



Physiotherapy guidelines for patients with COVID-19 in an Acute Care setting by the members of The Indian Association of Physiotherapists

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Preamble:

Physiotherapist have been the frontline workers since the outbreak of the pandemic COVID19 a public health emergency creating a dramatic effect throughout the world in terms of economic health and social life. During this crisis phase where national and regional authorities have instituted extraordinary measures to contain the spread. Physiotherapists 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.

The Indian Association of Physiotherapist hereby proposes to update the national consensus recommendations of physiotherapy management in COVID 19 in Acute care Indian Set up published (IJCCM OCT 2020 & Maharashtra state OTPT council June 2020) based on gathered experience, further consensus and literature and issue Guidelines for Pulmonary Physiotherapy in Acute care COVID 19

Objectives:

The objective of this Guideline is to explain the role of respiratory physiotherapy in confirmed Covid 19 patients in acute hospital settings. Respiratory physiotherapy aims to 1) Optimize ventilation and Oxygenation thereby reducing the need of supplemental oxygen to maintain saturation. This would minimize the additional need of oxygen as resource. 2) Relieve dyspnea and work of breathing hence reducing the load on respiratory muscles. 3) Remove secretions if present and clear airways to facilitate breathing and improve ventilation. 4)Alleviate anxiety and depression which would help in reducing the stress on breathing, making patients more comfortable and improve their ability to follow commands.5) Reduce complications associated with bedrest and ICU admission hence reducing the length of hospital stay and improve quality of life

Scope:

This document provides fundamental information to physiotherapists involved in acute COVID-19 care settings.

- 1) Screening and assessment for physiotherapy intervention
- 2) Indications and contraindications for respiratory physiotherapy
- 3) Pulmonary exercise interventions and
- 4) Safety and personal protection policy

Setting and Timing:

Early respiratory physiotherapy is not recommended for severely and critically ill patients if their conditions remain unstabilised or if progressive deterioration is seen. The timing of respiratory physiotherapy intervention should exclude contraindications and should not aggravate infection. The staged respiratory management measures can be used during different stages for patients with different sequela.

Core viewers:

Physiotherapists involved in the care of adult COVID-19 patients in intensive care units, hospital care centers, jumbo centers, home ICUs and any other acute care settings.

Acute Care ICU & Step-down unit: These are high dependency units where individual patients need to be evaluated with close monitoring. Physiotherapist should use personal protective equipment (PPE) while treating patients with COVID 19. It may include geriatric patients, obese patients and patients with multiple co-morbidities, one or more organ failure, the physiotherapy team here should design a tailor-made rehab care plan based on individual problems of each patient

Wards & Jumbo centers: Patients that are stable and do not need one on one monitoring can be treated with group therapy and contactless through the use of tele-physiotherapy , educational videos, remote consultations through sound systems, self-management booklets, exercise videos which are employed to reduce the usage of protective equipment and to avoid cross infections. During contact group therapy use of PPE is advocated

SECTION A: Placement of Physiotherapist

It is worthwhile to appoint dedicated team of physiotherapists in acute care considering the health benefits of physiotherapy care

A1. It is recommended that qualified physiotherapists with required skills in providing respiratory physiotherapy should be made available in every COVID care facilities.

A2. Necessary training should be provided for the physiotherapists deployed in COVID care facilities by the specialist physiotherapists if required

A3. Therapist placed in COVID care facilities should be trained in proper use of Personal protective equipment (PPE) (technique and sequence of donning and doffing) steps of hand washing technique, and disposal of biomedical waste as per institutional policy

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

Section –B: Physiotherapy Decision making

Patients admitted in acute care setup are categorized into mild, moderate and severe as per national task force guidelines. Patients severe COVID 19 pneumonia and ARDS are generally admitted in ICU and are on high flow oxygen support with Mechanical Ventilation (MV) or Non Invasive Ventilation (NIV) or Non rebreathing Mask (NRBM) or High Flow Nasal Oxygen (HFNO), those with mild involvement are generally admitted in wards and may be on room air.

B 1. Once received reference from treating physician, therapist shall categorize patient for the need and rationale of physiotherapy by reading through the case record and available investigations.

