

Clinical management of COVID-19



**Rehabilitation for Patients with
Physical Deconditioning and Muscle Weakness after COVID-19 illness**

COVID-19 Care Pathway: Overview

Screen for COVID-19

when a person first accesses the health care system.

Ask patient a series of simple questions based on standardized case definition. Keep a distance of at least 1 m between the person asking question and the patient.

Ad-hoc community screening sites / Community health workers / Clinics / Health posts / Hospitals / Ambulances / Phone-telemedicine / Pharmacies / Long term health care facilities

Acuity-based triage

in the emergency unit or similar area to sort patients into categories based on need for time-sensitive treatment.



Clinical assessment

for severity of disease, including assessment of risk factors.

arrange for testing as soon as possible

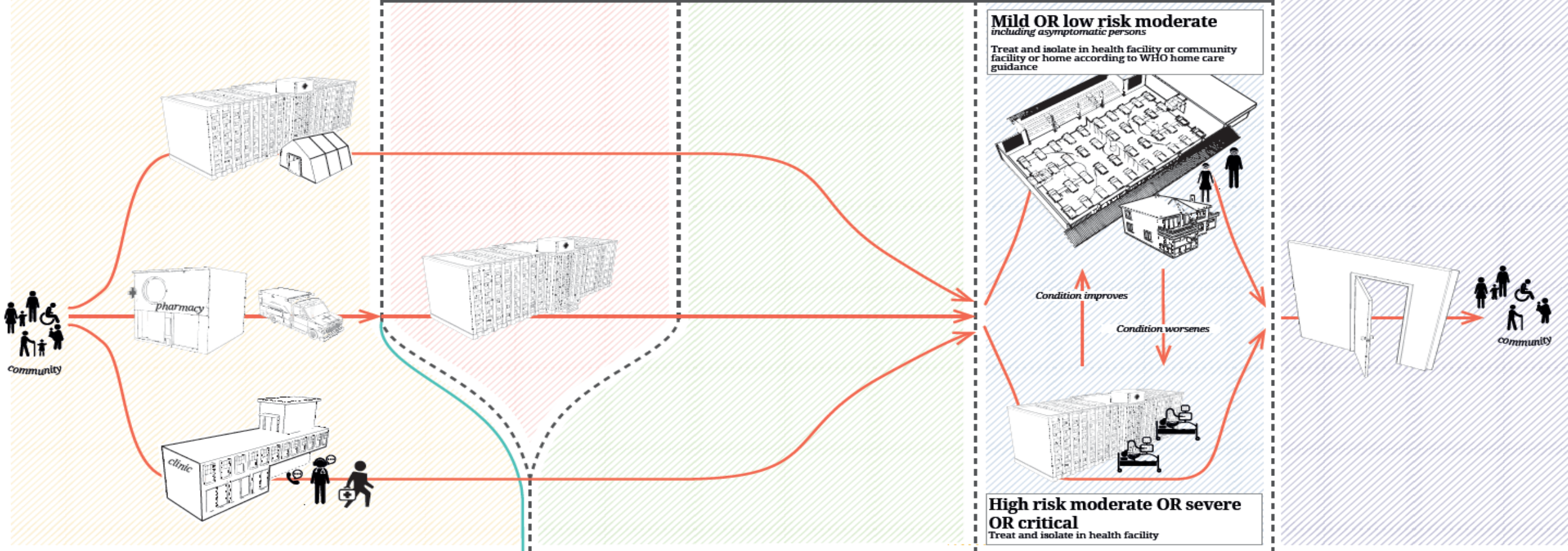
COVID-19 treatment

Treat and isolate in health facility (COVID-19 treatment centre, SARI treatment facility, rehabilitation centre, long-term care facility) or community facility or home according to WHO home care guidance.

Release from pathway

Discontinue transmission-based precautions, including isolation.
For symptomatic patients: 10 days after symptom onset, plus at least 3 days without symptoms (without fever and respiratory symptoms).
For asymptomatic patients: 10 days after test positive.

Appropriate infection prevention control measures, including isolation and personal protective equipment



Non COVID-19 care pathway per local protocol

Not a suspect COVID-19 case

Negative test

WHO: [Clinical management of COVID-19](#). Interim guidance, 27 May 2020.

