

Review Article

Role of Physiotherapist in management of Covid-19 Patients: A Review

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ABSTRACT:

Corona virus disease also referred to as COVID-19 is a virulent infectious disease which is highly communicable. The WHO has confirmed the COVID-19 outbreak as a pandemic. The main signs of the corona virus are fever, dry cough, tiredness, sputum production and shortness of breath whereas some patients also shows aches, pain, sore throat, Diarrhoea, conjunctivitis, Headache, loss of taste or smell, a rash on skin, or discolouration of fingers or toes, Physiotherapy plays a vital part of the treatment of COVID-19. The aim of this article is to highlight the importance and benefits of Physiotherapy interventions in the management of COVID 19 patients.

Keywords: Covid-19, SARS-CoV-2, Physiotherapy

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INTRODUCTION

The Covid-19 disease has emerged as a community health disaster and is spreading exponentially all over the world. The initial cases of Covid-19 were reported in Wuhan, City placed in China, in late December 2019. On 11th of February 2020, World Health Organization named the novel viral pneumonia as "Corona Virus Disease (COVID-19)" whereas the International Committee on Taxonomy of Viruses (ICTV) named this novel virus as "SARS-CoV-2" subsequent phylogenetic and taxonomic analysis.¹

The second wave of COVID-19 has affected India significantly, with the highest number of daily reported cases being slightly more than 0.4 million on May 7, 2021, and has declined since. Even though the number of new reported cases has reduced, India still contributed to approximately 45% of the new cases detected in worldwide and nearly 34% of the deaths globally during the third week of May, 2021.²

COVID 19 has an incubation period of is 3-7 days (median 5.1 days) and maximum up to 2 weeks from infection with average of 12.5/11.5 days in 97.5% of patients. COVID 19 symptoms include fever (89%), cough (68%), tiredness (38%), sputum production (34%), dyspnoea (19%), muscle/ body aches, and

headache, new loss of taste or smell, sore throat, congestion /runny nose, nausea /vomiting, diarrhoea. COVID-19 primarily affects the lungs. However it also can cause cardiac, haematological, neurological, gastrointestinal, renal and liver dysfunctions. Severe form of COVID 19 can occurs in patients with co morbidities like diabetes, hypertension and other cardiovascular disease.^{3,4}

COVID 19 patients usually present with an incapacitated physical condition due to fever, tiredness, myalgia which further reduces their exercise capacity, which causes prolonged immobilization. Significant decrease in activity levels lead to reduction in muscle strength and cardiorespiratory endurance. Even after discharge altered quality of life is observed among 44.1% of patients, with persistence of least 1 symptom post COVID 19. Around 87.4%, patients particularly report fatigue (53.1%) and dyspnoea (43.4%) two months post COVID 19. Other symptoms include joint pain, (27.3%) and chest pain (21.7%).

Physiotherapy in COVID is proved to be preventive and curative which includes respiratory care, postural changes, breathing exercises, dyspnoea relieving positions, limb mobility, relaxation exercises, and

ambulation of patients. The aim of this article is to highlight the importance and benefits of Physiotherapy interventions in the management of COVID 19 patients.

GOAL OF PHYSIOTHERAPY IN COVID-19 PATIENT⁸

1. Improve lung function
2. Decrease patient dependency on the ventilator
3. Limit Patient morbidity and mortality
4. Optimize ventilation and oxygenation
5. Reduce number of hospitalization days of patient
6. Reduce complication and improve quality of life as much as possible

CONSIDERATION TO BE TAKEN BEFORE STARTING THE PHYSIOTHERAPY⁸

1. The respiratory infection linked with COVID-19 is mostly associated with dry non-productive cough and lower respiratory tract involvement, which usually involves pneumonitis rather than exudative consolidation. In these situations, respiratory physiotherapy interventions are not indicated.
2. Patients who have suspected or confirmed COVID-19 and concurrently or subsequently develop exudative consolidation, mucous hypersecretion and/or difficulty clearing secretion, Respiratory physiotherapy interventions in hospital wards or ICU may be indicated.
3. Respiratory Physiotherapy interventions must only be given when there are clinical indicators, this is to limit unnecessary physiotherapist exposure to patients with COVID-19
4. Physiotherapist staff should not regularly go inside isolation rooms of patients with confirmed COVID-19.
5. Physiotherapist should keep a safe distance from patients if there is no intervention by hand, such as education on airway clearance techniques.
6. Understanding the mechanism of infection of COVID-19.
7. In ICU, the physiotherapist must consult the medical team before starting the intervention.
8. It may be necessary to receive patients from acute care earlier than is generally done.
9. Physiotherapy of a patient should be started only when all the following conditions are met:
 - Fraction of Inspired Oxygen (FiO₂) ≤ 60%. (0.6).
 - Saturation (SpO₂) ≥ 90%.
 - Respiratory rate: ≤ 40 breath/min.
 - Positive End-Expiratory Pressure (PEEP) ≤ 10 cmH₂O.
 - Systolic Blood Pressure (BP) ≥ 90 mmHg and ≤ 180 mmHg.
 - Mean Arterial Pressure (MAP) ≥ 65 mmHg and ≤ 110 mmHg.
 - Heart rate (HR): ≥ 40 BPM and 120 ≤ BPM.
 - No new arrhythmias or myocardial ischemia.

- No sign of shock with concomitant lactic acid ≥ 4 mmol/L.
- No new unstable deep vein thrombosis and pulmonary embolism.
- No suspected aortic constriction
- No serious liver and kidney disease
- Body temperature ≤ 38.5°C.

