

Physiotherapy Management in Geriatric Cardiorespiratory Rehabilitation



Learning Objectives

By the end of this lecture, students should be able to:

- describe age-related changes in the cardiovascular and respiratory systems.
- identify common cardiorespiratory diseases in the elderly.
- conduct a comprehensive assessment of cardiorespiratory function in older adults, including exercise tolerance and functional capacity
- describe the goals and components of a comprehensive geriatric cardiorespiratory rehabilitation program.
- develop individualized rehabilitation plans

Overview

Physiotherapy management in **geriatric cardiorespiratory rehabilitation** focuses on optimizing respiratory and cardiovascular function, improving physical endurance, and enhancing the overall quality of life in older adults with cardiorespiratory conditions.

Management strategies are tailored to address age-related physiological changes, comorbidities, and functional limitations commonly seen in the elderly population



Overview

What is Aging?



“Aging is a biological process that results from the accumulation of diverse molecular and cellular damage over time, leading to a progressive decline in physical and mental capacities, an

increased risk of disease, and ultimately death” (WHO, 2024)

Changes in Respiratory System

- Kyphosis and scoliosis due to ageing result in **chest wall and thoracic spine deformities** leading to reduction in lung compliance and increased work of breathing.
- Degeneration in the parenchymal support leads to dilation of air spaces causing **‘senile emphysema’**.
- Reduction of respiratory muscle strength which occurs more in men than women lead to **impaired effective cough**.

Changes in Respiratory System

- **Reduction of sensitivity and efficiency of self-cleansing mechanism** as bronchial epithelium and mucous glands degenerate
- With age, alveolar dead space increases and airway receptors decline in function, **reducing dyspnea sensation and ventilatory response to hypoxia and hypercapnia** contributing to poor outcomes in conditions like heart failure and pneumonia

Changes in Cardiovascular System

- Vascular ageing leads to intimal and medial thickening and gradual loss of arterial elasticity resulting in **vascular stiffness**
- Impaired vessel elasticity and increased vascular stiffness leading to the **development of hypertension** and thereby left ventricular strain hypertrophy
- Left ventricular hypertrophy leading to a reduction of early diastolic cardiac filling and increased cardiac filling pressure, **lowering the threshold for dyspnea**

Changes in Cardiovascular System

- Hypertension promotes collagen buildup and endothelial dysfunction, while cellular senescence contributes to **atherosclerosis** through DNA damage and telomere shortening.
- **Reduction in exercise tolerance** due to a fall in cardiac output by 3% per decade and by a **decrease in maximum heart rate achieved during exercise** due to myocardial beta receptor downregulation.

Healthy Aging

“the process of developing and maintaining the functional ability that enables well-being in older age” (WHO, 2021).

- Functional ability is defined by a person's "intrinsic capacity" (the sum of their physical and mental abilities) and how they interact with their environment
- In cardio-respiratory rehabilitation (CRR), our goal is to improve a patient's intrinsic capacity (e.g., endurance, muscle strength) to ensure their functional independence and allow them to do what they value

EBP in CRR (Global)

➤ **Multicomponent exercises**

- Exercise programs that combine several different types of physical activity, rather than focusing on just one (Labata-Lezaun et al., 2023)
- Typically includes aerobic training (like brisk walking or cycling), resistance or strength training (like using weights or resistance bands), and balance exercises (Sadaqa et al., 2024)
- This combined approach is highly effective because it addresses multiple aspects of physical decline that occur with aging (Cabroler-Molina, Martín-Rodríguez and Clemente- Suárez, 2025)

EBP in CRR (Global)

➤ Home walking programs with resistance training

- Pedometer-based walking plan (7,500 steps/day, 5 days/week) combined with TheraBand resistance exercises over 12 weeks for older adults with sarcopenia.
- Improved inspiratory muscle strength, 6-minute walk distance (6-MWD), and overall physical activity (Yuenyongchaiwat and Akekawatchi, 2022)

EBP in CRR (Sri Lanka)

➤ Pulmonary Rehabilitation COPD Patients

- Including supervised stretching, aerobic, strengthening exercises, and patient education, delivered twice weekly over six weeks
- Resulted in clinically meaningful improvements in exercise capacity and symptom control (assessed via ISWT, 6MWT, MRC dyspnea scale). (Sooriyakanthan et al., 2022)

➤ Studies on Pulmonary Rehabilitation

- Revealed integrating music, nutrition education, and culturally relevant components enhances program uptake (Perera et al., 2025)
- Revealed strong patient interest exists, but provider readiness and referral systems are weak, therefore training and system development are critical (Perera et al., 2022)

Best Practices in Geriatric Rehabilitation

- Screen routinely using a person centred geriatric framework (ICOPE/CGA) to detect physical, cognitive, psychological and functional problems.
- Use validated tools: 6-MWT/spirometry, SARC-F/Fried or FRAIL (frailty), PHQ-9/GAD-7 (mood/anxiety), and ICOPE screening items.
- Deliver individualized, multi-component interventions (aerobic + resistance + breathing training) matched to capacity, co-morbidities and goals.
- Screen for isolation, grief, meaning, and refer to counseling, clergy or community groups.
- Practice shared decision-making, obtain informed consent, assess capacity, protect confidentiality, and document care & referrals.