Learning Objectives

At the end of this module, you will be able to:

- Describe the etiology of physical deconditioning and muscle weakness in the context of COVID-19
- Know who and when to assess for physical deconditioning
- Provide education and advice to patients and their families with physical deconditioning
- Advise on rehabilitation interventions for patients with physical deconditioning

Introduction

- What is physical deconditioning and muscle weakness?
- How likely is it that someone will experience physical deconditioning and muscle weakness?
- What are the common rehabilitation needs and care pathway/patient journey for people with COVID-19 and physical deconditioning?

This training is focused on patients who are in the sub-acute to long-term phase of care and are medically stable. They may be an inpatient in a hospital or have returned to their home or community setting. It is not for patients in the ICU or a critical care setting.

Patients can develop physical deconditioning and muscle weakness due to:

- Inflammation of the peripheral nervous system which results in diminished reflexes, sensation, muscle tone, reduced balance and strength - a critical illness polyneuromyopathy.
- A form of myositis with increased muscle enzymes evident in blood analysis. This inflammatory state can result in muscular pain and weakness.
- Muscle atrophy as a side effect of some drugs, such as steroids or neuromuscular blocking drugs.
- Metabolic features (e.g hyperglycemia and malnutrition) increasing muscle atrophy.
- Immobility from prolonged bed rest induces muscle atrophy.

Presentation and Indicators of Physical Impairment

- Patients may experience high levels of fatigue and have muscle weakness and pain. Early COVID-19 studies have indicated that over a quarter of mechanically ventilated patients continue to experience ICU acquired weakness at discharge from hospital¹, while half of all hospitalized patients continued to experience fatigue at 60 days post onset².
- In severe cases, patients may have difficulties sitting up, getting out of the bed or chair, or dressing. Some may have trouble finding their balance and look for support in doing so.
- Less severe cases may present with an intolerance of exercise for a longer duration. Some might avoid physical exercise.
- People with pre-existing long-term conditions and frailty are likely to be more severely affected.

A quick review: Infection Prevention and Control

Specific infection control considerations related to rehabilitation for COVID-19 patients include are based around the core principles of IPC*:

- Hand hygiene
- Respiratory Hygiene
- Environmental Cleaning
- PPE
- Waste Management

Rehabilitation equipment use should consider the risk of infection and capacity to properly decontaminate:

- Wherever possible, single patient use and disposable equipment is preferred.
- Reusable equipment must be decontaminated before and after patient use;
- Ensure there is a way to flag clean equipment to differentiate from used equipment
- Avoid moving equipment between infectious and non-infectious areas.

Please refer to WHO IPC guidance and training material for more information.

*Refer to the WHO guide ["Infection prevention and control during health care when coronavirus disease \(COVID-19\) is suspected or confirmed"](#)

