



The Indian Association Of Physiotherapists

An ISO 9001:2015 Certified Association

**“National Guidelines for Physiotherapy
Professionals by The Indian Association of
Physiotherapists in managing Post COVID 19
Patients during Recovery phase”**

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Dr Anjali R Bhise, Principal, Government Physiotherapy college, Government Spine Institute, Civil hospital, Ahmedabad, Gujarat

Dr K M Annamalai, chief Physiotherapist, Apollo hospitals International limited, Ahmedabad, Gujarat

Dr G Arun Maiya, Professor and Dean, Physiotherapy, MCHP, MAHE Deemed University, Manipal

Dr Mariya Prakash Jiandani, Assoc Professor, Physiotherapy School & Center, Seth GSMC & KEMH, Mumbai

Dr Vishwa Prakash Gupta, Chief Physiotherapist, Head-CTVS Physiotherapy Unit, Addl. Charge- CIMR, AIIMS, New Delhi

Prof. Narasimman Swaminathan, Professor in Physiotherapy, Vice Principal, Faculty of Allied Health Sciences, Sri Ramachandra Institute of Higher Education and Research, Chennai, Tamil Nadu

Dr Nehal Shah, Principal In-charge, SBB College of Physiotherapy, Ahmedabad, Gujarat

Dr Kanchan Anand, HOD Physiotherapy, Fortis Escorts Heart Inst, New Delhi

Dr Prem V, Associate Professor and HOD, Physiotherapy, MCHP, MAHE Deemed University, Manipal hospital, Bangalore

Dr Priyanka Rishi, Associate Professor, Head of Laboratories, Department of Physiotherapy, Lovely Faculty of Allied Medical sciences, Lovely Professional University, Punjab

Dr Sanjiv K Jha, Director CCDR, Principal RD Gargi, Madhya Pradesh

Dr Ruchi Varshney, Director Ruchi Advanced Physiotherapy and Wellness, New Delhi

Dr Umanjali Damke, Principal and Professor, Physiotherapy S & C, Government Medical College and Hospital, Nagpur

Preamble:

Since more than a year now entire world is witnessing the catastrophe of the COVID-19 pandemic. Currently, several countries around the world are in different stages of novel corona virus infection, with many nations stepping into the post-COVID phase. As per WHO (World Health Organization), about 10% to 15% of COVID cases develop the ailment, and, about 5% of patients happen to fall critically ill. Usually, it takes two to six weeks for most of the corona virus infected individuals to recover from the infection.

COVID 19 has proved to be a multisystem disorder with a varied spectrum of presentation and lingering symptoms post recovery. The aftermath of COVID 19 in large proportion of survivors is with debilitating symptoms of fatigue, muscle pain, lack of sleep, memory loss along with persistent respiratory symptoms. These may last for weeks or even months. Some individuals might even be at risk of long-term impairment and need of long term oxygen therapy. The extent of impairment in the post-COVID phase is not yet known clearly, it is evident that many patients will need physiotherapeutic intervention for a longer period.

Physiotherapist have been the frontline workers since the outbreak of the pandemic COVID19 and have contributed in acute care therapy and are constantly thriving to help patients to improve their lung functions, ability to ventilate and oxygenate better and reduce the external demand of supplemental oxygen.

Knowing the impact post covid and persistence of symptoms there is a need to address these with apt Physiotherapeutic intervention measures. Considering the expected high burden of respiratory, physical and psychological impairment following COVID 19 infection, a huge number of patients should be referred early to a physiotherapeutic intervention program.

Post COVID Physiotherapeutic intervention – Published Case reports and research from the other countries have highlighted the importance of Physiotherapeutic intervention in minimizing the disability and restoring normal functioning in the patient. Physiotherapy plays a crucial role in the recovery of Post Covid patients through the use of individualized tailored programs based on system involvement, support and patient education and thus improve their physical, functional and psychosocial abilities.

The Indian Association of Physiotherapist hereby proposes to update and adapt the national consensus recommendations of physiotherapy management in post -COVID 19 (JAPI Dec 2020) based on further gathered experience, consensus and literature and issue Guidelines for Physiotherapy in Post COVID 19 stage and thereby improving functional outcomes. A

sustained program is the key to gain full function post covid especially those who had prolonged hospital and ICU stay

Objectives:

The objective of this Guideline is to provide recommendations for the physiotherapy assessment and management in post Covid 19 patients in the recovery phase.

Physiotherapy aims to optimize recovery in commonly seen dysfunctions as below and any other which would interfere with quality of life.

A) Cardiovascular &Respiratory system dysfunctions:

1. Improve Respiratory muscle functions
2. Relieve dyspnea/breathlessness which is persisting for a longer duration post COVID
3. Improve Exercise Tolerance and aerobic capacity of the patients

B) Musculoskeletal System dysfunctions:

1. Improve muscle strength and endurance which are put on stake due to long term hospital and ICU stay
2. Pain and Fatigue Management
3. Management of musculoskeletal pains and weakness which are a sequela to the COVID infection

C) Neurocognitive Dysfunctions

1. Provide neurorehabilitation pathway to patients affected with neurological sequelae post covid 19
2. Improve Cognition, memory and sleep

D) Metabolic Dysfunctions

- 1) Many patients are known to develop glucose intolerance. Exercise plays an important role in glycemic control
- 2) Considerations for another organ involvement such as hepatic and renal

E) Overall Enhance health-related quality of life and return to normalcy

Scope:

This document provides information to physiotherapists who play a vital role in physiotherapeutic intervention of a patient with post COVID infection towards the path of normal functional recovery. It includes recommendation for

1. Pre-Physiotherapy Screening and assessment for physiotherapy intervention (including Red Flags)
2. Physiotherapeutic interventions based on system involvement
3. Special considerations
4. Safety and personal protection policy
5. Integration of adjunct therapies such as Yoga

Setting and Timing:

Physiotherapy individualized tailor-made protocols are recommended for patients if they face residual respiratory, musculoskeletal and neuromuscular problems post COVID and are otherwise permitted to undergo such a protocol.