Physiotherapy Management

➤ Assessment;

A meticulous process designed to understand the unique needs and capabilities of older individuals.

- Cardiovascular Health: Cardiac function, endurance, and response to physical activity.
- Respiratory Function: Lung capacity, breathing patterns and oxygen saturation

Tools

- ✓ **6-Minute Walk Test (6MWT)** - standardized test to measure exercise tolerance and functional endurance
- ✓ **Spirometry:** This is a diagnostic test that measures how much air a person can inhale and exhale
- ✓ **Borg Dyspnea Scale:** This is a simple and subjective tool used to rate the patient's perception of shortness of breath (dyspnea) during physical activity

Physiotherapy Management

➤ Analysis and Diagnosis

involves looking at all the information collected from the various tools in assessment to form a comprehensive picture of the patient's condition

Key Areas;

- **Exercise Tolerance:** How much physical activity can the patient handle before becoming fatigued or short of breath?
- **Dyspnea Severity:** How severe is their shortness of breath, and at what points during an activity does it occur?
- **Functional Limitations:** What specific daily activities are they unable to do or struggle with? (e.g., climbing stairs, walking to the mailbox)
- **Comorbidities:** What other health conditions (like diabetes or arthritis) are they living with that might impact their rehabilitation plan?

Physiotherapy management

➤ Planning intervention

• The rehabilitation process;

- a) Recognition of potential
- b) Rehabilitation goal setting
- c) Re-ablement
- d) Regular review
- e) Resettlement
- f) Readjustment or empowerment

• The rehabilitation goals; **SMART**

- a) Specific: Identification of each team's role
- b) Measurable: Clarity
- c) Achievable: Challenging enough to stretch
- d) Relevant: Patient's wishes
- e) Time-related: Focus on patient
 - improvement.

Physiotherapy Management

➤ Planning interventions

✓ Airway Clearance Techniques (ACTs)

■ Active Cycle of Breathing Techniques (ACBT)

This technique is effective for sputum clearance, reducing flare-ups (exacerbations), and improving quality of life, especially for patients with bronchiectasis.

Specifically, it improves lung function without causing a drop in blood oxygen levels (desaturation) (Herrero-Cortina et al., 2023)

■ Positive Expiratory Pressure (PEP) devices

This technique offer modest benefits for a patient's health-related quality of life (HRQoL) and help reduce hospitalizations, particularly in patients with stable COPD. (Osadnik et al., 2012)

- Gravity-Assisted Methods; Postural drainage
- Manual Techniques; chest percussion and vibration



Physiotherapy Management

✓ Exercises training

- **Exercise prescription for older adults**, should be **individualized**, considering factors such as health status, functional capacity, mobility limitations and personal preferences.

FITT Principle (culturally adapted exercise programme)

Helps stimulate physiological adaptations, improve physical function and prevent injuries. Therefore, exercise programs should be progressive; **gradually increasing in intensity, duration and complexity over time.**

Exercise modalities should be varied and include a **combination of aerobic, strength, balance and flexibility exercises**. Examples include walking, cycling, water aerobics, resistance training, yoga and tai chi, each offering unique benefits for physical function and overall health.

Physiotherapy Management

✓ Promoting Physical Activity

Offer **tailored exercise programs** that cater to the specific needs and preferences of older adults ensuring accessibility and inclusivity for individuals with varying levels of mobility and fitness (walking groups, chair exercises, Tai Chi and water aerobics)

Community-based programs (walking groups, senior fitness classes, and recreational activities), provide opportunities to engage in regular physical activity in a social setting and foster the sense of community support.

Creating supportive environments that encourage and facilitate physical activity is among seniors involves making communities age-friendly by implementing infrastructure improvements (accessible sidewalks, well-lit walking paths and outdoor exercise equipment in parks)

Physiotherapy Management

- ✓ **Energy conservation techniques;** assist in reducing fatigue
 - Balance rest and work
 - Encouraging correct body positions
 - Avoiding staying in one position for a long period -
 - Advice to avoid activities that cannot be stopped if they become too stressful



Older adults often present with complex cardio-respiratory, musculoskeletal, cognitive, and psychosocial issues which requires multi-professional collaboration to improve outcomes by integrating expertise.

Benefits of Collaboration;

- Improves functional outcomes, exercise tolerance, and quality of life
- Reduces hospital readmissions and complications
- Promotes innovation, research productivity, and evidence-based practice
- Supports holistic, patient-centered care addressing physical, psychosocial, and spiritual needs

Innovation and Research Opportunities

- Joint research projects
- Clinical innovation teams (new exercise devices, tele rehab platforms)
- Data sharing & registries

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THANK YOU

