=14 Intervention = 12 weeks. Assessment instruments: • QWHOQOL-OLD, WHOQOL-BREF and SF-36 questionnaires.	GP and the GTR proved to be effective for improvement in the quality of life of the elderly women investigated.

POYATOS; FIELD; ARIAS., 2019	Pilates versus resistance training on trunk strength and balance adaptations in elderly women: A randomized clinical trial.	The aim of the study is to define whether Pilates or resistance training is better for improving isometric and isokinetic muscle strength and static and dynamic balance in older women.	ECR Elderly women (n=49) Pilates Group (n=16) Muscle Training Group (n=19) Group without physical activity (n=14) Intervention = 18 weeks Twice a week, for 60 minutes each session. Assessment instruments: • Biodex System III Pro isokinetic dynamometer, • Kistler 9286AA Portable Force Platform • Timed up and go (TUG).	The Pilates training group was more effective in improving isometric hip and trunk extension strength. Furthermore, both training programs showed moderate effects for TUG.
OLIVEIRA, et al., 2019	Evaluating the muscular strength, functional capacity, and risk of sarcopenia in elderly women who practice Mat Pilates.	The objective of the study was to investigate muscular strength, functional capacity and signs of sarcopenia in elderly people practicing Mat Pilates.	Observational cross-sectional study Elderly females (n=50) Mat Pilates Practitioners Intervention: minimum of 6 months and frequency of once or twice a week. Assessment instruments: • Testto sit and stand • Direct thread test • SARC-F questionnaire.	Elderly women evaluated presented a low level of muscle strength for the lower limbs and low performance in all functional capacity tests, but carrying out physical activities inhibited the development of sarcopenia.
COSTA, et al., 2018	Comparison of the perception of quality of life in elderly women who practice and do not practice the Pilates Method.	The objective of the study was to compare the perception of quality of life in elderly women who practice and do not practice the Pilates method.	Descriptive and comparative study Elderly female Pilates Group Gymnastics Group Group not practicing regular physical activity. Assessment instruments: • WHOQOL-OLD questionnaire • WHOQOL-BREF.	GP presented better perceptions in most quality of life domains and in the physical and psychological domains.
BUENO; MENEZES; WE READ; GERVÁSIO., 2018	Relationship of muscular strength with static balance in the elderly, comparison between pilates and multimodalities.	The objective of the study was to compare the effect of Pilates and multimodalities on muscle strength and balance in elderly women.	Cross-sectional study with a case-control experimental design. Elderly (n=62) Multimodality group Pilates group. Intervention = 16 weeks. Assessment instruments: • Hand grip strength • Balance through stabilometry • International Physical Activity Questionnaire (IPAQ).	GP contributed to better results in muscular strength, mobility and static balance, however, despite muscular strength being the variable with the best results, it showed no relationship with balance.
MELLO, et al., 2018	Contemporary Pilates Method in physical fitness, cognition and promotion of quality of life in the elderly.	The objective of the study is to verify the effects of the Pilates Method on physical fitness, cognition and quality of life in a group of elderly people.	A cross-sectional study, Elderly (n=13) 1 male 12 female. Intervention = 15 weeks Twice a week for 60 minutes each session. Assessment instruments: • Senior Fitness Test (SFT) • Vienna Test System (VTS) • EUROHIS QOL-8 questionnaire • Time up and go.	Pilates promoted improvements in levels of flexibility, agility, balance, dynamics, mobility, aerobic resistance, quality of life.

TABLE 01: Articles included in the literature review.



## DISCUSSION

Muscle weakness is defined by reduced muscle strength, which can affect sudden loss of balance, considering it a risk factor for falls.<sup>9</sup> According to Fernandes, et al,<sup>12</sup> the study carried out an investigation focusing on balance, strength dorsiflexor muscles in elderly people, in order to prevent falls. The interventions were resistance training and the Pilates breathing technique.

The result shows us that resistance training using slower speed movements paced by the Pilates breathing has produced improvements in balance. The role of breathing exercise helps to improve physical functions and is of paramount importance, for example, it can help with muscle relaxation, improves concentration, reduces stress, anxiety and depression, and improves balance.<sup>20,21,41</sup>

A study using unsupervised home-based inspiratory muscle training, twice a day, for eight weeks, concluded that the training protocol improved inspiratory muscle function and balance capacity in elderly people living in the community.<sup>10</sup> We also have a study that disagrees with those who suggested resistance training (RT) as an appropriate and effective method to improve balance in elderly people.<sup>11</sup> In the study, only semi-static balance was evaluated, finding moderate effects on balance capacity, different from the group that performed RT more slowly and controlled by breathing. Immediately after the intervention protocol, the TR group did not improve in any balance variable, although the exercises were performed twice in each training session.<sup>11</sup>

Longer periods of intervention may be needed to bring about significant improvements in balance when RT is performed. However, eight weeks were enough to obtain improvements in the balance parameters of this study when RT was associated with Pilates breathing.<sup>10,21</sup>

In the study by Patti, et al.,<sup>13</sup>, they presented

results that confirm the effectiveness of pilates in improving balance, as the objective of the study was to compare a general physical activity program for elderly people with a pilates program to evaluate the effects on balance. and reducing the risk of falls.

