

**MAHARASHTRA STATE COUNCIL FOR OCCUPATIONAL THERAPY
AND PHYSIOTHERAPY, MUMBAI**

**“Guidelines for Chest Physiotherapy management of
COVID 19 in Indian Setup”.**



Maharashtra Mission Begin Again ...

**MAHARASHTRA STATE COUNCIL FOR OCCUPATIONAL THERAPY AND
PHYSIOTHERAPY, MUMBAI**



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FOR OCCUPATIONAL THERAPY & PHYSIOTHERAPY, MUMBAI
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Date: 11/06/2020

To,

Physiotherapists

Subject: Guidelines for Chest Physiotherapy for management of COVID 19 in Indian Set up.

The country is suffering from COVID 19 pandemic. Corona virus primarily targets the respiratory system. Desaturation, ARDS, pneumonia are amongst common complications of the COVID 19. **Maharashtra Act II of 2004, section 2(i)** defines Chest Physiotherapy as lifesaving treatment modality in ICU. Dedicated COVID centers, Jumbo COVID centers have deployed Physiotherapists in acute care of COVID 19 patients

The COVID 19 cases in our country are increasing day by day. Maharashtra is having highest number of COVID patients in country. The international organization have issued various guidelines. The challenges faced by Physiotherapists in Indian COVID centers are different. Bearing this mind, the experts of this section had made one **Guideline for Chest Physiotherapy for COVID patients in Indian setup**. The drafting committee of council has approved it on 10/06/2020 & by President on 11/06/2020 for publication.

All concerned hereby informed to follow these guidelines in practices to prevent transmission of COVID 19 & manage patients in ICU. We appreciate your services to human kind in this crisis. I wish you bright health.

President
Dr. Sudeep Kale
Maharashtra State Council for Occupational therapy &
Physiotherapy, Mumbai.

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“Guidelines for Chest Physiotherapy management in COVID 19 in Indian Setup”.

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Expert consensus and recommendation for Physiotherapy management in COVID 19 in Indian setup.

This consensus and recommendations are formed based on guidelines by WHO, WCPT Literature review and expert guidance and experience of physiotherapist working in COVID hospitals of India. These guidelines are subject to update as more information is obtained based on the therapist treating patients affected with COVID 19

Preamble:

In the wake of COVID 19 affecting India, the worst affected were state of Maharashtra accounting for one third of all cases in the country. Entire buildings, open grounds are converted to jumbo medical centres COVID hospitals to meet the rising needs. Since March 2020 a number of rapid changes have been incorporated in the management of Covid 19 with emerging evidences. Physiotherapists have been involved in treatment of COVID patients in intensive care and acute settings. However due to lack of consensus and guidelines there have been different protocols.

Purpose:

Consensus building exercise has been undertaken to develop and provide recommendation by putting together current experiences and available evidence to physiotherapists working in the acute care setting for treatment of confirmed or and suspected COVID 19 patients in India.

Introduction:

Physiotherapists have a vital role in management of patients admitted in the ICU. Cardiorespiratory physiotherapy has a pivotal role in the management of acute and chronic respiratory conditions that helps in improving the quality of life following acute illness and also decreasing the ICU stay thus reducing the rate of morbidity and mortality.

Physiotherapy has been demonstrated as a need in physical rehabilitation of patients post COVID-19. These patients present with variable symptoms including either with dry or productive cough. Those with dry cough may not benefit with physiotherapeutic interventions but the patients presenting with productive cough and with underlying respiratory conditions or other comorbidities, associated with hypersecretion and ineffective cough (e.g. neuromuscular disease, respiratory disease, obesity etc) may benefit from the same. Many COVID 19 patients have also presented as stroke increasing their morbidity. There is sufficient evidence to suggest the development of ICU acquired weakness in patients admitted in the ICU for prolonged period.

Early mobilisation is a part of bundle of care for the ICU that helps reduce the morbidity and mortality, however there is lack of evidence in relation to COVID 19. As physiotherapy manouvers are aerosol generating and requires contact most of the time it raises therapist's safety concerns . The recommendations given below are to benefit the patient towards improved care and reduce morbidity as well as keeping therapist safety and prevention of cross-infection in mind.