They can be carried out under following settings:

1. In-patient:-Indoor patients who have stabilized and are transferred in step down units while preparing for discharge
 2. Home based / Community based:- Patients under isolation at home or quarantine center or in community halls.
 3. Centre based :-Institute based physiotherapeutic intervention
 4. Physiotherapeutic Intervention through Telemedicine - Using online platforms via video or telephonic consultation for the purpose of assessment and prescription of physiotherapy interventions.
- An initial consultation and shared decision-making process is advisable to discuss and agree with the person whether it should be by video, phone or in person. Take into account whether they may have symptoms that need investigating in person or require urgent referral to an appropriate service.
 - A screening questionnaire should be considered to be used in conjunction with clinical assessment as a part of the initial consultation to help document all of the person's symptoms.

- Support access to assessment and care for people with new or ongoing symptoms after acute COVID-19, particularly for those in underserved or vulnerable groups who may have difficulty accessing services.
- Patients with less symptoms can be treated through the use of tele-physiotherapy, educational videos, remote consultations through sound systems, self-management booklets, exercise videos
- During all such interventions except those on remote basis, both Physiotherapist and patient has to ensure all Covid precautions and hygiene
- Continuous monitoring of the vitals during the regime is mandatory

Core viewers:

Post Covid Physiotherapeutic intervention can be performed by any qualified Physiotherapist working in any set up. These patients can have plethora of problems ranging from fatigue and musculoskeletal pain to respiratory or neurological impairment. Physiotherapist shall be aware all such impairments and demonstrate competence to handle patients with a wide range of age and complexities in all settings. The physiotherapy team should design a tailor-made physiotherapy plan of care based on individual problems of each patient.

Commonly used terms during COVID 19 recovery

To effectively treat and manage Post COVID condition it needs to be defined and distinguished from other conditions. A set of definitions has been used to distinguish 3 phases following infection consistent with COVID-19, and to define the term 'long COVID'. These phases are defined below.

Acute COVID-19

- Signs and symptoms of COVID-19 for up to 4 weeks.

Ongoing symptomatic COVID-19

- Signs and symptoms of COVID-19 from 4 weeks up to 12 weeks.

Post-COVID-19 syndrome

- Signs and symptoms that develop during or after an infection consistent with COVID-19, continue for more than 12 weeks and are not explained by an alternative diagnosis.

It usually presents with clusters of symptoms, often overlapping, which can fluctuate and change over time and can affect any system in the body. Post-COVID-19 syndrome may be considered before 12 weeks while the possibility of an alternative underlying disease is also being assessed.

Long COVID

- In addition to the clinical case definitions, the term 'long COVID' is commonly used to describe signs and symptoms that continue or develop after acute COVID-19. It includes both ongoing symptomatic COVID-19 (from 4 to 12 weeks) and post-COVID-19 syndrome (12 weeks or more)

Section A: Placement of Physiotherapist

It is worthwhile to appoint dedicated team of physiotherapists in post Covid physiotherapeutic intervention set up

A1. It is recommended that qualified physiotherapists with required skills in providing Physiotherapy management pertaining to all impairments in the patient should be appointed

A2. Necessary training should be provided for the physiotherapists deployed in such Post COVID physiotherapeutic intervention by the specialist physiotherapists if required.

A3. Therapist placed in COVID care facilities should be trained in

1. Evaluation and assessment
2. Identification of red flags
3. Physiotherapeutic intervention through Telemedicine technology as required
4. Safety Precautions and steps of hand washing technique, and disposal of biomedical waste as per institutional policy

A4. It is highly recommended that therapist posted in post COVID care should be vaccinated as per Government of India's guidelines

Section –B: Physiotherapy Clinical Decision making

1. Physiotherapy decision making depends largely on manifestations of the patients, the associated movement dysfunction and physical therapy diagnosis. Patients with a limitation in physical /functional capacity and/or physical activity, impaired quality of life in various domains and those with known system dysfunctions are eligible for physiotherapy.
2. Physiotherapist should be able to assess the patient for impairments, activities and participation and develop a treatment plan focusing on maximal functional abilities with minimal energy consumption.
3. Decision making would be based on severity of symptoms and systems involvement
4. Asymptomatic patients without any primary system involvement and in home quarantine with normal basic investigations would need to be evaluated for deconditioning effect and fitness due to restricted activity at home. Physiotherapist should formulate an exercise program to maintain activity and fitness at home.
5. Asymptomatic patients but having any other primary involvement of cardiorespiratory, neuromusculoskeletal or metabolic impairment should be evaluated as per system evaluation and identification to deliver physiotherapy care
6. Symptomatic patients should be assessed based on symptoms experienced, origin of source of symptoms, relevant assessment and investigation, contextual factors, pharmacotherapeutic interactions to reach physical therapy diagnosis and provide and execute plan of physiotherapy care

The following residual effects can be experienced post covid 19.

1) Respiratory System

- a) Dyspnea/breathlessness (due to post-covid changes/fibrosis of the lung or pulmonary thromboembolism)
- b) Oxygen support on activity or long-term oxygen therapy (due to persistent V/Q mismatch)
- c) Difficulty in airway clearance (due to respiratory muscle weakness and/or atelectasis and/or hyper secretory phase due to long standing/associated lung infection)

2) Cardiovascular System

- a) Palpitation', chest pain, excessive fatigue in view of Myocarditis or Cardiomyopathy or Pulmonary thromboembolism
- b) Poor exercise tolerance

3) Nervous System

- a) Movement dysfunctions related to Stroke syndromes and Guillain Barre syndrome
- b) Loss of sleep -Anosmia
- c) Cognitive impairment related to ICU psychosis or due to prolonged ICU stay

4) Musculoskeletal System

- a) Muscle Pains(myalgia), Muscle weakness, Joint pains (poly arthralgia), excessive fatigue may be experienced. Patients may complain of less energy levels to carry out daily routine

5) Mental Health

- a) Anxiety', Depression, Post-traumatic stress disorder and ICU psychosis are common as a result of post intensive care unit syndrome

6) Metabolic

- a) New-onset Diabetes Mellitus

The physiotherapist should be aware and familiar with the clinical picture/ hospital stay and the physiotherapeutic intervention strategies. The physiotherapist should also be able to identify the need for referral to other disciplines such as psychologists and dietitians as needed. Some people (including children and older people) may not have the most commonly reported new or ongoing symptoms after acute COVID-19.

