

## Prescription of Exercise in Older Adults, Physiotherapeutic Approach

Erika Cyrus Barker

Director and Professor of the School of Physical Therapy,  
Universidad Santa Paula, San José, Costa Rica.

### Corresponding author

Dr. Erika Cyrus Barker TF. M.Sc, Ph.D, Director and Professor of the School of Physical Therapy, Universidad Santa Paula, San José, Costa Rica. E-mail: ecyrus@uspsantapaula.com.

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### Objectives

- Identify the changes related to aging that must be taken into account for the prescription of the exercise
- Define the appropriate functional assessments for the prescription of the exercise in the older adult
- Recognize the factors that influence the adherence to exercise by older adults
- Describe according to the objectives the correct exercise prescription for older adults.

### Healthy Older Adult

Capable of facing the process of change with an adequate level of functional adaptability and personal satisfaction. Guccione 2012 Today, 8.5 percent of people worldwide (617 million) is aged 65 and over. "Older people are a rapidly growing proportion of the world's population," said NIA Director Richard J. Hodes, M.D. "People are living longer, but that does not necessarily mean that they are living healthier". Aging, National Institute on 2016 [1].

According to Robin L. Marcus, et al (2012) Aging is associated with increased fatty acid infiltration in skeletal muscle; this age-related change affecting muscle composition significantly elevates intramuscular adipose tissue (IMAT). According to Kidde et al 2009, IMAT is related to negative consequences for health and functional alterations:

1. Increased risk of hospitalization.
2. Movement limitation.
3. Strength deficit.
4. Poor aerobic capacity.
5. Poor performances in the 6 MIN test.
6. Resistance to insulin.

IMAT increases with age and contributes to other comorbidities that appear in old age.

There is an inverse relationship between the usual physical activity of older adults and the infiltration of intramuscular fat.

Goodpaster et al. showed that a 12-month multimodal exercise program prevented the age-related increase in IMAT observed in an inactive control group during the intervention period.

### Functional Evaluation for Exercise Prescription in the Elderly Population

An important challenge is to evaluate the participant functionally and classify the functional level to determine if the older adult needs a specialized and / or individualized program. The motivation of the elderly patient can be to maintain the function and a positive quality of life, to generate social relations, to prepare for a competition, to improve the appearance or to achieve something totally unique.

The objectives of the older adult in terms of its exercise program should be taken into account as a priority.

### Assessing Physical Performance in Older Adults

Spirduso 1995, 2005 has identified five levels of functional ability:

Category	Description
Physically dependent	People who cannot execute some or all of the basic activities of daily living, including dressing, bathing, transferring, toileting, feeding, walking. These people are dependent on others for food and other basic functions of living.
Physically frail	People who can perform the basic activities of daily living but cannot perform some or all of the activities that are necessary to live independently, generally because of a debilitating disease or condition that physically challenge them daily.
Physically independent	People who live independently, usually without debilitating symptoms of major chronic diseases. However, many have low health and fitness's reserves, placing them as at risk for becoming physically frail after illness or injury.

Physically fit	People who exercise at least two times a week for their health, enjoyment, and well-being or engage regularly in a physically demanding job or hobby. Their health and fitness reserves out them at low risk for falling into the physically frail categories
Physically elite	People who train almost daily to either compete in sports tournaments or engage in a physically demanding job or recreational activity

These skill levels are heavily influenced by attitudes and the personal belief system.

### Functional Evaluation for Exercise Prescription in the Elderly Population

#### Strength

Sit To Stand (STS). STS is usually a reliable and valid indicator of lower body strength in adults over 60 years. Stephen R. Lord Susan M. Murray Kirsten Chapman Bridget Munro Anne Tiedemann, Aerobic resistance: 6 minutes' walk test (6 MWT). The 6 MWT can be reliably used in the assessment of ambulation functional resistance in older people. Cahalin LP 2012 Balance-Frailty and Injuries: Cooperative Studies of Intervention Techniques (FICSIT-4). FICSIT-4 is a test to measure the static balance. N Deshpande, EJ Metter, S Bandinelli, Cognitive functioning: The Mini Mental State Exam (MMSE) is a widely used method for detecting cognitive impairment and monitoring its progression in patients with neurological disorders, specially in the in older adults. Azmeh Shahid; Kate Wilkinson; Shai MarcuColin M. Shapiro 2011.

#### Maintaining Independence

Almost all functional skills require power to be effectively developed, so anyone interested in developing the functional status of patients should understand the difference between strength and power.

For more than 20 years, researchers have demonstrated that strength programs can improve function, however the idea that the elderly can do strength exercise is recent, PT should include power training as an essential part of the physiotherapeutic approach as soon as possible.

#### Essential Goals in the Prescription of Exercise in the Elderly:

- Joint mobility
- Equilibrium, Balance and Stability
- Cardiovascular Resistance
- Spinal Stability (CORE)
- MUSCULAR STRENGTH and Power
- Do not forget to include the objectives of the elderly patient in the process.

It's suggested that for patients who require more frequent sessions per week, should participate in group exercises with equals since this increases contact with other individuals, fomenting socialization, while this generates more adhesion [2].

