

Clinical Summary: Long COVID



Overview (Primary Author: Andrea Riley, MA, CCC-SLP)

Condition Description

Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. As of July 19, 2022, over 559 million cases of COVID-19 and 6.3 million deaths have been confirmed.¹

The incubation period of COVID-19 ranges from 0 to 24 days, with an average of 5-7 days.² While most individuals who contract COVID-19 will only experience mild symptoms, others experience serious complications, including pneumonia, acute respiratory distress syndrome, respiratory failure, liver injury, acute myocardial injury, acute kidney injury, septic shock, and multiorgan dysfunction in others.^{2,3} As of July 2022, the Centers for Disease Control and Prevention reports that 1.07% of reported cases of COVID-19 in the United States resulted in death.⁴

Shortly after the emergence of COVID-19, medical professionals across the world reported cases of patients who had recovered from COVID-19 but continued to present with various symptoms.⁵ These reports included patients who were originally asymptomatic.

The term long COVID was coined to describe a "diverse set of symptoms that persist after a minimum of 4 weeks from the onset of a diagnosed COVID-19 infection."^{6,7} It also is referred to as post-COVID syndrome. Long COVID symptoms can last weeks to months after recovering from COVID-19.⁸ They can be continuous or relapsing in nature and consist of one or multiple symptoms.^{6,7} Individuals with long COVID often experience difficulty performing routine tasks.^{6,9-10}

Symptoms of long COVID include, but may not necessarily be limited to^{6,8}:

- Tiredness or fatigue
- Post-exertional malaise
- Fever
- Difficulty thinking or concentrating
- Headache
- Sleep problems
- Dizziness
- Peripheral neuropathy
- Change in taste or smell
- Depression and anxiety
- Diarrhea
- Gastrointestinal pain
- Joint or muscle pain
- Rash
- Changes in menstrual cycles

Epidemiology/At-Risk Populations

Anyone can experience long COVID regardless of hospitalization and severity of illness.¹ The reported incidence of patients with long COVID varies across countries and sources.^{12,13} This may be due to inconsistent follow-up periods, populations reported, accuracy of self-reporting, and symptoms surveyed. The

different viral strains or variants may contribute to differences in long-term complications.¹¹ Despite discrepancies regarding the number of individuals who present with long COVID, common risk factors have been identified.

Risk factors for long COVID include^{1,7-8,14}:

- Female sex
- Occurrence of 5 or more COVID-19 symptoms in the acute stage
- Prolonged hospitalization
- Comorbidities
- Increased age
- Unvaccinated for COVID-19
- Having multisystem-inflammatory syndrome (MIS) during or after COVID-19
- Increased BMI

Medical Management

Management of long COVID varies across patients and warrants a multidisciplinary approach. Primary care physicians and pertinent specialists should work together to create a plan addressing the patient's symptoms. Mild symptoms such as cough, pain, or headaches can be treated with medications, while others may require more in-depth treatment or rehabilitation.⁷ Physical, occupational, speech, and vocational therapy and dieticians may be needed depending on the patient's symptoms.^{6-7,14} Counseling or other mental health services are beneficial for patients with psychological symptoms such as depression or anxiety.^{6,7}

It is important that patients with comorbidities have regular follow-ups with their physicians, as COVID-19 and long COVID have the potential to worsen preexisting health conditions.^{6,7}

Diagnostic Imaging/Other Testing

There is currently no single test to diagnose long COVID.⁷ Long COVID is diagnosed based on^{7,8,11,14}:

- Past positive COVID-19 test *or* demonstration of positive antibody testing
- Patient medical history
- Patient reported symptoms
- Medical examination
- Ruling out of other medical conditions