Section C: Pre- Physiotherapeutic Intervention Screening and assessment for Physiotherapy interventions

It is important that all patients referred for physiotherapy should be screened prior, assessed and continuously monitored prior, during and after physiotherapy care.

C1 Pre-Physiotherapy Intervention Screening:

C 1.1. Prior screening by checking the hospital/treatment records for any cardiovascular impairment in the form of myocarditis or ischemia or pulmonary thromboembolism during hospital stay and related advice by the physician is mandatory.

Patients with suspected post-Covid myocarditis, acute chest pain, pedal oedema, excessive sweating or any such signs of associated cardiac involvement or with raised inflammatory markers should immediately be referred to the concerned physician and should be attended only after the patient is completely asymptomatic of the cardiac symptoms and is ready/referred back for physiotherapeutic intervention.

Similarly patients with symptoms of giddiness should be evaluated for the source of symptoms before enrolment

Associated primary system impairments of cardio respiratory, metabolic, musculoskeletal or neurological should be noted to facilitate special rehabilitative pathways

C 1.2. Associated co morbidities that would alter the course and path of physiotherapy physiotherapeutic intervention should be documented

C 1.3. Hemodynamic stability at rest and with mobility and exercise during the ward course and pre discharge should be noted from documented records.

C 1.4. Respiratory and oxygen support requirements for activity induced desaturation should also be noted

C 1.5. Detailed evaluation for the course of disease when hospitalized or in quarantine centers, along with related investigations and pharmacological management should be noted to facilitate the mode of Physiotherapy intervention.

C.2 Physiotherapy Assessment

It is recommended that a detailed Physiotherapy assessment to be done before beginning of a Post Covid Physiotherapy regime. Such an assessment should include the following

- 1) Detailed Demographic data which would include age, gender, residence, work,

2) Covid-19 History

Covid 19 History details should include :

- a) Date of positive RTPCR
- b) Symptoms on diagnosis and categorization of severity
- c) Place of isolation whether quarantine centers, home, or hospital admission
- d) Hospitalization details including need of ICU stay, oxygen support, mechanical ventilation, NIV, HFNC, drugs, associated complications if any
- e) Investigations which would include CBC, Blood Sugar level and HbA1C, Inflammatory markers, enzymes, thrombogenicity, cardiac reports like ECG, echocardiography, respiratory system evaluation reports like X- Ray, HRCT, Last available ABG, PFT
- f) Present symptomology since post covid and perceived activity limitations
- g) Co-morbidities and preexisting Musculoskeletal or Neuromuscular disorders
- h) Perceived activity limitations

3) System Examination

System evaluation and examination should include

- a) Resting and activity related vital parameters of HR, BP, SpO₂
- b) Respiratory system evaluation for
 - i. resting and activity breathing pattern
 - ii. Ventilation and presence of secretions as on auscultation
 - iii. use of oxygen support details
 - iv. degree of dyspnea as on MRC scale
 - v. breath holding capacity
- c) cardiovascular system evaluation of change in heart rate and blood pressure with activity. Any associated symptoms of chest pain, excessive sweating or giddiness would warrant discontinuation of activity
- d) Musculoskeletal system
 - i. Pain - Site, type, severity using VAS/NPRS
 - ii. Range of Motion assessment
 - iii. Myalgia and Muscle spasm
 - iv. Gait with/without assistive devices

e)Neuromuscular system

- i. Balance and co-ordination assessment
- ii. sensory assessment
- iii. Paresthesia if present
- iv. Manual Muscle Testing

4)Functional Assessment

a)Functional Capacity

i. 6 MWT

- 1. Avoided in case of tele physiotherapeutic intervention mode
- 2. If difficulty to walk for 6 minutes due to any cause, two-minute walk test or 40-meter walk test can be considered

ii. 30 second sit to stand or 1 minute sit to stand test

iii. TUG for balance

b. Fatigue Assessment

i. Visual Analogue scale for Fatigue (VAS-F)

ii. Fatigue Severity Scale

c. Gross screening for Psychological impairment

- i. Screen for anxiety and depression and if found appropriate, refer to the consultant

d. Nutritional Assessment

i. Weight Loss

ii. Loss of Muscle Mass

iii. BMI

Physiotherapist needs to tailor monitoring of people's symptoms and discuss any changes, including new or worsening symptoms and the effects of these on the person's wellbeing.

Consider supported self-monitoring at homelike heart rate and blood pressure and pulse oximetry where feasible. Ensure that people have clear instructions and parameters for when to seek further help.

Physiotherapist needs to be alert to symptoms developing that could mean referral or investigation is needed.

Section D Physiotherapy Interventions:

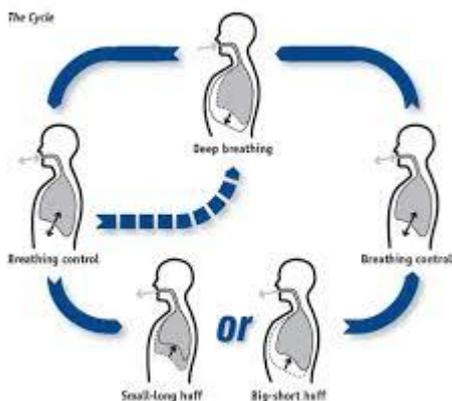
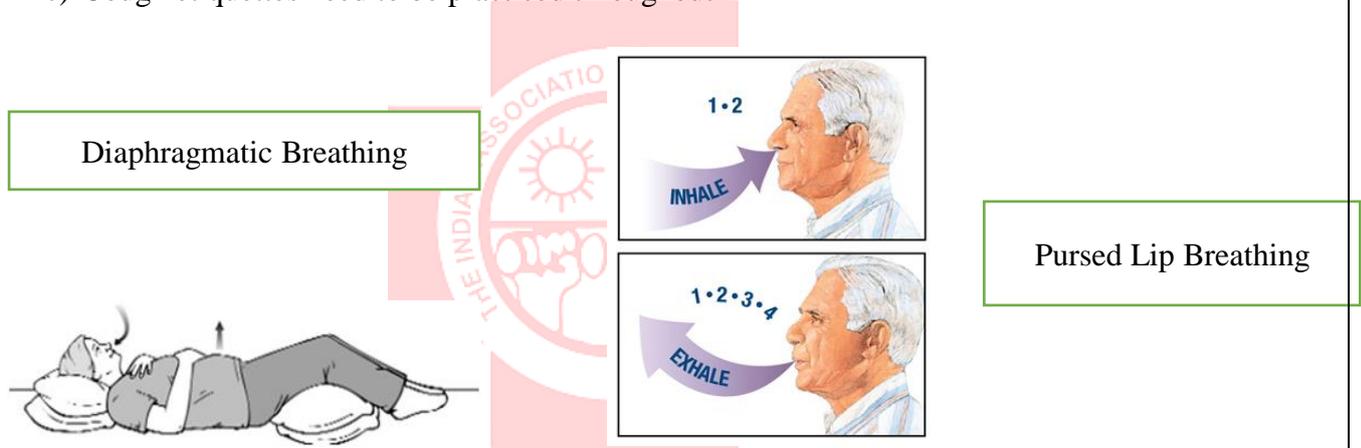
It is advisable to opt for tailor made protocol which depends on severity of impairments and number of systems involved. Physiotherapy interventions should be directed towards Respiratory exercises, Muscle endurance and strength training, energy conservation, functional independence and training and patient education. Intervention includes selection of proper exercises and Exercise Prescription.