This study showed that physical activity improves balance and has a positive influence on preventing falls, including mental and physical elements with specific control and strengthening of the abdominal muscles, multifidus, diaphragm and glutes. Significant differences were observed between Pilates and the effect of physical activities. The results suggest that Pilates can be considered for stabilization training and to reduce the risk of falls in the elderly. However, Moreno, et al.<sup>23</sup>, report conflicting results, showing us that Pilates can also reduce falls in the elderly<sup>22,23</sup>, but studies on the subject are still scarce to draw definitive conclusions about the effects of this exercise program. However, the literature highlights how Pilates improves balance and suggests that it can produce greater strengthening. The results suggest that Pilates can be considered for stabilization training and to reduce the risk of falls in the elderly.

Pucci, et al.<sup>14</sup>, tells us that both pilates and resistance training proved to be effective in improving the quality of life of the elderly women investigated. An improvement was observed in the field of social participation, highlighting a significant difference in the field of mental health. Quality of life was assessed using the WHOQOL-OLD, WHOQOL-BREF AND SF-36 questionnaires.

An integrative study review<sup>24</sup> showed that regular physical exercise improves QoL in its physical, social and emotional aspects. Some evidence also suggests that regular physical activity may be associated with a reduction in depression, anxiety, anguish and improved mood.<sup>24</sup>

The study by Pimenta et al.<sup>25</sup>, and Vagetti et al.<sup>26</sup>, found that regular physical activity is associated with better QoL, and the evidence points to improvements in mental health in the elderly.

Poyatos; Campo and Árias<sup>15</sup>, according to other studies, their objective is to define whether Pilates or resistance training are better for improving isometric and central isokinetic muscular strength and static and dynamic balance in elderly women.

In summary, the results suggest that Pilates training was more effective in improving isometric hip and trunk extension strength, while the muscle training program generated greater benefits in trunk and hip isokinetic strength. Furthermore, both training programs showed moderate effects for TUG.

Some systematic reviews with meta-analysis showed strong evidence that the Pilates training improves static and dynamic balance and lower limb strength.<sup>23,26</sup> In the meta-analysis, De Souza, et al.<sup>26</sup>, pointed out that pilates is effective in improving strength in elderly individuals.

In the study conducted by Oliveira, et al.<sup>16</sup>, the objective was to investigate muscle strength, functional capacity and the indication of sarcopenia in elderly people practicing pilates on the floor. The observational study shows us that the lack of physical exercise can affect and lead to the development of sarcopenia, which is defined as the progressive loss of muscle mass associated with functional decline.<sup>27</sup> However, research suggests that the pilates method and the habit Practicing physical exercise is a protective factor that inhibits the development of sarcopenia and is effective in maintaining muscle strength and physical capacity in the elderly.<sup>27,28</sup>

The results of the studies showed that elderly women between 70 and 79 years old presented worse results in functional capacity tests, low levels of muscular strength for the

lower and upper limbs and a higher risk of sarcopenia than individuals under 70 years old. Muscle strength was inversely related to reduced risk of sarcopenia, and functional capacity was directly associated with this risk. Thus, this loss (sarcopenia) interferes with several tasks of daily life, that is, getting up from a sitting position, walking around the house, getting up from a prone position, in addition to the general level of autonomy.

The lack of analysis of exercise performance and quantity, the influence of some variables, that is, frequency, duration, intensity of pilates sessions, as well as the time each elderly woman had available to perform the activity, and which exercises were performed, the lack of this data affected the search, as the study is observational, not experimental, which prevented the authors from evaluating the relationships between cause and effect.

However, physical exercise is still considered an important intervention to preserve and increase muscle strength and maintain functional capacity.

A study by Queiroz, et al.,<sup>29</sup> which evaluated the muscle mass of 43 elderly women with an average age of 73 years for 11 weeks, showed that 43 sessions of mat pilates, with a gradual increase in intensity, were sufficient to generate a positive effect on the increase of muscle mass in the elderly.

Results related to increased strength and muscle mass were also verified in other investigations that used mat pilates exercises.<sup>26,28,29,30</sup> This modality can significantly increase people's muscle mass and strength, as calisthenics are used when performing of the exercises, that is, the body weight itself serves as resistance when performing them.<sup>28,30</sup>

Costa, et al.<sup>17</sup>, aimed to evaluate the quality of life of elderly women who practice and do not practice the Pilates method. The result of this study shows, through the evaluation of the WHOQOL-OLD questionnaire, that the

pilates group presented better perceptions in most quality of life domains than the group of group gymnastics practitioners, and also presented higher scores for physical and psychological. This can be explained because physical, psychological, social and spiritual well-being factors are also included in the broad definition of quality of life, encompassing physical health, level of independence, psychological health, personal beliefs, social relationships and the relationship with the environment.<sup>31</sup>

Furthermore, none of the groups presented significantly higher values than pilates, suggesting that the method is an important activity/practice, for a positive perception of quality of life in elderly women in this age group, being observed through better performances in completing the questionnaires. WHOQOL-BREF and WHOQOL-OLD, instruments proposed for this assessment, recommended by the WHO.