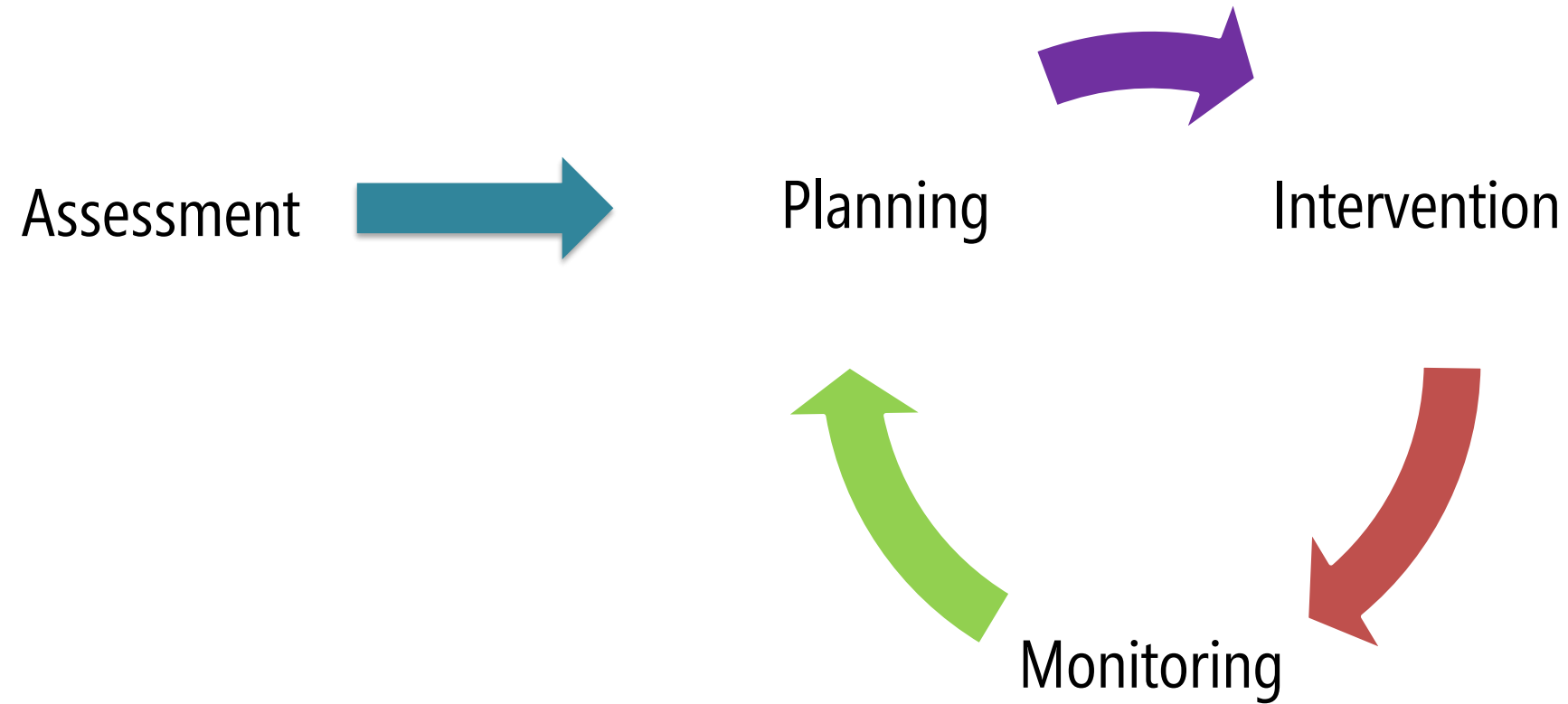
Objectives of Rehabilitation

The overarching goal of rehabilitation is to optimize functioning and reduce disability

Rehabilitation should be targeted to the specific goals of the patient, however in general, rehabilitation for physical deconditioning and muscle weakness aims to:

- Empower the patient and their family to understand the impairment and how to manage it in their daily lives;
- Improve physical function; and
- Compensate for physical deficits

Rehabilitation Cycle



Assessment: Who should be assessed?

Any patients who have been severely or critically unwell with COVID-19 are at risk of encountering limitations in physical functioning.

The following patients should be routinely assessed for physical deconditioning and muscle weakness:

- Patients who have been mechanically ventilated; on prolonged oxygen therapy; older patients; patients with complex clinical situations with co-morbidities; or any patients with a prolonged hospital stay.