D.1 Physiotherapy Intervention

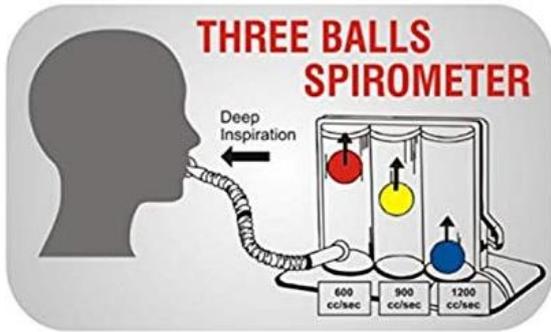
D.1.1 Respiratory Exercises

- 1) Improving Inspiratory Capacity and recruiting Diaphragm
 - a) Inspiratory breath holds with an inspiratory hold for 3 seconds
 - b) Diaphragmatic Breathing
- 2) Breathing control and Pursed lip breathing
- 3) Positioning - In patients with persistent breathlessness, prone positioning can be continued with adequate support for comfortable position and monitoring of vitals.
- 4) Airway Clearance techniques - for patients with retention of secretions or difficulty in expectoration
 - a) Active Cycle of Breathing (ACBT)
 - b) Autogenic Drainage (AD)
- 5) Lung Volume Expansion Exercises
 - a) Chest expansion Exercises with proprioceptive feedback with emphasis on thoracic expansion

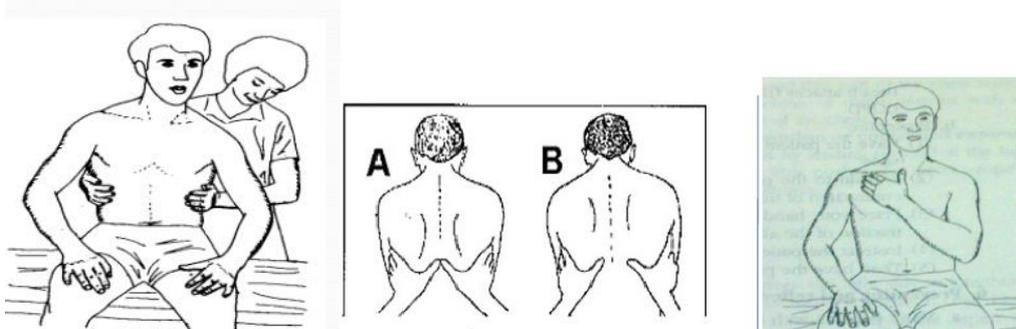
- b) Thoracic expansion exercises and ribcage mobility in view of restrictive nature of the disease
 - c) Segmental Expansion Exercises
 - d) Incentive Spirometry - Single use device
- 6) Respiratory Muscle Training - it is recommended to avoid overloading the muscles during respiratory muscle training
- a) Inspiratory Muscle Training (IMT) - these device load respiratory muscles. 2 sessions of 10 minutes per week for six weeks
 - b) Non-threshold load training for inspiratory muscles - started from 3 cm H₂O and slowly increased thereafter, 10-15 minutes
 - c) Cough etiquettes need to be practiced throughout



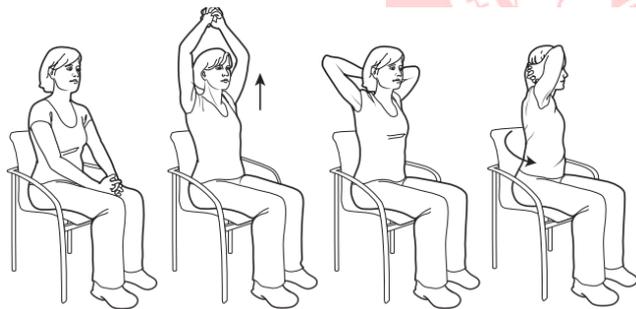
Active cycle of Breathing techniques



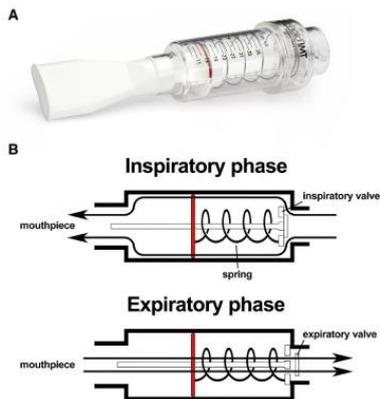
Incentive Spirometer



Segmental Breathing Exercises



Thoracic Expansion Exercises



IMT Device

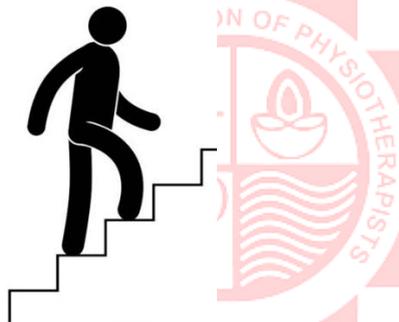
D.1.2 Exercises to improve endurance

Unfortunately, many patients that develop COVID-19 are not endurance trained prior to infection.