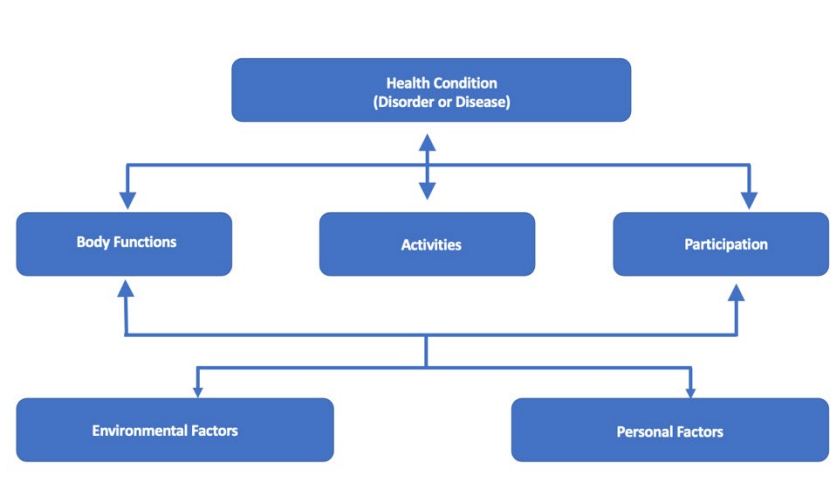
Existing medical diagnostic approaches can be used to diagnose specific long COVID related conditions and symptoms.⁸

Classification (Primary Author: Ryan Schrock, PT, DPT)

International Classification of Functioning, Disability and Health (ICF)^{15,16}

The ICF provides a language and conceptual framework to measure function and disability. The ICF was developed on the principles of universality, parity, neutrality, and environmental influence. These principles guide health care decision-making across health, cultural, and societal sectors. The ICF model is a useful tool for physical therapists to conceptualize human function as a dynamic interaction of intrapersonal and extrapersonal factors.

Figure 1. Interactions Between the Components of ICF



ICF Classifications

Long COVID is a unique disorder where mechanism, severity, and progression are currently being researched due to its brief history.^{17,18} Exact ICF classification for long COVID should be considered ongoing, limiting its full classification.^{15,17,18} The following table provides a guide of plausible effects in individuals with long COVID.

Table 1. ICF Classification for Long COVID

ICF Component ¹⁵	Domains	
Body function	<ul style="list-style-type: none"> ▪ Consciousness functions ▪ Energy level function ▪ Appetite function ▪ Sleep function ▪ Attention functions ▪ Emotional functions ▪ Higher-level cognitive functions ▪ Hearing and vestibular functions ▪ Taste function ▪ Smell function ▪ Sensory function and pain ▪ Heart functions ▪ Blood vessel functions ▪ Blood pressure functions 	<ul style="list-style-type: none"> ▪ Oxygen-carrying functions of the blood ▪ Hypersensitivity reaction function ▪ Immune response function ▪ Respiration functions ▪ Respiratory muscle function ▪ Mobility of bone and joint functions ▪ Muscle power functions ▪ Muscle endurance functions ▪ Movement functions ▪ Gait pattern functions
Body structure	<ul style="list-style-type: none"> ▪ Structure of the brain ▪ Spinal cord and related structure ▪ Structure of the nervous system ▪ Structure of the inner ear ▪ Structure of the nose ▪ Structure of the mouth ▪ Structure of the cardiovascular system 	<ul style="list-style-type: none"> ▪ Structure of immune system ▪ Structure of the respiratory system ▪ Thoracic cage ▪ Muscles of respiration ▪ Structures of trunk ▪ Structures related to movement
Activities and participation	<ul style="list-style-type: none"> ▪ Handling stress and other psychological demands ▪ Changing and maintain body position ▪ Carrying ▪ Walking and Moving ▪ Handling objects ▪ Mobility ▪ Self-care ▪ Household tasks ▪ Caring for household objects and assisting others 	<ul style="list-style-type: none"> ▪ General interpersonal interactions ▪ Education ▪ Work and employment ▪ Economic life ▪ Community life ▪ Recreation and leisure ▪ Religion and spirituality ▪ Human rights ▪ Political life and citizenship
Environmental factors	<ul style="list-style-type: none"> ▪ Products and technology for personal use in daily living ▪ Products and technology for communication, education, and employment ▪ Natural events ▪ Human caused events ▪ Support and relationships ▪ Individual attitudes of family members and friend 	<ul style="list-style-type: none"> ▪ Individual attitudes of health professionals ▪ Societal attitudes ▪ Social norms, practices, and ideologies ▪ Civil protection services ▪ Economic services ▪ Health services, systems, and policies ▪ Labor and employment services ▪ Political services, systems, and policies

Physical Therapy Classification

The Guide to Physical Therapist Practice supports multiple classification inclusion of long COVID. Several patterns are appropriate within the Neuromuscular and Cardiovascular/Pulmonary classifications.¹⁹⁻²¹ Plausible neuromuscular patterns include 5A, 5C and 5D.²⁰ Cardiovascular/Pulmonary patterns include 6B, 6C, 6F, 6G, and 6J.²¹

Additional Therapy Classification Systems

The development of long Covid classification systems is in its early stages.¹⁷ Preliminary work that incorporates function is primarily cluster analysis.^{22,23} Phenotype cluster analysis is not ideal for classification.