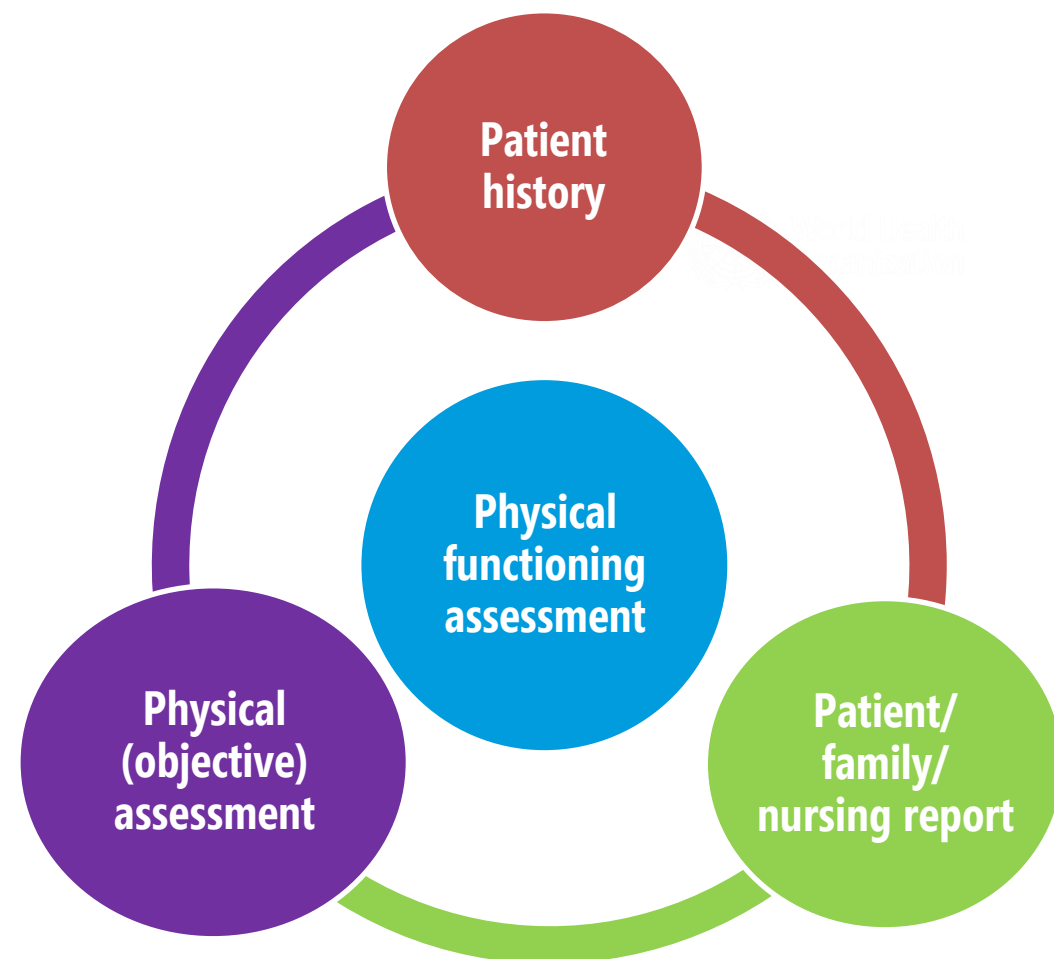
Assessment: Who should be assessed?

- Any patients that **exhibit signs of physical deconditioning and weakness** such as high-levels of fatigue and difficulty with transfers and mobility.
- **Patients who have managed COVID-19 in their homes** may also be identified as having limitations in physical functioning. If limitations remain for longer than 6-8 weeks from onset of illness a referral for assessment may be indicated.

Assessment Approaches

Physical functioning assessment is comprised of:

- Gathering the patient's history
- Hearing reports from the patient, their family and the nurses/caregivers
- Conducting a physical assessment. This includes through standardized and non-standardized means