Method:

Experts in the field from cardiorespiratory physiotherapy and those providing therapy for patients with COVID 19 from various hospitals were identified. Existing guidelines, consensus and recommendations from various countries, world health organization and world confederation of physiotherapy were appraised. Experiences of physiotherapist treating patients with COVID 19 from various hospitals were noted. A guideline for physiotherapy workforce planning and preparation, physiotherapeutic intervention and safety considerations was prepared. A level of agreement was reached on 5 point likert scale from strongly disagree to strongly agree. The components disagreed were further discussed to reach a consensus.

SCOPE:

This document provides recommendation on the acute hospital setting for

1. Workforce planning and preparation including screening to determine indications for physiotherapy.
2. Delivery of physiotherapy interventions including both respiratory and mobilisation
3. Post COVID Rehabilitation
4. Safety precautions

UNDERSTANDING COVID 19:

Coronavirus disease 2019 (COVID-19) is caused by SARS-CoV-2, is a newly emergent coronavirus, that was first recognized in Wuhan, China, in December 2019. The genetic sequencing of the virus is in closely related to the SARC virus. A symptomatic COVID-19 case is a person who has developed signs and symptoms suggestive of COVID-19 while an asymptomatic case is a person infected with SARS-CoV-2 who does not develop symptoms

Various studies suggest that transmission mainly occurs from symptomatic people to others by close contact through respiratory droplets, by direct contact with infected persons, or by contact with contaminated objects and surfaces.

The study of SARS-CoV shows that virus infected lung epithelial cells produced IL-8 in addition to IL-6. IL-8 is a well-known chemoattractant for neutrophils and T cells. Infiltration of a large number of inflammatory cells is also observed in the lungs. Among the innate immune cells, neutrophils were found to be in more number. Neutrophils can act as double-edged sword as neutrophils can induce lung injury. The majority of the observed infiltrating adaptive immune cells were likely T cells, CD8+ T cells are primary cytotoxic T cells. Cytotoxic T cells derived from CD4+ T cells were found in severe patients. These cytotoxic T cells can kill virus but also contribute to lung injury. These inflammatory CD14+CD16+ monocytes with high expression of IL-6, accelerates the progression of systemic inflammatory response.

It appears to have a systemic inflammatory response with multiple organ involvement. COVID-19, similarly to other CoVs, is also found to have associated with cardiac complications, like arrhythmias and myocardial injury. Clinical presentations have been in the

form of ARDS,myocarditis, stroke, kidney failure and multiple organ failure. Lung being primarily involved with presentation of ARDS and subsequent fibrosis. Lung CT scan findings suggest multiple mottling and ground glass opacity even in asymptomatic patients.

The patients present clinically from asymptomatic to symptomatic with COVID positive and suspected COVID with acute respiratory infection.

The severity is variable and further classified as per symptoms:

1. Asymptomatic	COVID nucleic acid test positive. Without any clinical symptoms and signs and the chest imaging is normal. Does not desaturate on activity
	COVID nucleic acid test positive. Without any clinical symptoms and signs and the chest imaging is normal, however desaturate on activity.
2. Symptomatic	
Mild	Symptoms of acute upper respiratory tract infection (fever, fatigue, myalgia, cough, sore throat, runny nose, sneezing) or digestive symptoms (nausea, vomiting, abdominal pain, diarrhoea)
Moderate	Pneumonia (frequent fever, cough) with no obvious hypoxemia, chest CT with lesions
Severe	Pneumonia with hypoxemia (SpO2 < 92%)
Critical	Acute respiratory distress syndrome (ARDS), may have shock, encephalopathy, myocardial injury, heart failure, coagulation dysfunction and acute kidney injury

In the present context COVID 19 patients referred for physiotherapy may be on mechanical ventilator, Non- invasive ventilation or ECMO in severe to critical involvement. Patients with moderate to mild severity may be on high flow nasal oxygen or rebreathing bag .It is important to assess, plan, monitor and implement therapy with safety considerations for both patient and therapist.

Based on the above information the following recommendations are made

1. RECOMMENDATIONS FOR PHYSIOTHERAPY WORKFORCE PLANNING AND PREPARATION

Though many hospitals in India are declared as dedicated COVID Hospitals major hospitals manage both COVID and non COVID patients. We cannot emphasise less the need for rehabilitation of patients in the non COVID area. Hence staff delegation and rotation with a dedicated team of experts to work in COVID ICU is required. Staff with limitation in giving services to COVID 19 patients can be deployed in non-covid clinical work and administrative duties.