These studies represent early studies that may guide future classification development.^{22,23} Future research will formalize more specific classification to guide disease management.^{17,22,23}

Phenotype Clustering²²

This 3-cluster subgroup by phenotype may reflect different long COVID mechanisms that support various therapeutic interventions.

Table 2. Potential Long COVID Classification Based on Phenotype

Group Assignment	Cluster 0	Cluster 1	Cluster 2
General phenotype qualities at acute phase	<ul style="list-style-type: none"> ▪ More affected at hospital admission ▪ Greater number of preexisting conditions ▪ Greater number of symptoms at hospital admission ▪ Greater number of long Covid symptoms ▪ Greater number of ADL limitations ▪ Higher levels of anxiety/depression ▪ Worse sleep quality ▪ More respiratory long Covid symptoms ▪ Worse functional limitations 	<ul style="list-style-type: none"> ▪ More affected at hospital admission ▪ Greater number of preexisting conditions ▪ Greater number of symptoms at hospital admission ▪ Greater number of long Covid symptoms ▪ Greater number of ADL limitations ▪ Higher levels of anxiety/depression ▪ Worse sleep quality 	<ul style="list-style-type: none"> ▪ Less affectation at hospital admission ▪ Lower number of preexisting conditions ▪ Lower number of symptoms at hospital admission ▪ Smaller number of long Covid symptoms ▪ No functional limitations

Proposed Likert-Scale Severity Phenotype²³

This study compared self-reported symptoms using a 0-10 numerical rating scale with the COVID-19 Yorkshire Rehabilitation Scale in largely nonhospitalized COVID patients. Although symptom-specific phenotypes were not identified, reasonable correlation was found between symptom scores and functional disability, as well as symptoms scores and overall health. Three severity phenotypes were identified as follows, warranting further research:

Table 3. Potential Long COVID Severity Classification

Classification	Mild	Moderate	Severe
Score	< 3	3-5.9	< 6

Neurological Long COVID Subtypes²⁴

Neurological involvement, including the central and peripheral nervous system, is implicated in the long COVID experience. The severity of COVID infection, and potential for iatrogenic injury, may additionally affect neurological symptoms. Iatrogenic injury may explain why Type 2 long COVID may exhibit a worse clinical course during acute COVID. The following table highlights 2 potential types of neurological long COVID.

Table 4. Potential Neurological Long COVID Subtypes With Symptoms

Neurological Subtype	Implicated System	Typical Signs and Symptoms
Type 1 long COVID	Primarily CNS	<ul style="list-style-type: none"> ▪ Memory impairment ▪ Psychological disorders ▪ Headache ▪ Anosmia (loss of smell) ▪ Ageusia (loss of taste)
Type 2 long COVID	Primarily PNS	<ul style="list-style-type: none"> ▪ Acute/chronic neuropathies ▪ Cranial mononeuropathies ▪ Subjective PNS reports ▪ Compressive neuropathies/plexopathies

For the Following Sections: Please refer to the Process of Patient/Client Management in the [Guide to Physical Therapist Practice](#).

Examination (Primary Author: R. Lucas Burns, PT, DPT)

Interdisciplinary Team

Given that multiple body systems may be involved with the sequelae of long COVID, interdisciplinary involvement may be indicated to ensure comprehensive care for the patient. Interdisciplinary team members may include, but may not be limited to, the following: the patient and family, physical therapists, speech-language pathologists, occupational therapists, cardiologists, pulmonologists, neurologists, physiatrists, case managers, psychologists, social workers, respiratory care practitioners, dieticians, exercise physiologists, and rehabilitation nurses.

History

The history is typically obtained from the patient, family members, or other interested parties. The information obtained from these parties may include demographic information, information about the patient's previous level of function (health, vocation, hobbies, interests), their living environment, medical history, family history, chief complaints, comorbid conditions, current functional status, medications, and results of any diagnostic imaging or other clinical tests that may be relevant to the physical therapy plan of care.²⁵

The history information gathered may guide the physical therapist toward hypotheses about potential impairments the patient has in body structure, function, activity limitations, or participation restrictions. It also

assists with gathering data that could be pertinent when deciding to refer out to other interdisciplinary team members.

