



# Restoring Strength and Mobility in Older Adults with Acute Sarcopenia; A Case Study

<sup>1</sup>Km. Himanshi Tyagi, <sup>2</sup>Dr.Uzma Khan, <sup>3</sup>Prof. (Dr.) Jasmine Anandabai

<sup>1</sup>PG Student (MPT), <sup>2</sup>Assistant Professor, <sup>3</sup>Dean and Principal,

<sup>1</sup>Jyotirao Phule Subharti College of Physiotherapy.

<sup>1</sup>Swami Vivekanand Subharti University, Subhartipuram, N.H. 58, Delhi Haridwar Bypass, Meerut, Uttar Pradesh, India

## Abstract

The case study, an older woman with acute sarcopenia brought on by osteoarthritis in her knees is examined to see if a comprehensive physiotherapy program will improve her functional results. Functional physical exercise, mobility training, balance training, progressive resistance training, and pain management were all part of the treatment. The patient's quality of life, quadriceps strength, sit-to-stand performance, and level of pain were significantly improved. The multimodal strategy may lower death rates and enhance general health.

**Keywords:** Sarcopenia, Osteoarthritis, Knee, Physiotherapy, Resistance Training, Balance Training, Functional Exercises, Older Adults, Case Study.

## INTRODUCTION

The illness known as sarcopenia is defined by a gradual and widespread decline in skeletal mass and strength as people age [1]. The two most crucial elements of the musculoskeletal system are muscle and bone. Although there are age-related changes in the structure of both bones and muscles, illnesses that directly or indirectly damage bone and muscle, as well as lifestyle changes brought on by aging, have a bigger effect on their health [2]. The decrease of skeletal muscle mass and physical function (muscle strength or physical performance) that comes with aging is now often known as sarcopenia [3,4,5]. In older individuals, it leads to physical impairment, a worse quality of life, and a higher death rate [6].

Sarcopenia is more common among long-living older persons ( $\geq 80$ ) than in those between the ages of 60 and 79 (5%–13%). As people age, their physical composition changes significantly, becoming more fat and less muscle. The prevalence of muscle mass loss rises to 50% in those over 80, with 5% to 13% of people over 60 experiencing it on average [7].

Acute stresses including disease, hospitalization, accident, or immobilization are often the cause of acute sarcopenia, which is the quick and substantial loss of skeletal muscle mass, strength, and function over a brief period of time [8]. Acute sarcopenia is often seen following major surgery or during severe illness. During acute situations, oxidative stress, inflammation, catabolic hormonal changes, and decreased physical activity are some of the variables that contribute to muscle loss [9].

Sarcopenia's pathogenesis is complex, combining extrinsic variables like poor diet, comorbid diseases, and physical inactivity with internal aspects including hormone alterations, mitochondrial dysfunction, and chronic inflammation [10].

The capacity of a muscle or set of muscles to produce force in the face of opposition is referred to as strength. It is a basic physical characteristic that is essential to many daily tasks. Factors such as muscle mass, neuromuscular function, and nervous system efficiency all affect one's capacity to generate strength [11].

Mobility is frequently used to describe the capacity to carry out activities of daily living (ADLs) independently and with ease. The capacity to move freely, effortlessly, and effectively through space is referred to as mobility. It includes a range of physical activities, from simple ones like standing and walking to more intricate ones like ascending stairs or getting out of a chair [12].

METHODOLOGY

SUBJECT

This study included a patient who was diagnosed with acute sarcopenia at the physiotherapy OPD of Jyoti Raophule subharti College of Physiotherapy. He was enrolled in the study for four weeks. After learning the study's goals and specifications, the subject's caregiver voluntarily gave their consent. The patient's family consulted at physiotherapy OPD for difficulty in the knee movements of their mother. Because the patient complained of severe pain in both knees and difficulty in walking, and daily activities. History of the patient in osteoarthritis in both knees, identified five years ago. Sarcopenia, is determined by a decrease in handgrip strength and muscle mass. The hypertension is managed with medicine. The Gait: Antalgic, slow pace, requiring a walker.