Pilates method sessions or classes, when carried out on equipment,<sup>33</sup> focus on the priorities of each individual, which does not happen in group gymnastics, especially in the elderly population. This characteristic, combined with the benefits provided by the method, such as gains in mobility, balance, coordination and concentration.<sup>32,41</sup>

Following this perspective, Han, et al.,<sup>34</sup> reported on the influence of psychosocial factors on health perception. In the present study, Pilates practitioners showed higher perception values in the physical and psychological domains, favoring a better perception of the social domain.

Due to changes caused by the aging process, the perception of quality of life may be reduced in the elderly population<sup>35</sup>. This highlights the importance of physical activity.

According to the study by Bueno, et al.,<sup>18</sup> the objective was to compare the effect of Pilates and multimodalities (water aerobics, dance,

weight training, swimming) on muscular strength and balance in elderly women. Pilates promoted greater gains in muscular strength, mobility and static balance, however, despite muscular strength being the variable with the best results, it showed no relationship with balance.

The purpose of the study by Mello, et al.,<sup>19</sup> was to verify the effects of the Pilates method on physical fitness, cognition and quality of life in a group of elderly people. The result of the Pilates method brought improvements to the health of elderly people, helping to promote their quality of life. According to the literature, elderly people who have better levels of functional fitness have better levels of independence in their activities of daily living, and maintaining good physical health is essential for personal autonomy and quality of life, especially in the elderly population.<sup>38</sup>

The tests used were the Senior Fitness Test (SFT), which measures the physical fitness of elderly people, carried out by three physiotherapists in the state of RS, in Santa Maria.

The results highlight that the Pilates method was effective in improving dynamic balance, mobility, flexibility of the lower and upper limbs, agility and postural stability, and concluded that there were significant results in the Time up and Go, Turn-180 and Forward Reach Tests.

In the study by Donalht, et al.,<sup>36</sup> the authors analyzed the improvement of balance and muscle strength and gain, compared the practice of pilates and tasks that stimulate balance, observing that tasks that required balance offer greater gains. The increase in the Brazilian elderly population is a reality and the adoption of prevention and health promotion measures that follow the American College of Sports Medicine<sup>37</sup>, must be based on four components of physical fitness: cardiorespiratory resistance, flexibility with



stability, motor control and strength muscle.

Thus, studies suggest that a program based on the Pilates method can be effective in improving balance, mobility, postural stability and reducing the number of falls.<sup>39,40</sup>

The search for results showed an improvement in reaction time and quality of life, and has positive effects in several aspects, highlighting the improvement in physical fitness and quality of life.

## CONCLUSION

Through this integrative review, the studies showed improvements in mobility, muscle strength, balance and quality of life, which the Pilates method is capable of promoting in the elderly.

The research addressed the importance of muscle strengthening and balance in the elderly, with a focus on preventing falls, such as resistance training with slower movements, accredited with breathing, with significant improvements observed in better performance during the application of balance assessment instruments., such as TUG and EEBERG.

Gaining mobility in the elderly, through the pilates method and resistance training, after carrying out physical activities, both in the lower and upper limbs, demonstrated positive results in range of movement, flexibility, agility and ability to carry out daily activities more easily. The studies mentioned suggest that the regular practice of physical activity, including pilates, resistance training and balance exercises, can contribute to improving mobility, independence and, consequently, the quality of life of the elderly.

Furthermore, the regular practice of physical activity, such as pilates, was highlighted as fundamental to improving the quality of life of the elderly, positively influencing physical, social and emotional aspects, bringing personal autonomy, with improvements in ADLs, and results with better perceptions of domains and skills, in the WHOQOL-OLD, WHOQOL-BREF and SF-36 questionnaires.

The importance of the Pilates method in the elderly population shows that well-being and body awareness brings harmony between the body and mind, making the elderly aware of their limitations and capabilities. The method is a valuable tool for each individual, promoting active aging, improving physical and mental conditioning, led by qualified physiotherapists.

However, several studies have demonstrated the effectiveness of different approaches, such as resistance training, contemporary pilates, mat pilates, for improving balance, muscular strength and quality of life in the elderly. It is important to note that, despite the positive results, the research also highlighted the need for more studies to deepen the understanding of the effects of different exercise modalities and the long-term impact.

We are currently in the decade of healthy aging, which encompasses cognitive, social, physical and learning aspects. In this context, Pilates plays a significant role, helping to stimulate memory, promote social interaction, improve strength, flexibility, and encourage challenging the mind and body, promoting a more rewarding quality of life as we age.

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