1.1 Recommendations for deployment of physiotherapist in COVID area:

With variable presentation from asymptomatic to symptomatic with increasing severity the covid care area are designated from quarantine centres to COVID ICU. Physiotherapist designated to these areas should be as per their expertise and training. All steps should be taken to ensure necessary training for safety of patient and therapist.

- All physiotherapist should undergo training for COVID care .
- Physiotherapists with specialised knowledge, skills and decision making ability in ICU can be consulted for advice and training.
- Senior physiotherapists with adequate experience in intensive care should be involved in determining the appropriateness of physiotherapy interventions for patients with suspected and/or proven COVID-19 in consultation with senior medical staff and according to a referral guideline in ICU.They should identify additional physical resources that may be required for physiotherapy interventions and how the risk of cross-infection can be minimised (e.g. respiratory equipment; mobilisation, exercise and rehabilitation equipment, equipment storage).
- Junior staff or trainee should be provided with training and appropriate supervision and support, particularly with decision making for complex patients with COVID-19. Hospitals should identify appropriate physiotherapy clinical leaders to implement this recommendation.
- Physiotherapists who do not have recent cardiorespiratory physiotherapy experience should be identified by hospitals and be trained for covid physiotherapy care centre with mild to moderate involvement

- Physiotherapist without acute hospital or ICU training may facilitate rehabilitation, discharge pathways or hospital avoidance for patients without COVID-19.
- Educational institutes can deploy postgraduate trainees to work in COVID and non COVID facility after training.
- Deployment of staff to treat patients in various places from quarantine centres to COVID wards and COVID ICUs should be based on the expertise and skill required.

1.2 Recommendations for Plan for an increase in the required physiotherapy workforce.

- Rotations for staff should be allowed.
- A pool of contract staff can be recruited to work in case of additional need.
- Research staff who are currently working in non-clinical roles can be recruited after training.
- Retired staff with knowledge and skills can be consulted for covid and non covid roles
- Staff who are currently working in non-clinical roles can be recruited after training to work in acute COVID setup.
- Workforce should be organized into teams that will manage COVID-19 versus non-COVID patients. Minimise or prevent movement of staff between teams. Liaise with local infection control services for recommendations for staff safety.
- Staff working in COVID area should be provided with a period of quarantine or isolation as advised by local or state policy.
- Number of staff to be deployed as per beds in the COVID ICU and care set up should be proportional to avoid undue increased workload and increased exposure within COVID ward or ICU.

1.3 Recommendations to provide learning resource and psychological support.

In order to increase the workforce strength it is important to provide resource and training.

- Learning resources and training to staff in the form of eLearning package exclusively for COVID 19 should be provided.
- Local physiotherapy staff ICU orientation and training should be provided.
- Graduate physiotherapist should be exclusively trained to treat COVID 19 with online training or course.

- Training in Personal protective equipment (PPE) ,Disinfection and disposal of biomedical waste and Hand washing should be provided.
- Relevant international, national, state and/or hospital guidelines for infection control in health care facilities should be provided.
- Promote debriefing and psychological support to boost up morale that may be adversely affected due to the increased workload.
- Alleviate anxiety over personal safety and the health of family members.
- Physiotherapists who are judged to be at high risk should not enter the COVID-19 isolation area. This includes those who are older than 55yrs of age, pregnant, immunocompromised, with associated comorbidities of diabetes, cardiac disease, renal involvement ,malignancy, respiratory disease, anaemic.

2. RECOMMENDATIONS FOR PHYSIOTHERAPY REFERRAL:

Though the presentation of COVID 19 is respiratory in nature all patients may not benefit from chest or respiratory physiotherapy. Respiratory Physiotherapy would be contraindicated in a particular subset of patients. Autopsy study has shown thrombotic foci causing a shunt effect, in such a case hypoxemia would not be corrected with physiotherapeutic intervention. Associated myocarditis, severe respiratory failure, adult respiratory distress syndrome, multisystem failure does not warrant physiotherapy. So also Patients with dry cough and non-exudative pneumonia may not benefit with chest physiotherapy.