Long COVID Specific History Questions

- Were you hospitalized for your condition?
 - If yes, were you brought to the intensive care unit or placed on a ventilator?
- When were you first diagnosed with COVID-19?
- What symptoms did you have when first diagnosed?
- Describe your current symptoms
 - Type
 - Duration
 - Constant, fluctuating, specific mechanisms for triggering
- Was supplemental oxygen prescribed for you?
 - If so, do you still use it? How much?

Regarding social/health habits, patients should be asked:

- Do you smoke?
- Do you participate in regular exercise?
 - If yes, what do you do and how often?
- How would you describe your mood/general sense of well-being after your COVID-19 diagnosis?

Table 5. Systems Review

System	Recommended Screening*	Rationale
Musculoskeletal ^{14,26-49}	Screen/observe for: <ul style="list-style-type: none"> ▪ Pain with movement or palpation ▪ Bilateral symmetrical involvement of joint structures 	COVID-19 can lead to significant musculoskeletal complications including: <ul style="list-style-type: none"> ▪ Joint/muscle pain ▪ Rheumatoid arthritis
Neuromuscular ^{14,27-33,39,41,43,45,49-71}	Screen/observe for: <ul style="list-style-type: none"> ▪ New onset sensory loss/motor weakness* ▪ Difficulty controlling movements ▪ Dizziness, dysphagia, dysarthria, nausea/vomiting, nystagmus* ▪ Acute changes in mental status* 	COVID-19 can lead to significant neuromuscular complications including: <ul style="list-style-type: none"> ▪ Guillain-Barre syndrome ▪ Ataxia ▪ Stroke ▪ Convulsion ▪ Neuromuscular fatigue ▪ Anosmia ▪ Headaches ▪ Spasms ▪ Nerve pain

<p>Cardiopulmonary^{14,26, 27,29-32,59,72-79}</p>	<p>Screen/observe for:</p> <ul style="list-style-type: none"> ▪ Vital signs (blood pressure, heart rate, oxygen saturation)* ▪ Sudden shortness of breath or chest pain* ▪ Orthostatic hypotension 	<p>COVID-19 can lead to significant cardiopulmonary complications including:</p> <ul style="list-style-type: none"> ▪ Pulmonary embolism ▪ Acute myocardial infarction ▪ Coronary artery atherosclerosis ▪ Cardiac hypertrophy ▪ Respiratory failure ▪ Pulmonary fibrosis ▪ Pneumonia
<p>Integumentary^{26,80-82}</p>	<p>Screen/observe for:</p> <ul style="list-style-type: none"> ▪ New onset skin lesions 	<p>COVID-19 can lead to integumentary complications including:</p> <ul style="list-style-type: none"> ▪ Psoriasis ▪ Lupus
<p>Gastrointestinal/urogenital^{26,83-87}</p>	<p>Screen/observe for:</p> <ul style="list-style-type: none"> ▪ Changes in bowel or bladder function, frequency, or color* ▪ Persistent GI distress ▪ Loss of appetite ▪ Changes in ability to engage in sexuality/intimacy 	<p>COVID-19 can lead to significant gastrointestinal/urogenital complications including:</p> <ul style="list-style-type: none"> ▪ Diarrhea ▪ Anorexia ▪ Nausea and vomiting ▪ GI hemorrhage ▪ Erectile dysfunction
<p>Cognitive/psychosocial^{14,26, 29-32,41,43,55,60,64,66,67,69,70,88-90}</p>	<p>Screen/observe for:</p> <ul style="list-style-type: none"> ▪ Suicidal ideations* ▪ Changes in sleep patterns 	<p>COVID-19 can lead to significant cognitive/psychosocial complications including</p> <ul style="list-style-type: none"> ▪ Depression ▪ Anxiety ▪ Cognitive decline ▪ Insomnia

*May warrant immediate and emergent referral to a higher level of care

Examination

Note: In 2020, APTA released a core set of outcome measures for adults and children with COVID-19, along with a decision tree to assist with clinical decision-making in the evaluation of a patient with COVID-19. These documents can be found [here](#).