- 1) Cycle Ergometer / Walking / Stair Climbing - These can be performed together in one regime or separated across the regime depending on patient's compliance. Beginning with 5 minutes can be progressed to 15 minutes.
- 2) Intensity of walking and cycling can be based on 6 MWT report.
- 3) Generalized low impact aerobic exercises are recommended to avoid muscle and joint injury. Dosage can be decided as per FITT Principle



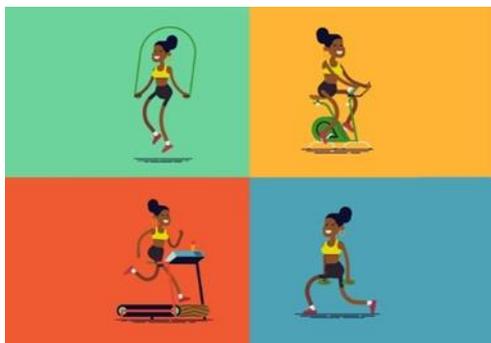
Cycle Ergometer



Stair Climbing



Walking



Aerobic Exercises

D.1.3 Exercises to improve muscle strength

Muscle-strengthening activities involving major muscle groups are recommended on two or more days a week

- 1) Resistance's training of major muscle groups to be performed for Upper and Lower Limb muscles.
- 2) Preferable resistance training should be done in functional positions
- 3) 2 sets of 10 repetitions should be performed as per phase of Recovery
- 4) It is preferable to opt for circuit training while going for strengthening exercise regime.
- 5) Use of multi joint exercises should be preferred over single joint strengthening
- 6) Preferable exercise protocol should be 3-6 sets per muscle group per week. It is preferable to opt for multi joint exercises within the limits of fatigue. Exercise session should start with 15 minutes and not exceed 45 minutes, low repetitions of less than 5-6 initially with interval of minimum 3 minutes between the sets and this can then progress as the recovery status improves. Exercises can be performed with controlled movement velocity of approximately 2 seconds in both concentric and eccentric phases.

D.1.4 Improving balance and co-ordination

- 1) Static and Dynamic Balance training exercises as per the patient status should be performed
- 2) Such exercises should be performed initially on stable surface without obstacles progressing to obstacles and then to unstable surface without obstacles and finally to obstacle training on unstable surface
- 3) Closed chain functional movements as partial squats, chair squats, pushups, weight shifts to be prescribed and these can also be advised to patients who are performing such exercises at home or through tele physiotherapy during the recovery phase post assessment.
- 4) Backward walking, Side walking, walking with obstacles are the progression to such exercises in later phase of recovery

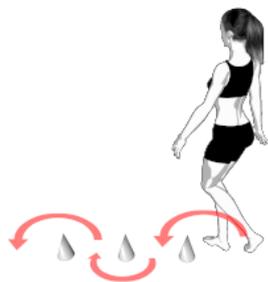
D.1.5 Achieving Functional Independence

1) Walking -

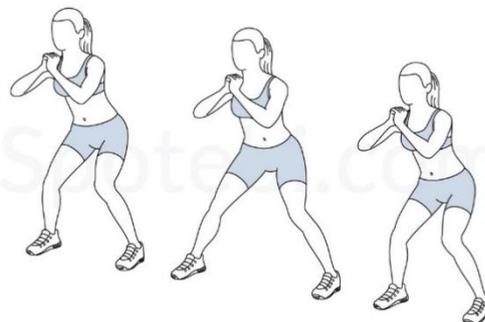
a) 10,000 steps/day is reasonable for healthy adults;

b) 64–170 steps/minute with at least 10 min duration is also reasonable for healthy adults

2) Encouraging patient to perform activities of daily living with micro breaks and within the limits of fatigue.

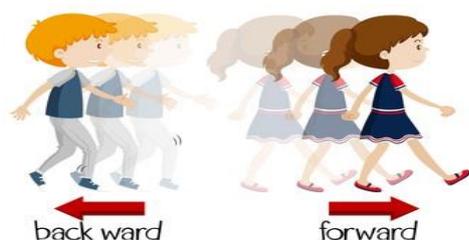


Obstacle Walking



Lateral Walking

Normal Walking



Retro walking

D.2 Exercise Prescription Guidelines

Table 1 - A General guidelines of exercise prescription in the post COVID 19 recovery phases.

| Time post covid diagnosis | 3-6 weeks | 6-12 weeks | 12-36 weeks | More than 36 weeks |
|---------------------------|---|--|---|---|
| Intensity | Start slow RPE9-10 on 20-point scale or 1-3 on 10-point scale | Based on exercise test and Symptom management of breathlessness and fatigue or RPE10-13 on 20-point scale or 2-4 on 10-point scale | Patient oriented Based on exercise test and Symptom management of breathlessness and fatigue or RPE10-13 on 20-point scale or 2-4 on 10-point scale | Patient oriented Based on exercise test and Symptom management or RPE13-15 on 20-point scale or 4-5 on 10-point scale |
| Frequency | Daily | Daily to 5 times a week | Aerobic – daily or thrice a week depending on intensity Resistance training 2-3 times a week | Aerobic – daily or thrice a week depending on intensity Resistance training twice a week |

| | | | | |
|------|--|---|---|---|
| Time | Multiple short session to accumulate 15-20 minutes of activity. | 20-30 mins | Minimum of 20 minutes of activities and progress up to 45 minutes of continuous activities according to patient's tolerance. | Minimum of 30 minutes of continuous activities and progress up to 60 minutes of continuous activities according to patient's tolerance. |
| Type | ADL activities Walking Functional activities like sit to stand | Walking-lateral lower limb exercises can be added as per tolerance. Interval training can be incorporated Incorporate group exercises and interval training. Upper and lower extremity free exercises Treadmill and cycle ergometer Balance exercises in sitting standing should be given. | Body weight exercises can be added. Exercises can be grouped in 1-3 sets/time with 8-12 repetitions with 1 minute rest interval between set. 5% to 10% is increased per week. Progressive resisted exercises of minimum 2-3 session per week for upper | Body weight exercises can be added. Exercise s can be grouped in 1-3 sets/time with 8-12 repetitions with 1 minute rest interval between set. 5% to 10% is increased per week. Progressive resisted exercises of minimum 2-3 session per |

| | | | | |
|--|--|--|--|---|
| | | <p>Resisted</p> <p>Upper and lower extremities low weight exercises as per patient's tolerance (RPE).</p> <p>Exercises of 1-3 set/time with 8-12 repetitions with 2-minute rest intervals.</p> <p>Progress according to the patient's tolerance.</p> <p>Addition of resistance training</p> <p>Minimum 2-3 sessions per week</p> | <p>and lower extremities as per patient's tolerance (RPE).</p> | <p>week for upper and lower extremities as per patient's tolerance (RPE).</p> |
|--|--|--|--|---|