2.1 Patients likely to benefit from Respiratory physiotherapy:

- Productive cough and presence of airway secretions.
- Patients with associated respiratory morbidity or metabolic or any other associated neuro musculoskeletal impairment
- Patients with secretions with ineffective cough.
- Patients with improved saturation response to positioning, reduced fatigue and breathlessness post therapy.
- Patients being weaned from ventilator support.
- Patients on prolonged bedrest and immobile

2.2 Patient with nil active Respiratory physiotherapy:

- Patients with a diagnosis of COVID 19 with a dry unproductive cough.
- Patients on ventilator with ARDS with increased PEEP > 15, intubated and already proning for 12 hrs and sedated.
- Patients with a diagnosis of COVID 19 with severe hypoxemia and increased distress requiring intubation.
- Patients who need only suctioning.

2.3 Contraindication to Physiotherapy

- Myocarditis, unstable haemodynamics, elevated or altered enzymes, signs of arrhythmia.
- Presence of fever.
- Hypotension or hypertension (BP <90/60 or BP > 150/100).
- Uncooperative Patient.
- Unstable Intracranial Pressure.
- Uncontrolled Bronchospasm.
- Pulmonary thromboembolism.
- Patient on mechanical ventilator with increased levels of PEEP and in multisystem failure
- Patients in sign of increased respiratory distress
- Patients not maintaining saturation inspite of high flow nasal oxygen therapy or NIV

2.4. Categorization of Patients for physiotherapy:

A. Sedated patients on Mechanical Ventilator- Goal is to minimize complications of immobility and respiratory care as per need.

B. Minimally sedated patients on mechanical ventilator or NIV- Goal is respiratory care as per need and facilitate early mobilization and weaning of ventilator .

C. Patients on High flow oxygen therapy- Goal is respiratory care as per need and progressive mobilization

D. Patients on low flow oxygen and off oxygen therapy- Goal is respiratory care as per need and functional independence.

E. Discharged: Follow up and telerehabilitation to maintain endurance capacity.

3. RECOMMENDATION FOR ASSESSMENT AND SCREENING.

The leading team physician would screen and refer patients which are haemodynamically stable for physiotherapy. Physiotherapist would further assess and screen as under using contactless method as far as possible :

- Haemodynamic stability: Cardiac sequelae should be considered in all patients post-COVID-19, regardless of severity, and all patients should be screened for their cardiac symptoms, Heart rate and Blood pressure recovery.
- Respiratory distress and desaturation: Throughout therapy patient should be monitored for signs of respiratory distress and oxygen desaturation. In event of increased desaturation, high PEEP requirement, increased respiratory rate and haemodynamic instability physiotherapy should be discontinued. Saturation to be measurement at start of treatment and through the exercise program.
- Impairments of mobility, strength, endurance and balance arising due to atrophy , sarcopenia and immobility are screened using chair sit and rise for 30 sec . Grip strength as a quick measure of gross strength and one leg stance can be used for screening in asymptomatic and symptomatic patients with mild to moderate severity one leg stance and functional mobility.
- Functional Capacity evaluation: Lower six minute walk test and decreased functional capacity has been reported following SARS outbreak , 2weeks following hospital

discharge. TUG , L test or Six minute walk test is recommended to perform to assess functional capacity .

- Fatigue: Many patients have reported excessive fatigue and hence it is recommended that perceived level of fatigue and exertion should be monitored before and after therapy on a visual analog scale or Borgs Scale.
- Prolonged ICU stay causes ICU psychosis and cognitive impairment. In patients weaned off and extubated consider screening for cognition in patients

4. RECOMMENDATIONS FOR PHYSIOTHERAPEUTIC INTERVENTIONS:

Physiotherapeutic manoeuvres include body positioning to improve ventilation perfusion ratio and oxygenation, airway clearance to clear secretions in the airway and alveoli and early mobilization to combat ill effects of deconditioning and prevent critical care illness and myopathy and improve function and quality of life.

In asymptomatic patients and those with mild symptoms therapy can be provided with the help of charts and audio-visual aids. Early mobilization should be encouraged to combat effects of deconditioning with monitoring

Contactless mode of therapy should be encouraged where feasible. Physiotherapists preferably use posterior approach and maintain a distance >2m and away from the “blast zone” or line of cough .It is essential that cough etiquettes are taught to all the patients. Patient should be wearing a mask during all physiotherapeutic manouvers. All safety precautions should be followed.

4.1 Positioning:

- It is recommended to encourage awake active prone positioning in mild to moderate severity as it can help in improving oxygen saturation, delay or reduce the need for intubation and intensive care in pneumonia due to COVID 19.
- Dyspnoea relieving positions for patients with mild to moderate symptoms in sitting with fixation of upper extremity to facilitate breathing may be of help in patients with increased respiratory rate and distress.