B 2 Clinical classification and suggested Physiotherapy care:

Severity	O2 Saturation (SpO ₂)	Symptoms	D Dimer	HR CT severity score	O2 support	Physiotherapy management
Mild	Mild or No change at rest (SpO ₂ of 92-94%)	No	<1	< 8	Low flow oxygen or Room air/ home isolation	Diaphragmatic breathing exercise (RR<24) Incentive spirometer
Moderate	Drop in SpO ₂ during activity	fever, cough, breathlessness	>1 moderate to severe	9-19	High flow oxygen (HFO) system/ venturi mask	Proning Airway clearance techniques- (Active techniques- ACBT, FET) Diaphragmatic breathing exercise (RR.<24) Early mobilisation (with monitoring of level of consciousness, oxygen saturation and haemodynamic stability in discussion with physician)
Severe	High FiO ₂ and PEEP to maintain oxygenation	Altered mental status Signs of ARDS(mild to Severe)		> 15	Mechanical ventilator (MV) or non - invasive ventilation (NIV)	Proning Airway care Closed suctioning Early mobilisation
Critical	Needs High FiO ₂ & PEEP to maintain oxygenation	ARDS, multiorgan failure,sepsis,shock,			Mechanical ventilator or on Extra Corporeal Membrane oxygenation (ECMO)	Proning Airway care Closed suctioning Early mobilisation.

Section C- Screening and assessment for Physiotherapy interventions

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

C1 Screening

C 1.1. It is recommended that Screening for comorbid conditions like cardiovascular, metabolic and associated musculoskeletal or neurological impairments.

C 1.2. Hemodynamic stability such as Heart rate, Blood Pressure, ECG changes and other associated cardiovascular signs documented in the case record should be analysed by the treating therapist. Wherever required discuss with consultant in charge and other health care team to rule out hemodynamic instability.

C 1.3. Respiratory parameters such as respiratory rate, breathing pattern, Oxygen status and breathlessness should be observed. Any recent change in the respiratory parameters should be observed and documented.

C 1.4. It is mandatory to screen for activity induced desaturation. Fall of oxygen saturation more than 3% or saturation of < 96% at rest should be monitored closely. Patients with HFO therapy are observed to desaturate rapidly. Oxygen need should be monitored and titrated in consultation with physician.

C 1.5. Patients should be screened for feasibility of mobilisation, especially those who are mechanically ventilated.

C.2 Physiotherapy assessment

C .2.1. Muscle strength and Range of motion should be assessed in stable patients admitted for more than 4 days as skeletal muscle weakness is observed.

C .2.2. Quick tools for functional assessment during predischage and in mild affection can be used . These are 40 metre walk test, one leg stance, timed up and go test and six minute walk test. Where feasible isometric grip strength can be measured using hand dynamometer.

C .2.3. Fatigue can be measured using Fatigue severity scale while mobilization, graded exercise and on activities of daily living. Borg scale of perceived exertion is simple and understood by patient easily hence is also recommended.

C .2.4. Patients in ICU on Mechanical ventilator, NIV should be assessed for agitation and delirium using (Richmond Agitation Sedation Scale) RASS20 for decision making of active mobility within safety limits. Pressure areas should be screened for developing of pressure sores if any

C .2.5. Routine evaluation of skin should be done in patients who are sedated and immobilized for pressure sores

C .2.6. Respiratory physiotherapy assessment should be carried for clinical decision making of judicious use of respiratory physiotherapy intervention..

D.1 Respiratory Physiotherapy

D.1.1. Patients likely to benefit from respiratory physiotherapy:

Increased need of supplemental oxygenation support due to ventilation perfusion mismatch
Presence of copious secretions
Associated respiratory disease
Secretions with weak cough
Inadequate ventilation
Improved saturation response to positioning, reduced fatigue and dyspnoea.
Weaning from Mechanical Ventilator.
Prolonged immobilization during ICU stay
Decreased functional capacity

D.1.2. Patients with minimum benefit from Respiratory physiotherapy:

D.1.2.1. Patients with acute ARDS infection with a respiratory rate $> 30\text{b/min}$; $\text{SpO}_2 < 90\%$ despite oxygen support, a FiO_2 of $> 50\%$ on a non-invasive mechanical ventilator and $\text{PEEP/CPAP} > 10\text{cmH}_2\text{O}$, and previously proning for 12 hrs and deeply sedated.

D.1.2.2. COVID 19 patients presenting with severe hypoxemia and increased work of breathing requiring intubation.

Section E Physiotherapy Interventions:

Physiotherapy intervention comprising of therapeutic body positioning helps to improve ventilation-perfusion ratio and oxygenation, airway clearance techniques to clear secretions in the airways and early mobilization to prevent effects of immobilization such as critical illness neuropathy and myopathy due to prolonged ICU stay, thereby ameliorate function and quality of life. The screening and evaluation process provide clinical reasoning for physical therapy intervention.