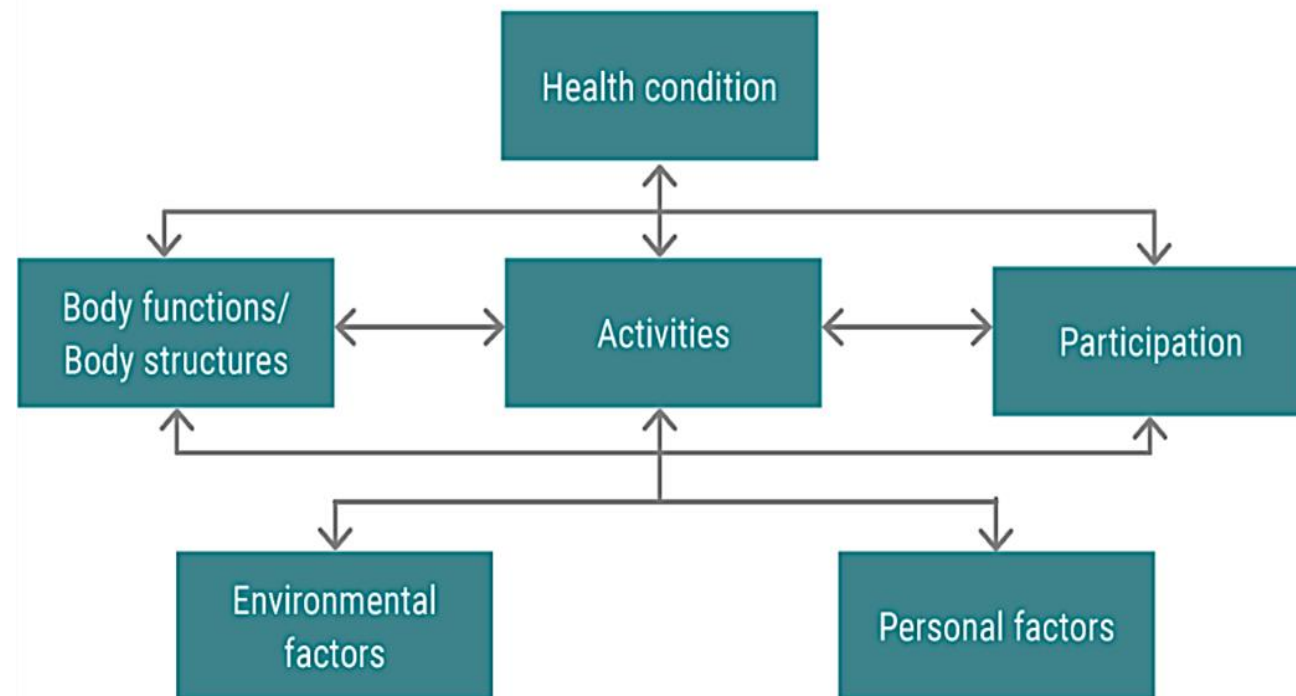


Assessment approaches

The **WHO-ICF** can serve as a model to capture and organize several constructs from subjective and objective assessment.

It is likely that many patients experiencing physical functioning difficulties will also experience respiratory difficulties and assessing both may be necessary.

*See the **module for lung functioning** for guidance.*



Assessment: History and Patient Report

Patient history and report should gather information on the patient's:

- ✓ Clinical history and diagnostic results
- ✓ Pre-admission physical status (to determine extent of change)
- ✓ Co-morbidities (to identify factors that may inform clinical decision making and influence recovery). Pay particular attention to cardiovascular and neurological comorbidities
- ✓ Physical difficulties reported, including strength, balance, pain, exercise tolerance, fatigue
- ✓ Home and community environment, including ability to exercise safely indoors or outdoors
- ✓ Relevant personal and cultural factors
- ✓ Neurological difficulties may be reported and if this is the case a neurological assessment should also be conducted.

Physical assessment

A physical examination should assess:

- **Strength and range of movement**
 - E.g. manual muscle testing (such as MRC sum or handgrip test).
- **Balance and coordination**
 - E.g. standing balance, timed up and go, or Berg balance score.



(image credit: WHO / Blink Media - Ehtiram Jabi)

Physical Assessment

A physical examination should assess:

- **Functional mobility**, especially transfers and walking, with consideration of safety and discharge readiness
 - E.g. Observation of transfers in and out of bed and walking up steps
- **Exercise tolerance:** such as through step test or sit to stand test. **Care should be taken, with close monitoring for desaturation.** Test selection will vary depending on acuity and expected response of the patient.

Results from assessments should be used to make decisions with the patient and their family regarding:

- Discharge readiness
- Support requirements
- Rehabilitation intervention required, including provision of assistive products
- Goals
- Mode of ongoing rehabilitation service delivery e.g. inpatient, outpatient, community, virtual, etc.

Rehabilitation Interventions

The following areas should be targeted in a rehabilitation programme that addresses physical deconditioning and muscle weakness:

1. Early mobilisation
2. Education, including for fatigue and breathlessness
3. Functional mobility, including for provision of assistive products
4. Muscle stretching and strengthening
5. Physical exercise and fitness

1. Early Mobilization

- Early mobilization during the inpatient period is recommended. This should begin in the ICU and critical care setting.
- Provide support for early mobilization as early as can be tolerated by patients. This may include:
 - Bed mobility
 - Bed exercises: may include passive, active assisted, active, or resisted. Consider for both strength and range of movement
 - Sitting out of bed in supportive chair
 - Undertaking sit to stand exercises
 - Standing with support. If necessary, consider tilt table or hoist

2. Education – Activity Resumption and Fatigue

- Provide general advice regarding the importance of resuming everyday activities at an appropriate pace, that is safe and manageable for energy levels.
- For patients who have been critically unwell with COVID-19, some fatigue is to be expected during recovery. Education and advice regarding this is important.
- Resumption of activity should be gradual and well-monitored, particularly for patients experiencing Post Intensive Care Syndrome (PICs).