Intensity of Exercises – It is advisable to start such exercises at 40% intensity which can be progressed by 5% every week. Decision on Exercise intensity should be based on Heart Rate, RPE and Oxygen Saturation of the patient. Progression needs to be done based on patient's symptomatology.

Special considerations should be taken for elderly /geriatric population and children. Caution should be exercised while prescribing exercises for pregnant ladies. Antenatal Physiotherapy care pathway should be followed for the same.

Risk of fall and frailty should be evaluated for elderly population and special test carried out. Use of assistive device should be looked into.

Children should be evaluated as per symptoms, Therapeutic modalities and test suitable for children be undertaken.

The frequency, intensity, type and time (FITT) of exercises would vary depending upon the patient status, severity, symptoms and phase of recovery.

- 1) Total duration of Exercise Program - in order to achieve maximum benefit, exercise program should be of minimum 6-12 weeks with 2-3 days per week of supervised sessions of 30-45 minutes duration with appropriate rest intervals and within the limits of fatigue
- 2) Oxygen support and monitoring during exercise - continuous monitoring of Oxygen saturation is mandatory.
 - a) In patients with Oxygen support or at risk of desaturation more attention towards monitoring saturation to be paid. Exercise induced desaturation needs to be evaluated prior to exercise prescription
 - b) Re-evaluation of oxygen requirement should be done frequently
 - c) Monitoring of resting Blood Pressure and heart rate should be done.
- 3) Aerobic and resistance training
 - a) Should be applied as per FITT Principle
 - b) Done within limits of RPE
 - c) Exercise prescription of endurance and resistance training should be done as per the general guidelines mentioned in Table 1.
- 4) Exercises should be administered within the level of tolerance without desaturation below 95% in mild cases and 88% in moderate and severe cases

D.2.1 Long Covid Patients with use of supplementary Oxygen

It is seen that Oxygen use has extended from inpatient to outpatient settings for patients recovering from Covid 19 due to hypoxemia. Oxygen delivery systems are categorized into low-flow and high-flow systems. Patients recovering post-acute phase from Covid 19 may need Low flow Oxygen Delivery system at home post discharge.

- ❖ Low flow Oxygen Delivery System - Low-flow systems provide lower oxygen flow than the actual inspiratory flow up to 30L/min.

Types of Low flow Oxygen delivery system include: -

- Nasal Cannula - for mild hypoxia between 1-6 L /min
- Simple Face Mask - Used to deliver between 5-10L /min
- Non re-breather mask - Low flow device with a high FiO_2 . It can be set to deliver between 10 and 15 L /min (80–95% oxygen)



- ❖ High Flow Oxygen Delivery System - High-flow oxygen therapy is applied with a special binasal high-flow nasal cannula (HFNC). This would be commonly seen in an acute care set up in ICU. High-flow oxygen therapy can effectively be used to treat patients with moderate levels of hypoxemic respiratory failure.

D.2.2 Precaution for Physiotherapy while patients need Oxygen therapy

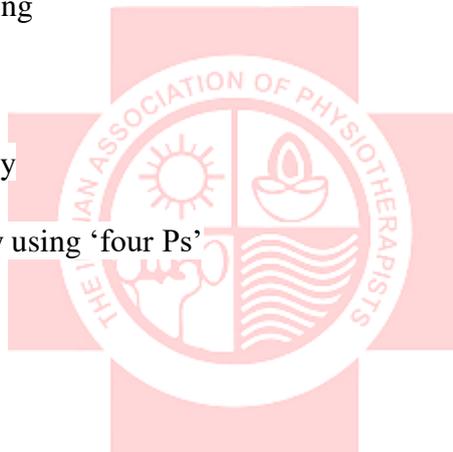
- A patient using oxygen at rest, will definitely require it during exertion and all exercises.
- The additional demands of physiotherapeutic interventions may cause oxygen desaturation; patients should be observed for signs and symptoms of hypoxemia
- Patients with a forced expiratory volume (FEV1) less than 50% or a diffusing capacity for carbon monoxide (DLCO) less than 60% of the predicted normal value, are likely to exhibit oxygen desaturation during exertion and should have their oxygenation status monitored.
- A drop in oxygen saturation to less than 90% during activity indicates that the patient needs supplemental oxygen during activity; an order to institute oxygen

therapy or to increase the oxygen dose during exertion should be requested from the physician.

- It is recommended to titrate Oxygen to maintain saturation at least 90-92% during activity.
- Associated Hemodynamics should be constantly monitored along with fatigue
- Home physical therapists should be aware of the oxygen therapy prescription for their patients and ensure that they are using their oxygen as prescribed. Energy conservation techniques should be used. Energy Conservation Strategies to reduce fatigue are important in early recovery phase and patients who desaturate.