E.1 Acute phase intervention in Intensive Care Units (severe respiratory conditions)

E.1.1. Acute phase in severe respiratory conditions, respiratory physiotherapy procedures aim towards promoting reduction of dyspnea, tracheobronchial clearance; The role of physiotherapy here is to promote oxygenation. This would help in reducing the need of external oxygen support.

E.1.2. Strengthening of skeletal muscles and recovery of ADL are contraindicated as they can further load respiratory system resulting in increased risk of distress

E.1.3. Airway clearance techniques are not advised during acute phase in patients without a major case of bronchial obstruction. The risk/benefit ratio to be considered based on patient condition.

E.2. Acute phase severe condition in step down care units

E.2.1. In hospitalised patients with mild to moderate disease, physiotherapy can decrease symptoms like dyspnea, anxiety and depression, and improve physical capacity and quality of life. The goal of physiotherapy here is to promote better ventilation, maintain oxygenation, reduce peripheral load and improve functional capacity

E.2.2. Interventions include therapeutic body positioning, Breathing exercise, Airway clearance as needed, Limb mobility, muscle reconditioning, strengthening of respiratory and peripheral muscles as needed

E.2.3. Clearance techniques are indicated in hyper secretive patients by preferably using closed plastic bags, sputum mug or disposable device which help to prevent any spread of virus

E.3 Therapeutic Positioning:

E.3.1. Awake active prone positioning “COVID awake repositioning proning protocol” called as “CARP” in mild to moderate severity is advised to increase oxygen saturation, delay or reduce the need for intubation and intensive care in pneumonia due to COVID 19

E.3.2. COVID awake repositioning prone protocol

30 mins to 2 hrs full prone

30 mins to 2 hrs right side lying

30 mins to 2 hrs propped up sitting

30 mins to 2hrs left side lying

30 mins to 2hrs prone

E.3.4. Based on preliminary observation not all patients benefit in prone, hence the best saturation position should be accordingly advised

E.3.5. A close collaboration with team is needed to know the safe and best positions , on the basis of which a 24 hr rotation chart can be provided to facilitate improved oxygenation

E.3.6. Proning is a proven method for improving oxygenation in ARDS, however it requires expertise for patients on MV and human resource. It should be provided in the best possible manner with assistance for prolonged hours upto 12-16.

E.4.3. Breathing Exercises:

E.4.3.1. Diaphragmatic breathing exercise (DBE) not recommended, if respiratory rate is more than 24 breaths/minute or in case of any signs of respiratory distress

E.4.3.2. Diaphragmatic breathing emphasizes on abdominal movement during inspiration with relaxed shoulder girdle. It leads to slower, deeper breathing with less turbulence.

E.4.3.3. The therapist places hand on lower abdomen which acts as a proprioceptive stimulus. Patient is asked to breathe in and out through nose.

E.4.3.4. Diaphragmatic breathing can be initiated in prone position to improve ventilation in patients who tolerate prone position. Similarly chest expansion can be emphasized in the recommended therapeutic body position.

E.4.3.5. DBE- 3 times a day with 10 repetitions/set-sets (3-4 as tolerated)

Purse lip breathing can help to improve dyspnea

Effects

1. Diaphragmatic breathing exercise causes significant reductions in systolic BP by 8.4mmHg, diastolic BP by 3.6mmHg, heart rate by 6.2bpm and respiratory rate by 4.57 breaths/minute
2. Diaphragmatic breathing exercise can reduce oxidative stress, reduce cortisol and increase melatonin
3. Nasal breathing is enforced in diaphragmatic breathing as it improves oxygen uptake by 10-20% due to increased airway resistance as compared to mouth breathing. Nasal breathing when compared to mouth breathing is shown to increase nitric oxide (NO) concentration in nasal airway. The rationale for its use been the fact that NO acts as a local host defence in upper airways, stimulates the ciliary motility, an innate airborne messenger; it lowers pulmonary vascular resistance and improves oxygen saturation.

E.4.4. Airway Clearance Techniques:

E.4.4.1. In Mild to moderate disease with secretions, active cycle of breathing technique will assist in clearing the secretions

E.4.4.2 Chest manipulations involving chest percussion and vibration is recommended only with patients with copious secretions

E.4.4.3. Suctioning through closed inline suction system is advised to prevent complications of desaturation

E. 4.5 Nebulization:

D.4.5.1 Inhaled therapy using a pneumatic jet nebulizer is not recommended. A preferred option is to use dry inhalers or ultrasonic nebulizers connected to the mechanical ventilator in a closed circuit, without removing the antimicrobial filter on the expiratory branch of the circuit

E. 5 Respiratory devices

E.5.1. Various inspiratory and expiratory devices should be used judiciously. Cost effectiveness, patient benefit and risk of cross infection should be considered before prescribing. Strict infection control measures and single use policy should be adapted.