- An extended semi- sitting or sitting position is favourable when proning not possible due to patient discomfort or obesity .
- When possible and in close collaboration with the team, a 24 hour position rotation chart can be provided which favours alternations of the lateral decubitus, to semi prone to prone position. For maximum benefit each position is to be maintained at least for 30 minutes to an hour. It is recommended to use cushions/aids during prone positioning that support the body and avoid excessive active muscles work cause undue fatigue.
- In severe and critical patients that are sedated Proning is a mode of therapy for 12 hrs. Application of prone position during ventilation may require sufficient human resources and expertise to be performed safely. The ventilator tubing should be prevented from getting disconnected accidentally and causing aerosol liberation. In such a scenario the physiotherapist plays a role in recommending a continuous rotational positional change. Chest physiotherapy may not be indicated in patients who are critically ill and on mechanical ventilation with high PEEP.

4.2 Breathing exercises and Bronchial Hygiene:

- In patients with mild to moderate symptoms, breathing control and deep breathing exercises with diaphragm activation are recommended. Periodic deep breathing exercises to minimize atelectatic area can be helpful.
- Purse lip breathing can help alleviate dyspnoea and prevent bronchospasm.
- Active cycle of breathing technique is recommended as a method of airway clearance for patients with secretion. Since airway clearance causes massive droplet dispersion, airway clearance procedures should be administered only when considered strictly needed for the clinical improvement of the patient .
- Postural Drainage position may not be advisable and difficult to achieve. In sedated patients who are on mechanical ventilator and haemodynamically stable modified postural drainage can be attempted with monitoring if absolute necessary for secretion clearance. The benefit of the said therapy should be weighed before initiating. Percussions and vibrations should be avoided.

4.3 Nebulization:

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. The patient may be on non- heated humidifier in inspiratory line of breathing circuit to add moisture to the oxygen delivered.

4.4 Early Mobilisation:

- It is recommended to begin with an early active mobilization program based on haemodynamic monitoring and desaturation as soon as patient' sedation is reduced to maintain function. As COVID 19 induces inflammatory response due care and caution has to be exercised while planning any exercises. It is recommended not to increase intensity of exercise but maintain protocol as per haemodynamic stability, oxygenation status and approach to reduce deconditioning effect and morbidity.
- Low intensity exercise (≤ 3 METs or equivalent) should be considered initially particularly for patients who required oxygen therapy. Light activity can be encouraged while concurrently monitoring vital signs (heart rate, pulse oximetry and blood pressure). Gradual increase in exercise should be based on their symptoms and permissible levels of oxygen therapy. Rest periods should be increased if symptoms deteriorate
- Exercises to progress from assisted to active mobilization at the edge of bed and out of bed in a series of settings including inpatient, outpatient, in- home telehealth according to patient needs at home or quarantine centre or in the hospital.
- The goal in in-hospital patients would be to achieve function of basic activities of daily living. As COVID 19 causes a systemic inflammatory response, it is advised to allow adequate rest during exercises till discharge and stabilization. Prolonged exhaustive or high intensity training should be avoided.
- Asymptomatic patients may be encouraged to achieve at least 10 minutes of continuous light physical activity or structured exercise without fatigue or desaturation below 90%.
- Exercises may progress to 20 minutes applying FITT Principles of exercise training after three weeks of acute episode and once patient is asymptomatic to allow adequate recovery.

- All physiotherapeutic manouvers including mobilization are aerosol generating and hence should be used with complete precautions. Use of charts and audio-visual records to facilitate contactless therapy is recommended. Strict COVID protocol for prevention and safety should be followed. Any devices used should be discarded using recommendation of disposal as per biomedical waste hazard. Discontinuation of Physiotherapy should be discussed with referring physician/Intensivist depending on patient status.

4.5 Recommendation for the use of Devices:

Various devices for facilitation in inspiratory and expiratory exercises are available in market. However their use in COVID 19 is not known. There is no evidence so far on the use of below mentioned devices in treating patients with COVID 19. All devices are single patient use and strict protocol of biomedical hazardous waste disposal should be maintained. These devices cannot be shared between patients. Cost factor and patient preference should be considered before prescribing.