They include the following

- Advice to go slow
- Start activities gradually
- Conservation of energy using 'four Ps'
 - a) Planning
 - b) Prioritization
 - c) Positioning
 - d) Pacing
- Advice to avoid the boom-and-bust behavior
- Techniques to balance activity and rest



D.3 Termination of Exercises

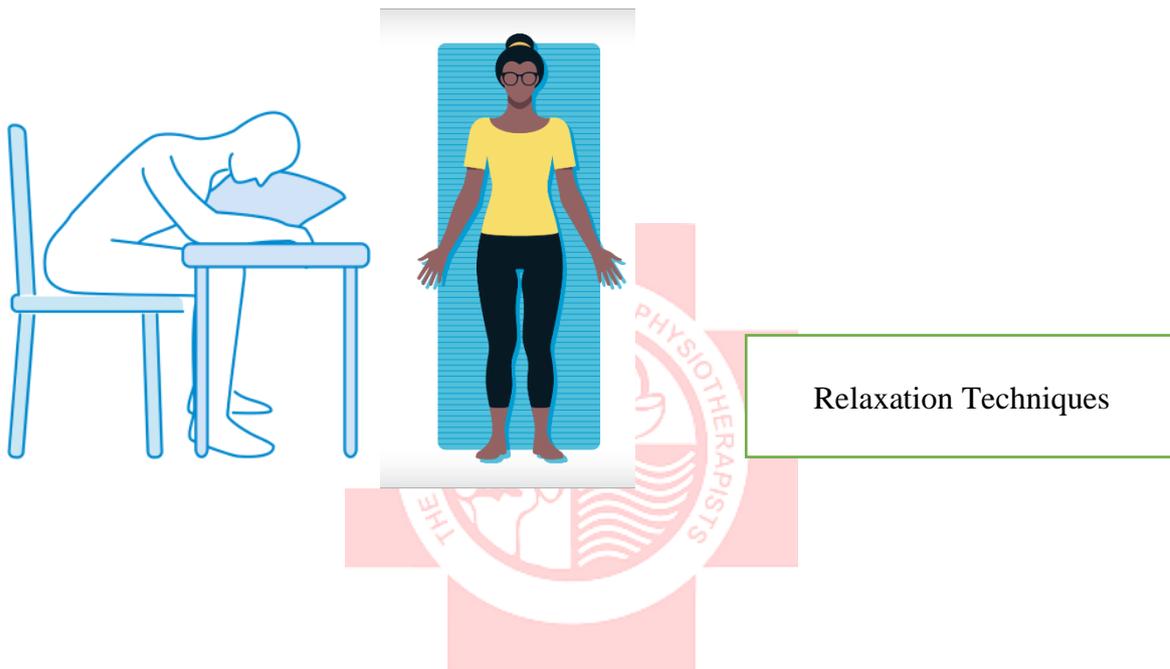
Exercises should be terminated immediately if patient shows the following (ACSM)

- 1) Oxygen saturation drops < 88% or Heart rate increases disproportionately
- 2) Develops symptoms such as palpitation, sweating, chest tightness, shortness of breath or leg cramps

3) Complains of any new symptoms

D.4 Relaxation

Relaxation approaches are important for patients to decrease anxiety and stress related to disease and isolation. Patient can be in position of ease without distress. Soothing music can be used while relaxation training is being imparted



Section E: Safety Recommendation for Patients and Physiotherapists

E.1 Safety for patients

- Safety screening to identify the readiness for activities and ambulation should include

Cardiovascular and respiratory factors:

- No new cardiac arrhythmia or myocardial ischemia
- Heart Rate > 40 or < 120 bpm
- Systolic blood pressure > 90 or < 180 mm Hg
- Mean Arterial Pressure ≥ 60
- Respiratory rate > 10 or < 28 bpm
- Oxygen saturation $\geq 90\%$

Other factors

- Pain: Numeric Rating Scale less than 3
- Hemoglobin level more than 7 grams/dL
- Platelet count level more than $21 \times 10^3 / \mu\text{L}$
- Body temperature $< 38.5^\circ\text{C}$
- Blood glucose level 3.5 – 20 mmol/L
- Potassium Level 3.5 to 5.5 mEq/L
- No invasive (arterial / venous) lines that makes mobilization unsafe
- Safe environment and appropriate staffing.
- Asses patient's response during activity and mobilization to know whether the patient is tolerating the intervention.
- Signs of intolerance include
 - Pain: NRS ≥ 3 .

- Increase in patient's heart rate of 30 bpm over baseline with an upper limit \leq 120bpm.
- Decrease systolic blood pressure $>$ 10mm Hg during exercise.
- Diastolic blood pressure \geq 110 mm Hg.
- No rise in systolic blood pressure and heart rate.
- Increasing ectopic beats.
- Arrhythmias.
- Signs and symptoms of myocardial infarction.
- Symptoms of respiratory distress.
- Patient appears distressed.

• E.2 Safety Recommendations for therapist:

E.2.1. Healthcare workers performing aerosol-generating procedures on patients with COVID-19 should wear fitted respirator masks (N-95) instead of surgical masks along with other personal protective equipment and eye protection

E.2.2 Procedures generates aerosol include chest percussion, vibration, prone positioning and activities that can results in expectoration of sputum or facilitate cough like exercise training and mobilization. Since airway clearance produces enormous droplet dispersion, it should be considered strictly only if indicated even if the patient has recovered from Covid 19.

E.2.3 Whenever possible contactless mode of therapy is recommended. Strict social distancing should be followed when treating the patient in a center.

E.2.4 Tools for patient education such as charts in language understood, audio-visual aids, mike systems should be used to encourage contactless or minimal contact therapy.

E.2.5 It is essential that cough etiquettes (covering mouth with hands, handkerchief, coughing in sleeves with folded elbows) be taught to all the patients. Patient should be wearing a mask during all physiotherapeutic maneuvers.

Section F Recommendation for discharge planning following recovery:

F1. COVID 19 mimics other Co-V outbreaks, hence evidences and experiences of the past having demonstrated an impaired quality of life associated with emotional distress may be expected as long-term sequelae in COVID 19 survivors. A prolonged critical care stay associated with lung changes would need long term exercise program to improve quality of life. Most patients with COVID 19 would need pulmonary physiotherapy approach and follow up. Home programme with education, counselling, tailored exercise program and healthy nutrition along with tele physiotherapy should be encouraged accordingly.

