



## Crucial role of physiotherapy in treating COVID-19 patients

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### Article History:

Received on: 07 Jun 2020  
Revised on: 10 Jul 2020  
Accepted on: 15 Aug 2020

### Keywords:

Physiotherapy,  
COVID-19,  
Severe acute respiratory  
syndrome,  
Novel corona virus,  
Acute respiratory  
distress syndrome

### ABSTRACT

The emergence in China of 2019 of severe acute respiratory syndrome coronavirus2 (SARS-CoV-2) previously provisionally names 2019-nCoV disease (COVID19) caused major global outbreak and is a major public health problem. On 30 January 2020, the WHO declared COVID19 to be the sixth international public health emergency. This present pandemic has engrossed the globe with a high rate of mortality. As a front line practitioner, physiotherapists are expected to be getting in direct contact with patients infected with the virus. That's why it is necessary for understanding the many aspects of their role in the identification, contains, reduces and treats the symptoms of this disease. The main presentation is the involvement of respiratory system with symptoms like fever, cough, sore throat, sneezing and characteristics of pneumonia leads to ARDS(Acute respiratory distress syndrome) also land up in multiorgan dysfunction syndrome. This text describes and suggests physiotherapy management of acute COVID-19 patients. It also includes recommendations and guidelines for physiotherapy planning and management. It also covers the guidelines regarding personal care and equipment used for treatment which can be used in the treatment of acute adult patients with suspected or confirmed COVID-19.



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ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v11iSPL1.3300>

Production and Hosted by

IJRPS | [www.ijrps.com](http://www.ijrps.com)

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### INTRODUCTION

Severe Acute Respiratory Syndrome Coronavirus 2, also known as SARS-CoV 2, is a new virus found in 2019 that causes Coronavirus Disease-2019 (COVID-19) Very communicable (Thomas *et al.*, 2020). The WHO has announced a new name for the COVID-19 outbreak as Coronavirus-2 (SARS-CoV-2) severe acute respiratory syndrome (Lai *et al.*, 2020).

In India, about 1,994,332 cases, with 41,073 deaths (Coronavirus Update (Live): 19,047,762 Cases and 712,449 Deaths from COVID-19 (Coronavirus Update (Live), 2020) and in Maharashtra 468279 cases, including 16782 deaths till writing this article (COVID-19, 2020). The present mortality rate is

upto 3.13% to 3.12% (Covid-19, 2020).

Latest findings show that patients aged 60 years are at greater risk than children who may be less likely to become compromised or may have milder or even asymptomatic symptoms (Velavan and Meyer, 2020).

In intensive care unit (ICU) approximately 5 percent admission rates and approximately 42 percent of admitted patients may need oxygen. This varies from other respiratory viruses which are transmitted between 2 to 10 days before symptoms occur. This virus is transmitted by droplet from sneezing and coughing within 2m of the infected person from person to person via respiratory secretions. This virus remains live for at least 24 hours on the hard surfaces and approximately 8 hours on the soft surfaces.

The virus may also be transmitted by hand contact from person to person if it is touched on contaminated surface and then touched by the nose, mouth and eyes. This is possible that closed environments make a secondary impact COVID-19 dissemination and promotion of super spreading events. Virus stays 3 hours viable in the air (M S Ajimsha, 2020; Nishiura, 2020; Thomas et al., 2020).

The range of illness varies from mild which is most common to severe illness which requires intensive care monitoring and mechanical ventilator. Individuals infected with COVID-19 produce symptoms like fever, sneezing, sore throat, cough, fatigue, sputum & shortness of breath. The extent varies from asymptomatic infection or mild URTI with respiratory failure and death may occur to viral pneumonia. Present reports are estimated to be asymptomatic in 80 percent of cases, severe in 15 percent of cases requiring oxygen, and critical in 5 percent requiring ventilator and life support. In the pneumonia is the most common serious appearance of infection in which about 81% patients were suffering from mild infection and about 43% of patients had only fever and about 13% patients no symptoms throughout the illness. Mostly the affected population is the elderly and those having severe comorbidities like diabetes, cardiac diseases, cancer or on chemotherapy drugs, chronic kidney disease on dialysis, post organ transplant and patients having lung disease are mostly affected (Guan et al., 2020; Huang et al., 2020; Lai et al., 2020). Children's were rarely affected and if they get infected usually have a mild disease (Ren et al., 2020; Velavan and Meyer, 2020; Zhu et al., 2019).

It also leads to various complications i.e Severe pneumonia, Acute respiratory distress syndrome, Sepsis, Septic shock, Multiple organ failure, Acute

kidney injury, Cardiac injury (Arora et al., 2020).