- Incentive spirometer facilitates inspiration can be used for contactless therapy as tolerated. If it stimulates or precipitates cough it is to be discontinued.
- In patients with secretions oscillatory PEP device to mobilize secretions eg flutter/acapella can be used as contactless mode of therapy 3-4 times in a day. Cost effective blow bottle PEP may be used alternatively with safety precautions.
- In Patients on ventilator with copious secretions High frequency chest wall compression or mechanical vibrator can be applied as contactless mode after ensuring haemodynamic stability.
- Inspiratory muscle trainer may be used after ensuring haemodynamic stability and monitoring for improving respiratory muscle strength for contactless training in difficult to wean patients .

4.6 Recommendation for relaxation:

A general body relaxation may help patients to improve parasympathetic balance and reduce anxiety. Audio recordings and soothing music can be used for the same. Focus on breathing can be encouraged.

4.7 Recommendation for rehabilitation following recovery:

Although COVID-19 predominantly affects the respiratory system, evidence indicates a multisystem inflammatory disease which is frequently severe and often results in death. Though long-term sequelae of COVID-19 are unknown, evidence from previous CoV outbreaks demonstrates impaired pulmonary and physical function, reduced quality of life and emotional distress. COVID-19 survivors who required critical care may develop psychological, physical and cognitive impairments.

There is an expected morbidity with COVID 19 exists for a period of 3–6months and more .Follow-up and telerehab should be encouraged. The National Institute for Health and Care Excellence (NICE) recommends progressive rehabilitation programmes that can be best initiated within the first 30 days (post-acute phase) to have greatest impact on recovery . Residual impairments need to be evaluated in order to determine appropriate rehabilitation.

Patients in the severe category should be identified with exercise progression guideline following an approach similar to pulmonary rehabilitation.

5. RECOMMENDATION FOR PSYCHOLOGICAL SUPPORT AND CARE FOR PHYSIOTHERAPISTS

- **Regular assessment :** Regular assessment is required for assessing the psychological state of the therapist.
- Provide counseling sessions. Consider and/or promote debriefing and psychological support; staff morale may be adversely affected due to the increased workload, anxiety over personal safety and the health of family members.
- There has to be access to employee assistance programs, counselling, facilitated debriefing sessions. In case of need assistance can be provided by psychologist.
- **Safety Recommendations:**
 - A priority should be to protect healthcare workers from exposure. ICU doctors should participate in early identification and lead the management of critical patients. If negative pressure ICU isolation rooms are not available, an alternative approach is to use HEPA Carbon Photocatalysis air purification systems for source control.

- Healthcare workers performing aerosol-generating procedures on patients with COVID-19 should wear fitted respirator masks, such as N-95 or equivalent – instead of surgical masks in addition to other personal protective equipment, such as gloves, gown and eye protection.
- Aerosol-generating procedures should be performed on ICU patients only if absolutely necessary with COVID-19 in a negative pressure room, if available. Negative pressure rooms are engineered to prevent the spread of contagious pathogens from room to room.
- Therapist should not stand facing the blast and maintain safe distance at all times with posterior approach.
- **PPE Recommendations for physiotherapists**
- All Staff will be trained in correct donning and doffing of PPE, including N95 “fit-checking”. A registry of staff that has completed PPE education and fit checking should be maintained .
- Recommended PPE for therapist caring for COVID-19 infected patients includes added precautions for patients with significant respiratory illness, when aerosol generating procedures are likely and/or prolonged or very close contact with the patient is likely. In these cases, **airborne precautions** are followed including:
 - An N95/P2 mask
 - Fluid resistant long-sleeved gown
 - Goggles/face shield
 - Gloves
 - Hair cover
 - Shoes that are impermeable to liquids and can be wiped down

PPE must remain in place and be worn correctly for the duration of exposure to potentially contaminated areas. Do not adjust the PPE mask in workplace. All personal items should be removed before entering clinical areas and donning PPE. This includes earrings, watches, lanyards, mobile phones, pagers, pens etc. Stethoscope use should be minimised. If required, use dedicated stethoscopes within isolation areas. Hair should be tied back out of the face and eyes. If reusable PPE items are used, e.g. goggles – these must be cleaned and disinfected prior to re-use

Use of Scrubs and/or staff may be encouraged to get changed out of their uniform before leaving work and to transport worn uniforms home in a plastic bag for washing at home.

Self Care, Hygiene, proper nutrition, exercise and sleep are important to maintain health. Medications and supplements as advised by ICMR guidelines for prophylactic use should be followed.