E.5.2 Oscillatory PEP device can be used to mobilize secretions 3-4 times in a day. These devices should not be used where it requires removal of facemask whether NRB or NIV. Patient affordability has to be considered before prescription of devices

E.5.3. High frequency chest wall compression (HFCC) or mechanical vibrator or cupping or percussion devices can be applied without direct contact of therapist to patient while safeguarding haemodynamic parameters in patients on ventilator with copious secretions

E.5.4. Inspiratory muscle trainer can be used where respiratory muscle weakness is found to improve strength of respiratory muscles.

E.5.5. Incentive spirometer can be used for improving volume and ventilation in patients on Nasal Prongs or Room Air.

E.6 Early Mobilisation:

E.6.1. Physical therapy starting with early passive or active assisted mobilization program is planned based on patient's level of consciousness, oxygen saturation and haemodynamic parameters. In sedated and paralyzed patients – passive movements or electrical muscle stimulation can be considered. As COVID-19 induces inflammatory response, benefit risk ratio to be weighed while planning any exercises

E.6.2 Gradual progression of low intensity exercises based on patient response to following parameters such as saturation, symptoms, permissible level of oxygen therapy and haemodynamic response should be encouraged.

E.6.3 Exercises to progress from assisted to active mobilization at the edge of bed and out of bed. Advancement of the exercise will be based on level of cooperation, hemodynamic stability, exercise capacity and neuromuscular parameters. The adequate rest interval during exercises to be allowed till discharge and to achieve functional capacity of the patients

E.7 Graded Mobilization

E.7.1. Patients with mild symptoms due to COVID-19, is advised to consider light activity within functional requirement of the patients. During exercise, if patient desaturates, oxygen therapy may be initiated in consultation with the physician. Provide adequate rest period during exercise and avoid exhaustive activities

E.7.2. Asymptomatic patients may be supported to reach at least 10 minutes of physical exercise without fatigue or desaturation below 90%. Satisfactory rest interval should be promoted to avoid undue fatigue.

E.7.3 Exercises may increase to 20 minutes applying principles of frequency, intensity, time and type after three weeks of acute episode and once patient is asymptomatic to allow adequate recovery

E.7.4. Appropriate Mobility aids to be used to improve ADL and should be disinfected. Use of light therabands to improve muscle strength can be considered during pre-discharge phase provided there is no decrease in oxygen saturation.

E.8 Recommendation for relaxation:

D.9.1. 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 in the isolation facility and quarantine area.

Section F: SAFETY RECOMMENDATION FOR PATIENTS AND PHYSIOTHERAPISTS

F.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
- No new or increase in inotropic infusion
- Heart Rate >40 or <120 bpm
- Systolic blood pressure >90 or <180 mm Hg
- Mean Arterial Pressure ≥ 60
- Respiratory rate >10 or <40 bpm
- Oxygen saturation $\geq 90\%$

Other factors

- Pain: Numeric Rating Scale less than 3
- Glasgow Coma Scale (GCS) score more than 13
- 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 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 .

- Reduced level of consciousness.
- Increase in patient's heart rate of 30 bpm over baseline with an upper limit ≤ 120 bpm.
- Decrease systolic blood pressure > 10 mm Hg during exercise.
- Diastolic blood pressure ≥ 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.

All the lines and tubes, to be taken care of while positioning

At more care should be taken to maintain the connectivity of mechanical ventilation.

Consider Group therapy in patients with mild to moderate disease. Safe distancing and appropriate use of mask during group sessions.

F.2 Safety Recommendations for therapist:

F.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

F.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.

F.2.3 Whenever possible consider contactless mode of therapy is recommended. Physiotherapists shall stand posterior to patient and keep a distance of more than 2m and stay away from the “blast zone” or line of cough

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

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

F.2.6 PPE should not be removed or adjusted and correctly worn for the duration of exposure to potentially contaminated areas

F.2.7 All personal accessory items like rings, earrings, phone, writing material should be removed before donning and entering COVID zone. Dedicated stethoscopes and pulse oxymeters should be used within isolation areas. Reusable PPE items i.e. goggles and faceshields must be cleaned and disinfected using guidelines for CDC.

Section G Recommendation for discharge planning following recovery:

G.1. 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.

Conclusion

This guideline provides recommendations to physiotherapy care in Covid-19 acute care. Physiotherapists working in acute care shall consider these recommendations along with their clinical judgements. These recommendations should be updated when appropriate evidence available

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