Section G Yoga:

Practice of yoga along with physiotherapy may be effective in facilitating recovery. Physiotherapist plays an important role to guide patients in yogic practices being performed based on knowledge of movement science and assessment of patient parameters. Please refer the guidelines by ministry of AYUSH for YOGA guidelines

- Yoga is a traditional mind-body system originating in India over 5000 years ago. It plays an important role in integration of mind, body and spirit, cultivation of balance, calm, harmony and awareness and can mitigate the health and social impact of COVID-19 illness
- Pranayama or breath regulation includes modulation of the pace of breathing, viz. slowing down or pacing the breath, manipulation of nostrils and chanting of humming sounds. Physiotherapeutic approach can be integrated in patients practicing pranayama.
- Asana is a body-posture that results in a steady state of comfort. The practice of postures for flexibility, balance, strength, and endurance can be advised by physiotherapist in patients practicing it based on assessment and movement analysis.
- Meditation in motion, that leads to restoration of one's physical, mental and spiritual well - being. Physiotherapy practice of relaxation and meditation can be integrated.

Table – 2 Common Yoga practices to be individually tailored based on response

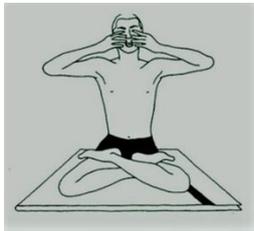
| Practices | | Methods | Effects |
|----------------------------|---|----------------|---|
| Loosening practices | Neck movements Shoulder movements Trunk movements | | It helps to prepare muscles and joints for further yoga practices |

| | | | |
|------------------|--|--|---|
| | Hip movements Knee movements | | |
| Pranayama | Sectional breathing Abdominal breathing Thoracic breathing Clavicular breathing Full yogic breathing | Breath should be slow, steady and controlled. It should not be forced or restricted in anyway. Initially start the practice with few repetitions and gradually increase the number of repetitions. | It increases lung volumes and capacities |
| | Right nostril breathing Left nostril breathing Alternate nostril breathing | Nostril breathing: Breathe in and out through right nostril, by closing left nostril and vice versa Alternate nostril breathing: Breathe in through right while closing left nostril and exhale through left while closing right and then breathe in through left and exhale through right | It decreases sympathetic activity and enhances parasympathetic activity reducing stress and anxiety |

| | | | |
|--|--------------------|--|--|
| | | completes one cycle | |
| | Bhramari breathing | Practitioner will sit in any comfortable posture and inhale and exhale through nostrils slowly and deeply. While exhaling, will have to produce sound (humming sound) like bumble bee strictly through nasal airways, keeping oral cavity closed by the lips, ears closed by fingers | It may increase Nasal Nitric Oxide (NO), which may improve blood flow to the ciliary epithelium, as antiinflammatory action, improves ventilation perfusion ratio in lungs and causes relaxation of bronchial smooth muscles |
| | Ujjayi breathing | Inhale slowly through your nose and exhale through your mouth. When exhaling, produce the sound 'HHHHHAAA'. keep your mouth closed while exhaling. Generate | Sound vibrations calm and focus the mind, letting you relax more. Sound causes the bronchi to vibrate subtly, activating the ciliated epithelium. |

| | | | |
|-------------------|------------------------|---|--|
| | | <p>the same sound as before but this time with your mouth closed.</p> <p>Make sure the sound originates from your throat and not from your nose</p> | |
| Asanas | Standing posture | <p>Tadasana (The palm tree posture)</p> <p>Padahatasana (The hands to the feet posture)</p> <p>Trikonasana (The triangle posture)</p> | |
| | Sitting posture | <p>Bhadrasana (The firm posture)</p> <p>ArdhaUshtrasana (The half camel posture)</p> <p>Sasakasana (The Hare posture)</p> <p>Vakrasana (The seated twist posture)</p> | |
| | Lying on the stomach | Bhujangasana (The Cobra posture) | |
| | Lying on the back | Pawanamuktasana (The wind releasing posture) | |
| Meditation | Mindfulness meditation | For beginners, soothing music may | Meditation helps to reduce anxiety and |

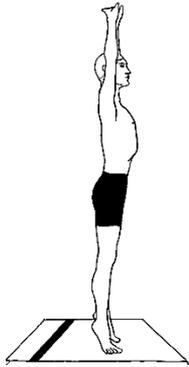
| | | | |
|--|--|---|---|
| | | <p>be played in the background during meditation or to observe the breath.</p> <p>Practice it as long as you can.</p> | <p>stress by reducing the cortisol level and enhance the alpha brain wave.</p> <p>Makes the body stable and calm the mind</p> <p>Balance the functions of neuroendocrine system thereby enhance the immune system</p> |
|--|--|---|---|



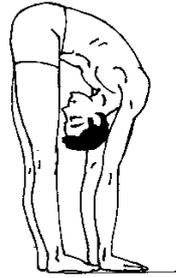
Bhramari



Nadisodhana breathing



Tadasana



Padahastakasan



Trikonasana



Bhadrasana



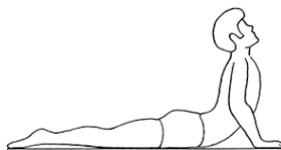
ArdhaUshtrasana



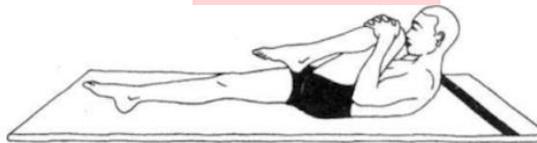
Sasakasana



Vakrasana

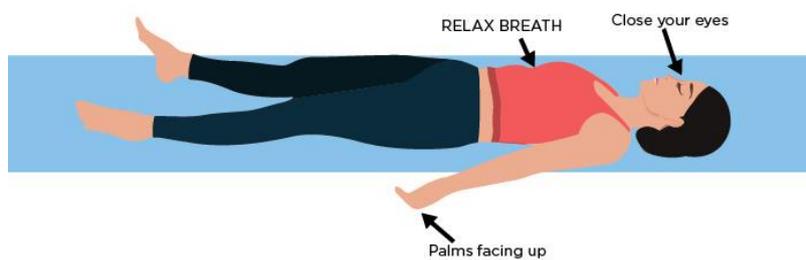


Cobra pose



Pawanmuktasana

SHAVASANA POSE



Conclusion

This adapted and updated document provides guidelines to physiotherapists in assessing, planning and implementing post COVID physiotherapy care in patients recovering from COVID-19. Therapists' individual clinical judgment will be the key along with the guidelines in rehabilitating clients recovered from COVID. These guidelines are subject to upgradation with more information and evidence as available.

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