There is limited evidence at the current moment for valid and reliable outcome measures in individuals with long COVID. The following section lists tests and measures that have been validated in similar populations. These measures are delineated by common symptom presentation for individuals with long COVID and may be selected for use based off the patient's history or positive findings on examination. These exams are organized according to ICF terminology for assessing body structure and function, activity, and participation.

Table 6. Examination

Symptom/ Complaint	Body Structure and Function	Activity	Participation
Fatigue ^{14,27,28,32,41,56-64}	Borg RPE	2-minute step test 2-minute walk test 6-minute walk test DePaul Symptom Questionnaire	Modified Fatigue Impact Scale Fatigue Severity Scale
Cognitive impairment ^{14,29-31,41,43,55,60,64,66,67,69,70,88-90}		Saint Louis University Mental Status Exam Montreal Cognitive Assessment Timed Up and Go Cognitive Walking and Remembering Test	
Depression/dec reased quality of life ^{41,43,57,65,91}		Goal Attainment Scale Patient-Specific Functional Scale	EQ-5D-5L SF-36
Dyspnea ^{14,27,29-32,59}	Maximal Inspiratory & Expiratory Pressure Borg RPE Vital Signs	2-minute step test 2-minute walk test 6-minute walk test	St. George Respiratory Questionnaire Modified Medical Research Council Dyspnea Scale
Muscle weakness ^{28,32,36,42,44,47,48}	Dynamometry Manual Muscle Testing	5 Time Sit to Stand 30-Second Sit to Stand	
Muscle/joint pain ^{14,27,29-31,33,39,41,43,45,49}	Visual Analog Scale NPRS Palpation/Inspection	McGill Pain Questionnaire	

Insomnia ^{14,27,32,41,49,56,57,64}			PROMIS-Sleep Disturbance Pittsburgh Sleep Quality Index
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Due to the heterogeneous nature of symptoms with long COVID, clinicians also may consider the following tests and measures:

Table 7. Additional Exam Considerations

Body Structure and Function Impairment	Activity Impairment	Participation Impairment
<p>Sensory integrity</p> <p>Monofilament testing</p> <p>Light touch and sharp/dull screening</p> <p>Reflex Integrity</p> <p>Deep Tendon Reflexes</p> <p>Range of Motion</p> <p>Goniometry</p> <p>Posture</p> <p>Seated and standing assessment</p> <p>Vision</p> <p>Visual field testing</p> <p>Visual acuity testing</p> <p>Vestibular</p> <p>Vestibular screening</p>	<p>Postural Control</p> <p>Modified Clinical Test of Sensory Integration on Balance</p> <p>Berg Balance Scale</p> <p>Mini-Best Test</p> <p>Gait Assessment</p> <p>Functional Gait Assessment</p> <p>10-Meter Walk Test</p> <p>High-Level Mobility Assessment Tool</p> <p>Upper Extremity Function</p> <p>9-hole-peg-test</p> <p>Box and Block Test</p>	<p>Headaches</p> <p>Headache Disability Index</p> <p>Postural Control</p> <p>Activities Specific Balance Confidence Scale</p> <p>Pain</p> <p>Consider region specific outcome measures (Shoulder Pain and Disability Index; Low Back Pain Disability Questionnaire, etc.)</p> <p>Dizziness</p> <p>Dizziness Handicap Inventory</p> <p>Upper Extremity Function</p> <p>Quick DASH</p>

Prognosis (Primary Author: Jessica Schmidt, MS, OTR/L)

Since long COVID is a new diagnosis, it is unknown how long and to what extent symptoms will last.⁶⁶ Some persons report symptoms 2 years after acute COVID-19 infection.⁹² Percentages vary significantly among studies, but approximately half of the people diagnosed with COVID-19 report at least one symptom one year after acute COVID-19 diagnosis.⁹²⁻⁹⁴ The most significant decrease in symptoms appears to occur around 6 months.^{65,93-96} Cluster analysis investigations to categorize levels of long COVID are ongoing and provide potential models for future therapy prognosis studies.²² Future investigations are needed to determine if the prognosis will vary between strains. The following data comes from patients in the earlier waves of the pandemic.