Table1. demographic details of the patient

Characteristic	Value
Age	68 years
Gender	Female
Height	155cm
Weight	57kg
BMI	23.7kg/m <sup>2</sup>

Table2. physical examination pre and post

Examination Parameters	Pre Assessment	Post Assessment	Normal ranges
Pain (NPRS)	7/10 (severe pain)	3/10 (mild pain)	0: No pain
Knee (ROM)	90° flexion bilaterally	120° flexion bilaterally	130°-140° flexion (healthy adults)
Muscle Strength (MMT)	Quadriceps: Grade 2/5	Quadriceps: Grade 4/5	Grade 5/5: Normal muscle strength
Sit-to-Stand Test	Unable to perform 3 repetitions	Completed 8 repetitions	<12 seconds to complete 5 repetitions
Quality of Life (SF-36)	45/100	75/100	Higher scores indicate better quality of life

**Table3.** treatment method

Week	Treatment	Exercises and Techniques	Frequency / Duration
<b>Week 1</b>	Pain Management & Initial Strengthening	<ul style="list-style-type: none"> <li>- TENS for pain relief (15 minutes/session).</li> <li>- Moist heat pack.</li> <li>- Isometric quadriceps exercises (5-sec hold).</li> </ul>	5 sessions/week. Daily home exercises.
	Mobility Training	Gait training with walker support. <ul style="list-style-type: none"> <li>- Active-assisted ROM exercises for knees (flexion/extension).</li> </ul>	2 times/week. 7–10 reps per session.
<b>Week 2</b>	Resistance Training	<ul style="list-style-type: none"> <li>-Resistance band exercises for lower limbs (light resistance).</li> <li>- Sit-to-stand practice using a raised chair.</li> </ul>	3 times/week. 2 sets of 8 reps.
	Balance Training	<ul style="list-style-type: none"> <li>- Single-leg stance (with support).</li> </ul>	2–3 sessions/week. 30–60 seconds per rep.
<b>Week 3</b>	Progressive Strengthening	<ul style="list-style-type: none"> <li>- Seated leg presses with light resistance.</li> <li>- Step-ups on a 4-inch platform.</li> </ul>	3 times/week. 2 sets of 10–12 reps.
	Mobility & Endurance	<ul style="list-style-type: none"> <li>- Walking drills on flat surfaces</li> </ul>	(8-12 minutes) Daily
<b>Week4</b>	Functional Improvement	<ul style="list-style-type: none"> <li>- Progression of resistance band and leg press intensity.</li> <li>- Step-ups with increased height (6 inches).</li> </ul>	3 times/week. 2–3 sets of 12 reps.
	Flexibility Training	<ul style="list-style-type: none"> <li>- Stretching for hamstrings, quads, and calves (15-second hold).</li> </ul>	Daily. 3 repetitions per muscle group.
<b>Week5</b>	Advanced Balance Training	<ul style="list-style-type: none"> <li>- Dynamic balance exercises (e.g., heel-to-toe walking, uneven surfaces)</li> </ul>	3 times/week. 15–20 minutes per session.
	Functional Strength	<ul style="list-style-type: none"> <li>- Sit-to-stand practice from standard chair height.</li> <li>- Bodyweight squats (as tolerated).</li> </ul>	3 times/week. 2–3 sets of 8–10 reps.
	Integration of Functional Activities	<ul style="list-style-type: none"> <li>- Carrying light weights while walking (functional simulation).</li> </ul>	

## Result

The patient's strength, mobility, and general function all showed noticeable improvements all throughout the four weeks of the intervention.

## Discussion

The benefits of a complete physiotherapy strategy in enhancing functional outcomes for an elderly person suffering from acute sarcopenia due to osteoarthritis in the knee are illustrated in this case study. Given the complex nature of a condition called the observed improvements in pain, range of motion, muscular strength, functional skills, and quality of life underscore the need of a multimodal treatment.

The substantial decrease in pain intensity, which was probably made possible by the combination of moist heat treatment and TENS, was essential in allowing the patient to participate more fully in the exercise regimen. This emphasizes how crucial efficient pain management is to improving outcomes after therapy and promoting persistence in sarcopenia patients.