#### Strength Training Protocols

##### Intensity

Strength training should work close to 80% of 1RM of a person. In scale from 1-10 of level of physical exertion 5-6 for moderate

intensity aerobic exercise, 7-8 vigorous intensity aerobic exercise and 5-6 moderate intensity resistance exercise. When 12 repetitions can be performed correctly, a suitable increase is made from 5% to 10% and start again with 8 repetitions.

##### Frequency

5 days per week for moderate intensity aerobic exercise. 3 d/wk vigorous intensity aerobic exercise supplemented by resistance exercise 2 d/wk and flexibility 2 d/wk.

##### Duration

minimum of 30 minutes or up to 60 m per day for moderate intensity aerobic exercise. 20 to 30 m/d for moderate intensity aerobic exercise or at least 20 to 30 m/d for vigorous intensity.

##### Type

emphasis should be placed on aerobic activities that do not impose excessive orthopedic stress. Resistance training should consist of 8-10 different exercises targeting mayor muscles groups, flexibility recommend holding each muscle 30-60 seconds and balance is recommended in individual with high risks for fall Strength training should be done two to three nonconsecutive days per week [3].

##### Technique

To ensure the safety and effectiveness of strength training, the proper technique must be used at all times, including the following:

- **Range of motion:** full ROM should be the goal of all exercises when possible.
- **Respiratory Patterns:** Continuous, natural breathing pattern should be used during training.
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Assignment of Loads and Repetitions Based on the Training Objective

Training Goal	Load (RM%)	Repetitions
Muscular endurance	Less or equal to al 67%	More than12 (ideal 20-25)
Hypertrophy	67 % - 85 %	6-12
Muscular strength	More than 85%	Les sor equal to a 6

Assignment of Workload Based on Training Goal

Training Goal	Repetitions	Series
Muscular endurance	More than de 12	2-3
Hypertrophy	6-12	3-6
Muscular strength	Less or equal to 6	2-6

Amount of Rest Periods Based on Training Objectives

Training goals	Length of Rest Period
Muscular Endurance	Less or equal to 30"
Hypertrophy	30 a 90"
Muscular Strength	2-5 min.

#### Powertrain Protocols

Muscle power is related to mobility function in older adults, and effective power production requires rapid neuromuscular activation. Power training protocols are very similar to strength training protocols.

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## The differences are as follows

### Seed motion

energy formation requires high speed (fast) Motion for example, instead of taking two seconds to move the weight of the concentric phase should happen as fast as possible.

### Intensity

Research is still conducting the optimal intensity for power training: 50% to 70% seems to be the standard range being tested [4,5].

### When Strength Training Is Not Effective

When an older adult is undergoing a strength training routine and there is no noticeable improvement in endurance despite attempts to improve it, a number of factors can reduce the patient's potential for improved muscle performance.

First, proper nutrition is critical. Calorie intake and enough protein is necessary if any exercise routine is to be performed. However, malnutrition is common, depression and dementia. Dehydration is an important consideration when performing exercises with patients, especially in the context of family health.

### Strength Training Modification

When planning a strength training routine for geriatric patients, it is crucial to take into account the need to modify the training regimen in order to adjust to pathologies in cardiopulmonary and cardiovascular systems, as well as in the musculoskeletal system. Fatigue, poor physical work capacity, and lack of physical fitness are important considerations, especially in fragile elders who have multiple diagnoses. The Valsalva maneuver should be avoided. Isometric exercises are safe if the contraction time is not more than 5 to 10 seconds. Strength Training gradually expose them to the increasing load and their body will adapt. Their bones and muscles will be stronger, which will probably reduce the risk of falling and have less disabilities in their daily life!

### Recommended Levels of Physical Activity for Health from Age 65 Onwards

1. Adults 65 and older spend 150 minutes a week doing moderate aerobic physical activity or some vigorous aerobic physical activity for 75 minutes or an equivalent combination of moderate and vigorous activities.
2. The activity will be practiced in sessions of at least 10 minutes.
3. That in order to obtain greater health benefits, adults in this age group spend up to 300 minutes per week on moderate aerobic physical activity, or 150 minutes per week of vigorous aerobic physical activity, or an equivalent combination Of moderate and vigorous activity.
4. Adults in this age group with reduced mobility perform physical activities to improve their balance and prevent falls, three days or more a week.
5. There are activities that strengthen major muscle groups two or more days a week.
6. When older adults are unable to perform the recommended physical activity due to their state of health, they will remain physically active as their condition allows [6].

### Recommended Levels of Physical Activity for frailty older adult from age 65 onwards

Older adults can accumulate a total of 150 minutes per week in a variety of ways. The concept of accumulation refers to the goal of

totaling 150 minutes of activity based on intervals of at least 10 minutes each over the course of the week, for example by performing 30 minutes of moderate intensity activity five times a week. These recommendations apply to all older adults, regardless of their gender, race, ethnicity, or income level. The recommendations are extended to the older adults with disabilities, as long as they are adapted to each person according to their exercise capacity, their limitations and the specific risks to their health.

### Conclusion

- Functional assessment is a most
- Prioritize the functional needs
- Establish the rehabilitation, Functional and therapeutic objectives.
- Consider the person objectives too.
- Go gradually. Use multimodal exercises.
- Increase the load every 6 weeks.
- Attach the program to a goal.
- Re assess
- Celebrate the achievements [7-18].

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