Patients category	Goals	Interventions	Parameters	Intervention not to be done or with caution	Delivery of therapy
Asymptomatic positive patients with stable cardio pulmonary parameters and ambulatory					
COVID 19 patients who are able to maintain Oxygen saturation above 94% at home or in hospital	1. To maintain optimum ventilation of the lung 2. To maintain functioning and mobility	Positioning : Awake /active Prone position to improve oxygenation & frequent change of positions (30 ⁰ propped up, side lying) General mobility and endurance	Monitor haemodynamic s, saturation and fatigue or breathlessness	Physiotherapy interventions are not indicated for airway clearance or sputum samples	Preferably Non - contact & audiovisual aids telerehab

	3. Prevent deconditioning	activity for 10-15 mins with rest if needed Functional mobility eg walking in ward			
Asymptomatic patients with stable cardio pulmonary parameters and ambulatory but desaturating with mobility or exercise					
COVID 19 patients who are able to maintain Oxygen saturation above 94% at rest but desaturate on mobility or exercise	Maintain ventilation Maintain oxygenation Prevent deconditioning	Awake /active Prone position to improve oxygenation for atleast 30 mins at a time 3-4 times a day e.g rotational position change as Prone 30 mins- side lying 30 mins – half lying (propped up 30 mins- side lying 30 min again prone lying 30 min and continue) Saturation check: drop more than 3% exercises with supplemental oxygen in consultation with physician. Maintain safe haemodynamics	Discontinue Physiotherapy if increased desaturation, increased breathlessness and altered haemodynamics	Physiotherapy interventions are not indicated for airway clearance or sputum samples	Use of pulse oximeter /cardioscope while monitoring. Use of chart and audiovisuals for teaching

		General mobility and continue activity of daily living exercises with supplemental oxygen therapy Functional mobility such as walking , chair rise with monitoring			
Symptomatic patients with airway secretions on oxygen therapy via HFNO					
Pneumonia presenting with features: low-level oxygen requirement (eg, oxygen flow ≤ 5 l/min for SpO ₂ $\geq 90\%$) non-productive cough or patient coughing and able to clear secretions independently	Maintain oxygenation Maintain ventilation Airway clearance Reduce work of breathing Prevent complications related to bedrest	Positioning to improve saturation Awake /active Prone position to improve oxygenation for atleast 30 mins at a time 3-4 times a day e.g rotational position change as Prone 30 mins- side lying 30 mins – half lying (propped up 30 mins- side lying 30 min again prone lying 30 min and continue) Deep Breathing	Continuous monitoring of haemodynamics and saturation Observe for respiratory distress	Positioning / gravity assisted drainage techniques and manual techniques to be used with excessive caution No evidence in use of Incentive Spirometer . Discontinue if precipitates cough No evidence to the use of Oscillating PEP	<ul style="list-style-type: none"> Use of assistive device is recommended with safety precautions and disposal as per biomedical hazard <p>The below mention devices are not recommended Bubble CPAP Bubble PEP</p> <p>Nebulization Open suction. • Sputum inductions . use is not advised</p>

		Active cycle of breathing exercise. mobilization within safe haemodynamic limits Ankle toe movements bedside or edge of bed and out of bed mobilisation Active limb exercises		devices . To be discontinued if causes distress	There is a risk of creating an airborne transmission of COVID-19 during treatments. Physiotherapists should weigh up the risk versus benefit to completing these interventions and use airborne precautions.
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Symptomatic patients with severe oxygen deficient on NIV or HFNO