2. Education – Activity Resumption and Fatigue

Key messages:

- Resist pushing through fatigue. Do activity in manageable amounts.
- Keep expectations low and listen to how your body is coping during recovery.
- Stop before you get overly tired. Over-vigorous exercise can set back recovery.
- Consider energy conservation techniques, such as simplifying tasks, spacing activities throughout the day and resting before and after activities.
- Resume your everyday activities and exercise slowly, gradually increasing time and exertion levels.
- When returning to work, consider a 'phased return to work' to help build up slowly.
- Good nutrition, adequate psychological and social support are all important.

2. Education – Breathlessness

Patients may experience breathlessness with exertion when recovering from COVID-19. This can expend additional energy and cause increased anxiety.

Education should include guidance on the appropriate level to exercise at as well as indicators for when to seek help. Please refer to the module on lung impairment for more information on education around breathlessness.

Patient can try relieve breathlessness using a number of positions including:



3. Functional Mobility

- Ensuring patients can safely transfer and mobilise is important.
 - consider techniques for bed, bathroom and transport transfers, and for walking both inside and outside, including stairs where required.
- Ensuring patients have adequate static and dynamic balance and providing advice and exercise for this may be necessary.

3. Functional Mobility

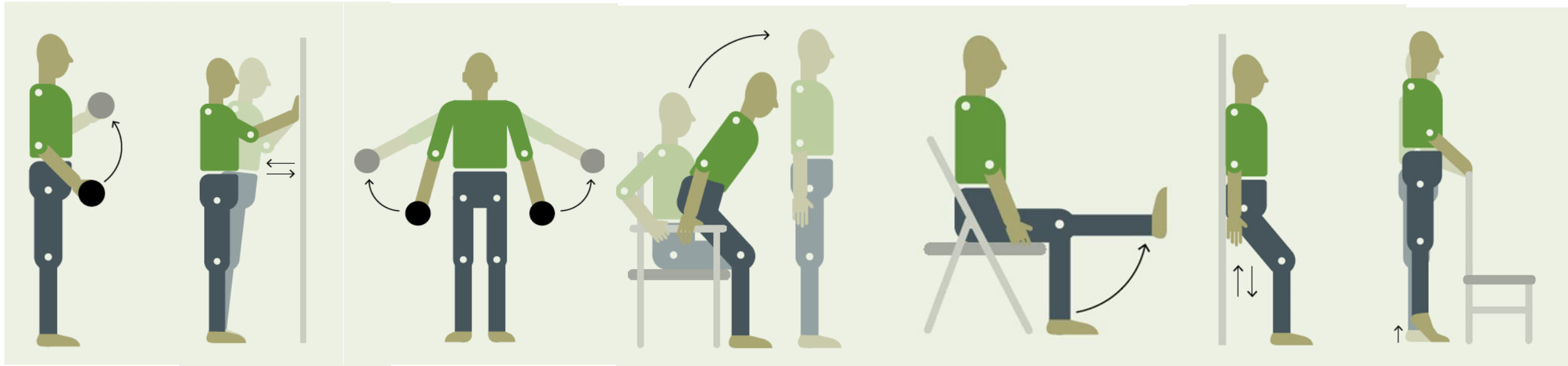
- Some patients may need an assistive product for their mobility.
- An appropriate assistive product should be identified and well-fitted and suitable for their home and community environment.
- Considerations are required for patients who have extreme breathlessness and/or need to carry portable oxygen.

4. Muscle Strengthening

Information and advice regarding muscle stretching and strengthening

- Patients with physical deconditioning and muscle weakness may start with exercises that support recovery in daily functioning.
- Start with active range of movement exercises, and if tolerated, the patient can proceed with muscle strengthening against resistance.
- Patients should be guided by symptoms - those with myalgia should avoid strengthening exercises until myalgia resolves.
- For immobile patients with profound weakness consider the daily use of neuromuscular electrical stimulation to address inactivity-induced atrophies in lower-limb muscles.