Body structure symptoms less prevalent at one-year include^{65,93,94,96}:

- Fever
- Sore throat/difficulty swallowing
- Loss of taste and smell
- Loss of appetite
- Gastrointestinal symptoms
- Confusion/brain fog

Body structure symptoms more prevalent at one-year include^{65,93,94,97}:

- Fatigue
- Weakness
- Dyspnea
- Muscle/joint pain
- Peripheral neuropathy
- Decreased memory and concentration
- Anxiety and depression

Activity/participation impairments lasting at one-year include^{65,93,94,97}:

- Insomnia
- Independence with daily living activities
- Work/occupational engagement
- Decreased quality of life

Factors associated with poor prognosis for returning to baseline activity/participation at one-year include^{22,94,98-101}:

- Female sex
- More medical comorbidities and symptoms at acute hospitalization
- Days hospitalized
- Muscle weakness due to prolonged ICU stay/postintensive care syndrome (PICS)
- Postexertional symptom exacerbation
- Number of/severity of postinfection respiratory symptoms, especially dyspnea at rest
- Autonomic dysfunction/POTS/orthostatic hypotension
- Musculoskeletal pain

Physical activity may help some persons living with long COVID and may flare symptoms in others.^{94,99} There is no established time frame for the duration of physical therapy treatment, therefore, treatment should be client-centered and guided by activity and participation limitations.^{94,98}

Intervention/Plan of Care/Discharge (Primary Author: Ryan Schrock, PT, DPT)

Interventions

Long COVID may initially present as a respiratory interstitial pneumonia.^{99,102} Long COVID additionally may manifest as neuromuscular, cardiovascular, pulmonary, swallowing, and psychological conditions.^{59,102-104} Multidisciplinary assessment and treatment from a multidisciplinary rehabilitation team may be indicated to treat long COVID.^{98,99,102-106}

The following figure presents a model of phase-based rehabilitation:

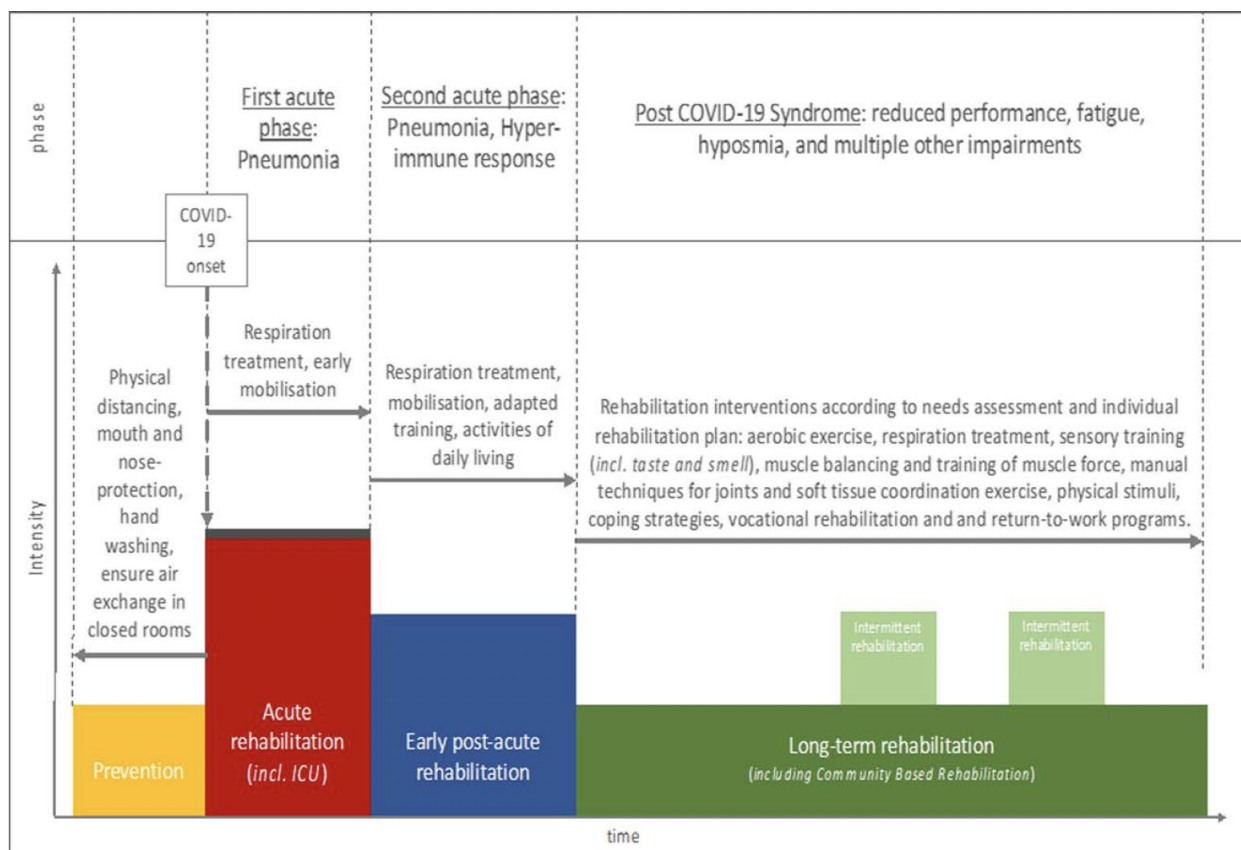


Figure 2. Model for phase-specific and phase-adapted rehabilitation responses for patients with SARS-CoV-2 infection and long COVID-19-Syndrome. (Reproduced with permission from Nugraha et al¹⁰⁷ and Acta Medica Indonesiana.)

Table 8. Recommended Long COVID Interventions

Category	Interventions	Outcomes
Patient/client instruction ^{99,102-105,108-110}	<ul style="list-style-type: none"> Energy conservation Disease education Home exercise program Coping mechanisms Assistive device/technology use 	<ul style="list-style-type: none"> Support patient/caregivers Understand current COVID-19 recommendations Improve treatment compliance Reduced fatigue Improve self-management Improve patient goal setting Improve use of community resources Improve understanding diagnosis Improve understanding of treatment

<p>Airway clearance and respiratory techniques^{99,102,108-114}</p>	<ul style="list-style-type: none"> ▪ Airway cleaning techniques ▪ Breathing control training ▪ Aerobic exercise ▪ Diaphragmatic breathing ▪ Pursed lip breathing ▪ Resistance breathing training 	<ul style="list-style-type: none"> ▪ Improve respiratory symptoms ▪ Preserve function ▪ Reduce complications and disability ▪ Decrease anxiety and stress ▪ Improve pulmonary function tests ▪ Improve exercise tolerance
<p>Motor function training^{99-103,105,107,110-112}</p>	<p>Mobility</p> <ul style="list-style-type: none"> ▪ Dual task activity ▪ Motor learning activity <p>Balance training</p> <ul style="list-style-type: none"> ▪ Static balance activity ▪ Dynamic balance activity ▪ Dual task activity ▪ Motor learning treatment ▪ Vestibular activity <p>Gait and locomotion training</p> <ul style="list-style-type: none"> ▪ Dual task treatment ▪ Motor learning treatment ▪ Gait kinematic activity <p>Posture training</p> <ul style="list-style-type: none"> ▪ Static balance activity ▪ Dynamic balance activity ▪ Vestibular activity ▪ Postural stabilization <p>Sensory training</p> <ul style="list-style-type: none"> ▪ Sensory integration treatment ▪ Vestibular activity 	<ul style="list-style-type: none"> ▪ Improve independence in walking ▪ Improve endurance ▪ Improve balance ▪ Improve somatosensation ▪ Reduce falls ▪ Improve community mobility ▪ Improve return to work activity