Chest x-ray indicating pneumonia, but initial results indicate that chest x-rays in COVID19 could have diagnostic limitations clinicians do need to be mindful that lung computed tomography scanning findings show significant mottling and ground glass opacity. Lung ultrasound is also a diagnostic tool that can be used on the bedside, displaying effects of multi-lobar B lines distribution and diffuse lung consolidation (Guan et al., 2020; Thomas et al., 2020).

## PATIENTS AND METHODS

### Which Persons should be tested

The persons having international travel history in the last 14 days, health care workers having symptoms mentioned above, patients with Acute Respiratory disease (fever and cough or Shortness of breath), asymptomatic cases comes in contact of affected case (testing should be done once between day 5 and day 14).

Persons comes in these criteria Should be subject to SARS-CoV-2 test. In that a nasopharyngeal swab as a specimen of the patient should be collected. Detection of virus is done by 'reverse transcription polymerase chain reaction' and a diagnosis is confirmed by positive test.

Physiotherapy is an well-known profession all over the world, and they work mostly in hospital wards and ICUs to treat acute as well as chronic cases. In particular, acts on patients with acute and chronic respiratory problems by cardio respiratory PT. There are attempts to improve physical and mental disability in patients. Physiotherapy can also be of interest to patients with COVID19 in the respiratory care and physical treatment. For this case, sputum secretion is less normal (34 percent), physiotherapy should only be performed if patients have excessive airway secretions that cannot be independently clear. High risk patients can also benefit from prior co-morbid conditions with elevated rates of secretion within adequate cough (for example patients of cystic fibrosis, neuromuscular disease and respiratory disorder).

Physiotherapist employed in ICU can provide patients with intubation with airway clearance techniques and those showing signs of inadequate airway clearance can also be useful in patients with serious respiratory failure with COVID19 (prone to maximizing oxygenation position). Long term ventilation, continuous sedation and use of neuromuscular blocking agents may intensify their morbidity and mortality by those admitted to ICU with high risk of developing ICU acquired weakness.

Therefore, initiating early physiotherapy care after the acute respiratory distress stage is important in order to prevent the impairment acquired by the ICU and to promote functional recovery. Physiotherapy's job is to provide therapies, organize patients and rehabilitate those critically ill associated with COVID19 to make patients functionally independent.

## RESULTS AND DISCUSSION

### Scope

This article is intended to provide information for acute care physiotherapist healthcare team and explains physiotherapy's imminent role in management of patients with COVID-19 expected and/ or confirmed.

### Recommendations for physiotherapist

Hospitals will identify physiotherapist workers with knowledge of working in ICU and Decision making with previous ICU experience. Personnel at high risk should not reach the exclusion zone COVID-19.

It involves pregnant workers with chronic respiratory disorder, immuno-suppressed, older people(> 60 years of age), cardiac disease, cardiovascular disease, diabetes, and those with immune deficiencies. Personnel planning should consider specific pandemic requirements such as additional dressing and PPE doffing workloads. Staff should be aware of WHO's Infection Prevention Guidelines.

### Indications for physiotherapy treatment

Patients with dry and non-productive cough with lower involvement in the respiratory tract are typically not reported to have pneumonitis in this situation. In this case physiotherapy is recommended to patients who experience exudative aggregation, mucous secretion and difficulty in removing the secretions also ICU patients developed weakness.

Treatment is also indicated in Patients with pneumonia or lower respiratory tract infection with elevated oxygen requirements, fever, breathing difficulties; regular, efficient coughing and ultrasound changes in the throat, CT or lung.

### Goals of physiotherapy management

To retaining bronchial hygiene and airway clearing, to reduce phases of shortness of breath, to reduce the risk of a mechanical ventilator, to maintain active range of motion in ventilated patients, to reduce infection spread, to maintain mobility of the chest wall, to reduce reliance on a mechanical ventilator, to restore muscular and pulmonary functions (Arora et al., 2020).

## Physiotherapy Management

### Chest Physiotherapy

Techniques for clearing airways include positioning, active breathing cycle, manual and/or ventilator hyperinflation, percussion, vibrations, positive expiratory pressure therapy (PEP) and the insufflation-exsufflation mechanical.

### Non-invasive ventilation and inspiratory positive pressure breathing

Inspiratory positive pressure breathing can be used by physiotherapists (e.g. rib fractures). Airway clearance strategies may include noninvasive ventilation in Respiratory malfunction control, or during exercise.

### Techniques for supporting the clearance of secretions

Techniques for promoting the clearance of secretions include helped or induced cough manoeuvres and suction by airway.

### Other Therapy

Physiotherapists advise exercises, and help mobilize patients. Physiotherapists also play a vital role in treating tracheostomy patients.

### Tracheostomy management

Closed in line suction is used to reduce the production of aerosols. Inspiratory muscle training should not be given until the risk of transmission is lower (Pryor et al., 2002; Jones et al., 1992; Thomas et al., 2020).