4. Muscle Strengthening



**Bicep
curl**

Wall push-up

Abduction

Sit-to-stand

Knee straightening

Squats

Heel raisers

5. Physical Exercise and Fitness

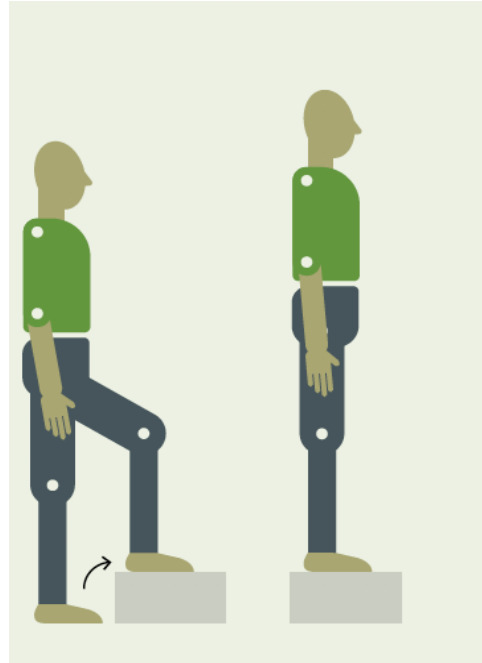
- Please refer to the module on lung impairment for detailed information on aerobic exercise and fitness
- For patients that abnormally respond to exercise with post-exertional malaise, high intensity training should be avoided
- Start at low to moderate intensity and build up gradually over time.
- In the initial 6 weeks after discharge or illness, it is recommended keep shortness of breath or fatigue below 4/10 on the Borg Scale
- Monitor for clinical signs of desaturation, using a pulse oximeter when possible.
- Ensure patients in the home situation have individually prescribed training parameters regarding frequency, intensity, duration and type.

Ensure exercise is safe, especially to avoid falls. Where there is a risk of falls, provide manual support or ensure supportive surfaces can be reached, such as bars.

5. Physical Exercise and Fitness



Marching on the spot



Step-ups

Walking

Jogging

Cycling

**When medically
safe**

**When outdoor
exercise is feasible**

Treatment of Other Complications and Conditions

- Some reports that people who experience severe COVID-19 may also experience other neurological consequences. These may include cerebrovascular accidents¹ and Guillain Barre Syndrome².
 - Any patient with neurological symptoms should have a thorough neurological assessment.
- The long-term consequences of COVID-19 are not yet understood but rehabilitation professionals should be aware of the potential for post viral fatigue and be aware of the signs, symptoms and management strategies.

¹Butler, M, Ellul, M, Pollak, T, Michael, B & Nicholson, T. 2020. Blog: The Neurology and Neuropsychiatry of COVID-19.

²Toscano, G, Palmerini, F, Ravaglia, S, et al. 2020. Guillain-Barre Syndrome Associated with SARSCoV-2. N Engl J Med.

2Zhao, H, Shen, D, Zhou, H, Liu, J & Chen, S 2020. Guillain-Barre syndrome associated with SARSCoV-2 infection: causality or coincidence? Lancet Neurol, 19, 383-384. 29

Monitoring

- Repeating assessments at set intervals is the typical mechanism for objectively monitoring physical status.
- Observation and patient and family report are important subjective mechanisms of monitoring physical status.
- Multi-disciplinary monitoring of comorbidities may be warranted to guarantee safety of rehabilitative interventions, and to optimize health.
- Consider transfer of rehabilitation information to the relevant health professionals, e.g. general practitioner, abiding by patient confidentiality legal frameworks.

Summary

- Many patients that have been critically unwell with COVID-19 will have some physical deconditioning and muscle weakness.
- Physical functioning will generally improve over time but patients that have had been critically unwell with COVID-19 should keep activity levels low for the initial 6 to 8 week period after discharge.
- A range of education, advice, exercise prescription and potentially provision of an assistive product will address many of the rehabilitation needs related to physical deconditioning and weakness.
- Provision of rehabilitation should occur along the continuum of care. Infection prevention and control measures may influence service delivery but measures can be taken to adapt and continue services.

Useful Links

- WHO Patient leaflet: Support for Self-Management after a COVID-19-Related Illness

<https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/technical-guidance/2020/support-for-rehabilitation-self-management-after-covid-19.-related-illness-2020>

- WHO Clinical Management of COVID-19

<https://www.who.int/publications/i/item/clinical-management-of-covid-19>

- Rehabilitation Considerations During the COVID-19 outbreak

<https://www.paho.org/en/documents/rehabilitation-considerations-during-covid-19-outbreak>

- WCPT response to COVID-19 – Briefing paper 2

<https://www.wcpt.org/sites/wcpt.org/files/files/wcptnews/COVID19-Briefing-paper-2-Rehab-PT-May2020.pdf>

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