<p>Therapeutic exercise^{98,99,102-105,107,110-113,115-117}</p>	<p>Aerobic exercise</p> <ul style="list-style-type: none"> ▪ Energy conservation techniques ▪ Pacing ▪ Low-intensity aerobic activity ▪ Moderate to high intensity aerobic activity ▪ Endurance activity ▪ Exercise tolerance activity <p>Resistive exercise</p> <ul style="list-style-type: none"> ▪ Graded, gradual resistance training ▪ Exercise tolerance activity ▪ Task-specific training ▪ Work-specific activity ▪ Household activity <p>Tissue lengthening/stretching</p> <ul style="list-style-type: none"> ▪ Range of motion ▪ Flexibility, stretching 	<ul style="list-style-type: none"> ▪ Reduce secondary complications ▪ Reduce fatigue ▪ Reduce shortness of breath ▪ Improve strength ▪ Improve quality of life ▪ Decrease anxiety and depression ▪ Improve exercise tolerance ▪ Reduce overexertion ▪ Perform safe exercise ▪ Avoid worsening symptoms
<p>Functional training^{99,102,103,105,110-112,114,115,118,119}</p>	<p>ADL/BADL/IADL activity</p> <ul style="list-style-type: none"> ▪ Bed mobility ▪ Transfer training ▪ Sitting ▪ Stepping ▪ Device/equipment use ▪ Eating <p>Task activity</p> <ul style="list-style-type: none"> ▪ Practice ▪ Household activity ▪ Work-specific ▪ Vocational rehabilitation 	<ul style="list-style-type: none"> ▪ Safe progression of function ▪ Reduce fatigue ▪ Promote self-care ▪ Reduce secondary complications ▪ Return to work ▪ Return to prior level of function
<p>Telehealth^{59,102-104,108-111,120}</p>	<p>Feasible telehealth interventions</p> <ul style="list-style-type: none"> ▪ Guided pulmonary rehabilitation ▪ Follow-up assessment ▪ Guided resistance exercise ▪ Guided task-specific activity ▪ Guided aerobic exercise ▪ Patient/caregiver instruction 	<ul style="list-style-type: none"> ▪ Promote protection and reduce transmission from active COVID-19 infection ▪ Support patients and caregivers ▪ Support self-management strategies ▪ Improve function

Plan of Care

Current studies continue to investigate specific interventions, effect on outcomes, and specific prescription recommendations.^{103,105,117} Contemporary rehabilitation recommendations support early initiation of rehabilitation, individualized assessment, and treatment prescription, focusing on physical and functional limitations.^{103,105,106,111,115,117} Early recruitment of patients with long COVID shows significant functional improvement.^{114,119,121}

Specific plan of care concerns arises with early intervention and exercise prescription. Safe rehabilitation care planning needs to incorporate complexity, promote patient education, and seek symptom stabilization.^{98,99} Specifically, exercise intensity is a concern with early exercise prescription.^{98,99,104,117,122} Exercise intensity should match a general level of function and severity to promote safety, activity pacing, and prevent autonomic dysfunction and overexertion.^{98,99,117,122} Additional studies are necessary to further identify specific exercise prescription principles.^{112,117,122}

Long COVID patients need to be evaluated based on individual symptom and functional presentation.^{99,102-106} Interventions and rehabilitation care planning should center on evaluative findings for a targeted treatment approach.^{98-99,104-106,112} Return of symptoms should trigger reassessment to reinitiate individualized rehabilitation.^{99,103,106} We expect future studies to clarify precise intervention modalities and prescription recommendations.^{59,103,105}

Discharge

There are no definitive studies identifying a discharge “timepoint” in a multidisciplinary rehabilitation care model.¹⁰⁴ Discharge decisions need to incorporate assessment at an individual level.^{98,99,102,104} One study found no improvement in several health outcomes at long term follow-up.¹⁰⁶ Patients experiencing a return in symptoms should be reassessed to reinitiate multidisciplinary rehabilitative care or referral as indicated.^{98,99,102,103}

Patients need to be involved in discharge decision making. We recommend the following considerations when contemplating discharge¹⁰⁴:

- Be alert to developing symptoms that may require referral or reassessment.
- Use shared patient/health care professional decision making for discharge, considering:
 - Post-care treatment plans
 - Patient preferences
 - Patient goals
 - Social support
 - Ongoing support needs

Additional Long COVID Resources

National Institute for Health and Care Excellence (NICE). Long COVID rapid clinical practice guideline. <https://www.nice.org.uk/guidance/ng188>

World Physiotherapy. World Physiotherapy response to COVID-19 Briefing Paper
9. <https://world.physio/sites/default/files/2021-06/Briefing-Paper-9-Long-Covid-FINAL.pdf>

World Health Organization. Living guidance for clinical management of COVID-19.
<https://www.who.int/publications/i/item/WHO-2019-nCoV-clinical-2021-2>

US government resources and research: <https://www.covid.gov/longcovid>

Long COVID/PASC clinical guidance statements from AAPMR.
[https://onlinelibrary.wiley.com/doi/toc/10.1002/\(ISSN\)1934-1563.LongCOVID](https://onlinelibrary.wiley.com/doi/toc/10.1002/(ISSN)1934-1563.LongCOVID)

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