Pneumonia AND co-existing respiratory or neuromuscular co-morbidity and current or anticipated difficulties with secretion clearance RR >30 SpO2<94	1. Maintain oxygenation and clear airways. 2. prevent effects of deconditioning and complications of bed rest such as DVT 3. Improve functioning within safe haemodynamic limits	Rotational positioning to maintain saturation Awake/active Prone for 30 min 3-4 times a day Lateral decubitis and propped up if unable to go prone Advocate dyspnoea relieving position Deep nasal Breathing exercise ACBT only if secretions present	Same as above	Same as above	Minimal contact wherever possible Maintain >2m distance from the patient while delivering treatment in patients. Therapist may stand laterally or posterior to the patient to avoid direct exposure to aerosolization
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		Ankle toe movements Bed mobilization within safe cardiorespiratory parameters Edge of bed and out of bed mobilisation			
Symptomatic patients with severe oxygen deficient, ARDS, multi organ failure and on ventilator					
Symptoms suggestive of pneumonia/lower respiratory tract infection (eg, increasing oxygen requirements; fever; difficulty breathing; frequent, severe or productive coughing episodes; chest x-ray, CT or lung ultrasound changes consistent with consolidation)	1. Maintain oxygenation 2. Clear airways. 2. To prevent effects of deconditioning and complications of bed rest such as DVT	CONTINUOUS ROTATIONAL POSITIONING Suctioning through closed suction system . Passive limb mobilisation. As patient haemodynamic stabilizes encourage in bed and out of bed activity Oxygen level should be increased prior to starting exercises	Early mobilization in patients who are conscious should be encouraged Monitor haemodynamics and saturation Care should be taken of the ET tube and the ventilator tubings.	If patient is sedated , has no secretions and proning is a part of treatment regime no active physiotherapy required.	Suctioning to be done with Closed suction with complete In absence of exudative pneumonia and unstable haemodynamics physiotherapy is not recommended

Recommendations for treating Non-COVID Patients

- A consequence of the pandemic has been the under-utilization of important medical services for patients with non-COVID-19-related urgent and emergent health needs.
- Healthcare systems must balance the need to provide necessary services while minimizing risk to patients and healthcare personnel (HCP).
- Prioritize urgent visits and delay elective care

Key considerations

- Be prepared to rapidly detect and respond to an increase of COVID-19 cases in the community.
 - Stay informed. Consult regularly with your state or local health department for region-specific information and recommendations.
 - Monitor trends in local case counts and deaths, especially for populations at higher risk for severe illness.
 - Thermal scanning of every individual visiting OPD to be done
- Provide care in the safest way possible.
 - Optimize telehealth services to minimize the need for in-person services.
 - Follow recommended infection control practices to prevent transmission of infectious agents, including screening all patients for COVID-19 signs and symptoms, universal source control, and infection control practices specific to COVID-19.
 - Be familiar with COVID-19 healthcare infection prevention and control recommendations specific to your setting.
- Consider that services may need to expand gradually.
 - Make decisions for expanding necessary care based on the local epidemiology and in concert with recommendations from state and local officials.
 - Prioritize at-risk populations who would benefit most from those services (for example, those with serious underlying health conditions, those most at-risk for complications from delayed care, or those without access to telehealth).

There are 2 tiers of recommended precautions to prevent the spread of infections in healthcare settings: Standard Precautions and Transmission-Based Precautions.

Standard Precautions

Standard Precautions are used for all patient care. They're based on a risk assessment and make use of common sense practices and personal protective equipment that protect healthcare providers from infection and prevent the spread of infection from patient to patient.

- Perform Hand Hygiene
- Use Personal Protective Equipment (PPE) whenever there is an expectation of possible exposure to infectious material
- Follow Respiratory Hygiene / Cough Etiquettes Principles
- Properly handle and properly clean and disinfect patient care equipment and instrument/devices.

Transmission-Based Precautions

Transmission-Based Precautions are the second tier of basic infection control and are to be used in addition to Standard Precautions for patients who may be infected or colonized with

certain infectious agents for which additional precautions are needed to prevent infection transmission.

- Contact Precautions
- Droplet Precautions
- Airborne Precautions

Contact Precaution: Ensure appropriate patient placement, Use personal protective equipment (PPE) appropriately, Limit transport and movement of patients, Use disposable or dedicated patient-care equipment, Cleaning and disinfection of patient treatment areas and equipments after each use.

Droplet Precaution: Source control: put a mask on the patient, Ensure appropriate patient placement, Use personal protective equipment (PPE) appropriately, Limit transport and movement of patients.

Airborne Precautions: Source control: put a mask on the patient, Restrict susceptible healthcare personnel from entering the room, Use personal protective equipment (PPE) appropriately, Limit transport and movement of patients.

Summary: The current pandemic being a challenge in itself and a variable picture it is necessary that utmost precautions are taken. The intention of these recommendations is to deliver safe and best care to the patient with wholistic approach to prevent morbidity as well as protect the physiotherapist by adhering safety guidelines. The therapist needs to weigh the benefit achieved vs Harm to optimize treatment with wholistic approach. The recommendations are subject to update with more available literature.

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Algorithm for Physiotherapy Management in COVID 19 Patients