INDICATIONS FOR PHYSIOTHERAPY IN COVID-19 PATIENT⁹

- 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 bed rest and immobile

CONTRAINDICATION OF PHYSIOTHERAPY IN COVID-19 PATIENT⁹

- 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

INFECTION CONTROL WHILE TREATING THE COVID-19 PATIENT⁹

The physiotherapist complies with infection prevention and control measures to support the health and safety of patients, health-care providers, her/himself, and others.

- Acquires the education, training, and proficiency to apply infection prevention and control techniques in physiotherapy practice (e.g., when needling, suctioning).
- Adheres to best practices of infection prevention and control in physiotherapy practice according to applicable legislation, regulatory requirements, standards, and guidelines.
- Maintains the cleanliness of all spaces, equipment, and devices according to appropriate legislation, infection prevention and control standards/policies, and manufacturer's recommendations.

- Documents details of reprocessing and sterilization of reusable medical equipment detailing parameters used to meet requirements outlined in Alberta Health's Standards for Cleaning, Disinfection and Sterilization of Reusable Medical Devices for Health-care Facilities and Settings, and retains this documentation for five (5) years.
- Disposes of devices and materials according to best practices and established protocols.
- Uses routine practices (e.g., hand washing, point-of-care risk assessment, use of personal protective equipment) to minimize or prevent the spread of acquired infections in the health-care setting.

PHYSIOTHERAPY INTERVENTION FOR COVID PATIENTS THERAPEUTIC POSITIONING

Positioning is a vital component of management for the mechanically ventilated COVID-19 patient, with regular turning recommended to prevent atelectasis, optimise ventilation and prevent pressure sores. Positioning can include lateral (side lying) positioning but may also include prone positioning, which is well recognised to treat hypoxemic respiratory failure. It is recommended to encourage awake active prone positioning "COVID awake repositioning proning protocol" called as "CARP" 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.^{10,11}

BREATHING EXERCISES

Crocodile breathing, which is posterior basal breathing exercise in prone position with arms elevated and folded to support the forehead is found beneficial in improving oxygen saturation in patients. It emphasizes on slow diaphragmatic inspiration followed by pursed lip expiration. Physiologic rationale: Respiration is a constant and powerful modulator of cardiovascular control. The negative intra thoracic pressure through inhalation reduces the pressure on the right atrium, thereby enhancing the venous drainage. During inhalation, the inferior vena cava diameter reduces, the efficiency of this process reaching its zenith in slow and deep respiration. Research has shown that correct physiologic activity of the diaphragm is crucial for venous drainage. Lower limb Mobilization coupled with slow deep breathing involving strong contraction of diaphragm prevents the venous stasis from recumbency.^{12,13}

In patients with mild to moderate symptoms, breathing control and deep breathing exercises with diaphragm activation are recommended. It is important to recruit and expand basal alveoli to prevent atelectasis. Diaphragm activation with scoop technique using patients own hand for proprioceptive feedback can be encouraged. Similarly, diaphragm

activation to expand posterior lung segments should be encouraged. Charts and audiovisual aids are found facilitatory in educating patients regarding breathing techniques. Pursed lip breathing can help alleviate dyspnea and prevent bronchospasm. On oxygen support with rebreathing bag or NIV patient may find difficult to use Pursed lip breathing.^{14,15}

EARLY MOBILIZATION

Mobilization should begin in a period of 3 days after admission to ICU and wards. It includes mobility exercises and ambulation. Mobilization not only has beneficial effects on the physical status of the patient, but also, on the mental status. Short durations of exercise bouts can bring about mood elevation by modulating neurotransmitters. Increased cortisol and lactate levels have excitatory effect on the cortex that alleviates depression and anxiety. This aspect has positive effects on the physical state too. Mechanical ventilation reduces the neural drive, increasing proteolysis leading to sarcomere rupture, contributing significantly to muscle atrophy and injury.¹⁶

It is recommended to begin with an early passive or active assisted mobilization program based on patients level of cooperation/orientation, oxygen saturation, and hemodynamic stability. As COVID-19 induces inflammatory response, due care and caution has to be exercised while planning any exercises. An early exercise and mobilization program (from range-of-motion to sit-to-stand and walking exercises, depending on functional status) during periods of daily interruption of sedation increased the number of ventilator free days and improved functional independence at discharge while decreasing the duration of delirium.^{17,18}

AIRWAY CLEARANCE TECHNIQUES

Some people with respiratory diseases produce a large amount of mucus and phlegm (also known as sputum.) Certain types of coughing can help loosen and bring up the mucus.¹⁸ Active cycle of the breathing technique is recommended as a method of airway clearance for patients with secretion. In patients with mild to moderate severity in presence of exudative pneumonia, it helps to clear secretions. Suctioning should be performed using a closed inline suction system.¹⁹

INCENTIVE SPIROMETER

This is a simple handheld gadget that helps keep your lungs clear when you're off your feet for a while.²⁰ Incentive spirometry is a lung expansion technique used to promote sustained maximal inspiration, which is proposed to help patients by improving ventilation/perfusion mismatch and alveolar-PaO₂ gradient. Incentive spirometer is considered as part of treatment protocols for patients with mild-to-moderate COVID-19 due to its theoretical benefits and limited risk.²¹

CONCLUSION

COVID-19, an ongoing pandemic of respiratory disease, it has generated a major distress due to the high percentage of death it has caused globally and non availability of valid treatment till date. Worldwide Physiotherapy is given in conjunction with medical treatment, necessitating collective response to COVID-19 patients being treated and assisted. Physical therapist plays an extensive role in providing exercise therapy, mobilization, and rehabilitation interventions to COVID-19 survivors in order to enable functional recovery. This advocates that Physiotherapy is significant in early recovery of COVID patients.

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