The weak quadriceps muscles were successfully addressed by the progressive resistance training program, which included activities like leg presses and resistance band workouts. This is in line with the body of research that shows the value of resistance exercise in enhancing older persons' strength and muscle mass. Improvements in functional abilities, such the sit-to-stand test, were probably influenced by the observed increase in quadriceps strength.

Also, the inclusion of exercises for single-leg stance and gait training as well as balance and mobility training addressed the complex character of sarcopenia, which affects not only muscular strength but also balance and mobility. These therapies probably helped increase functional independence and lower the risk of falls, which is a major issue for sarcopenic older persons.

The SF-36 score, which measures the patient's quality of life, shows an improvement, indicating that the intervention had an encouraging impact on the patient's general health. When assessing the efficacy of sarcopenia therapies, this research emphasises the need of taking into account both physical and psychological outcomes.

## Conclusion

The significance of comprehensive physiotherapy therapies in the management of acute sarcopenia in older persons is underscored by this case study. Significant gains in strength, mobility, and general function were shown by the multifaceted strategy that combined pain management, strength training, mobility training, and functional training. To further examine the efficacy of this method of treatment, additional studies with bigger sample numbers and longer intervention times are necessary.

**Conflict of interest:** Nil

**Acknowledgement:** Nil

## REFERENCES

1. Ishii S, Tanaka T, Shibasaki K, Ouchi Y, Kikutani T, Higashiguchi T, Obuchi SP, Ishikawa-Takata K, Hirano H, Kawai H, Tsuji T. Development of a simple screening test for sarcopenia in older adults. *Geriatrics & gerontology international*. 2014 Feb;14:93-101.
2. Coll PP, Phu S, Hajjar SH, Kirk B, Duque G, Taxel P. The prevention of osteoporosis and sarcopenia in older adults. *Journal of the American Geriatrics Society*. 2021 May;69(5):1388-98.
3. Shaw SC, Dennison EM, Cooper C. Epidemiology of sarcopenia: determinants throughout the lifecourse. *Calcified tissue international*. 2017 Sep;101(3):229-47.
4. Aj CJ. Sarcopenia: European consensus on definition and diagnosis. Report of the European Working Group on Sarcopenia in Older People. *Age and ageing*. 2010;39:412-23.



5. Sayer AA. Sarcopenia the new geriatric giant: time to translate research findings into clinical practice. *Age and ageing*. 2014 Sep 16;43(6):736-7.
6. Bloom I, Shand C, Cooper C, Robinson S, Baird J. Diet quality and sarcopenia in older adults: a systematic review. *Nutrients*. 2018 Mar 5;10(3):308.
7. Sato PH, Ferreira AA, Rosado EL. The prevalence and risk factors for sarcopenia in older adults and long-living older adults. *Archives of gerontology and geriatrics*. 2020 Jul 1;89:104089.
8. Dupont J. Revised sarcopenia consensus: are we missing the preclinical stage? Online comment on. *Age And Ageing*. 2018;48(1):1-.
9. Puthuchery ZA, Rawal J, McPhail M, Connolly B, Ratnayake G, Chan P, Hopkinson NS, Phadke R, Dew T, Sidhu PS, Velloso C. Acute skeletal muscle wasting in critical illness. *Jama*. 2013 Oct 16;310(15):1591-600.
10. Kim M, Won CW. Prevalence of sarcopenia in community-dwelling older adults using the definition of the European Working Group on Sarcopenia in Older People 2: findings from the Korean Frailty and Aging Cohort Study. *Age and ageing*. 2019 Nov 1;48(6):910-6.
11. Bouchrika I. 35 Scientific Benefits of Gratitude: Mental Health Research Findings in 2025. *Education*. 2025 Jan 8.
12. La Grow S, Yeung P, Towers A, Alpass F, Stephens C. The impact of mobility on quality of life among older persons. *Journal of aging and health*. 2013 Aug;25(5):723-36.