### Guidelines for patients with COVID-19 taking respiratory treatment

Tell patients to cover their mouth when they are coughing through their elbows or sleeves or in an tissue and the tissue should be disposed of and hygienized by hand. If necessary physiotherapists should be more than 2 m away from the patient. There is no evidence to support incentive spirometry in COVID19 patients. If possible avoid the use of noninvasive ventilation, mechanical insufflation / exsufflation, inspiratory positive pressure breathing devices or if they are indicated and alternative options are ineffective, then ensure that machines with viral filters can be decontaminated after use over machine ends and patient ends and machines. Disposable circuits should be used for these devices. Physiotherapist should wear full airborne PPE if physiotherapy is required to promote a sputum examination. When a sample has been collected a biohazard label should be labelled. A staff member wearing PPE will put it double bagged and in the isolation room. Specimen should be presented by

the person who understands the laboratory by hand character of specimen. Saline nebulisation should not be used.

### **Mobilization**

Physiotherapists are likely to be in direct contact with the patient when delivering care such as mobilization and activities that actually need support and they can use a high filtration mask, i.e. P2 / N95, when providing care. Sometimes mobilization and exercise can also produce cough in patients, making sure that patients wear a mask while mobilizing patients outside the isolation room. Patients should be treated with physiotherapy only those with severe functional disabilities (ICU acquired disability, frailty, various comorbidities) and a higher aged category. We should encourage early mobilization to minimize further complications. Patients will get out of bed ready and ask for basic exercises and ADL's. The equipment required for the treatment should be negotiated with the local authorities Service personnel monitoring and prevention of infections before use. Use resistant elastic bands Instead of distributing hand weights so it can be used alone. Larger equipment such as walking aids, chairs, cycle ergometer, and tilt tables must be decontaminated with ease.

### **Guidelines**

It should be well prepared for diagnosis. It should involve a minimum number of staff.

Make sure the equipment in use works and is cleaned before entering the rooms. Sharing equipment with patients includes washing and disinfecting before increasing use.

### **Personal protective equipment (PPE) for physiotherapists**

Types of PPE are FFP3(filtering face piece)respirators filter at least 99% of airborne particles, FFP2 and N95 respirators filter 94 % to 95 % of particles and can be used if FFP3 respirators are not available, fluid-resistant masks (Type IIR) provide droplet protection, eye and face protection can be a fluid-resistant surgical mask with integrated surgical protection, full face shield, or polycarbonate safety glasses, disposable long sleeved fluid resistant gowns must be worn and if not used, a plastic disposable apron should be wear under it ([Sayburn, 2020](#)).

Staff should be qualified to dress and doff the PPE kit properly, as well as N95. Beard personnel will be told to remove it to ensure that the mask works. Things should be wear by staff are operative mask / N95 mask, Fluid-resistant, long-sleeved gown, shield to the face or goggles, glove gloves, the

aerosol-generating hair cover, shoes that are or can be cleaned off, avoid repeated use of shoe coverings as it is likely to increase the risk of contamination by personnel, during care PPE particularly mask should not be adjusted, EPP donation and doffing should be as per guidelines, step by step. Information on local guidelines is required when exposed to COVID19 or changing into scrubs for laundering uniforms and wearing uniforms outside the workplace.

Remove all personal belongings before accessing clinical areas and putting on PPE(earrings, watches, cell phones, pens etc., ). Hair should be pulled back from the neck, avoid gear sharing. If high fluid exposure volumes are required then wear an extra plastic apron. Reusable PPE should be disinfected like goggles before use ([Thomas et al., 2020](#)).

### **CONCLUSION**

The importance of physiotherapy in the treatment of covid19 patients in ICU with appropriate guidelines is discussed in this study. The special environment for Physiotherapists is ICU and also they are integral part of multi disciplinary group. In COVID 19 ICU cases, the use of chest physiotherapy methods helps control symptoms faster along with treatment and contributes to reduced risk of developing hospital infection. The most widely used methods in hospital environment & ICU treatment management by the physiotherapist are most effective strategies in bronchial hygiene during clinical practice. Effective upper and lower limb movement on a mechanical ventilator in patients during ICU can decrease the complication and help to preserve peripheral oxygen delivery along with inactive blood supply for better health. This research also suggests that the involvement of the chest physiotherapist in the intensive care unit leads to the patient's early recovery and decreases the duration of stay on artificial ventilation and hospitalization, as well as the occurrence of respiratory failure and death.

### **ACKNOWLEDGEMENT**

I am grateful to all the co-authors for their expertise and assistance throughout all aspects of our study and for their help in writing the manuscript.

### **Conflict of Interest**

The authors declare that they have no conflict of interest for this study.

### **Source of Funding**

The authors declare that they have no funding support for this study.

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