Beyond COVID-19: Evidence-Based Consensus Statement on the Role of Physiotherapy in Pulmonary Rehabilitation in the Indian Context

Narasimman Swaminathan1, Mariya Jiandani2, Praveen J Surendran3, Prasobh Jacob1, Anjali Bhise4, Gaurang Baxi5, Poorvi Devani6, Bela Agarwal7, V Sundar Kumar8, Nicole Maria Pinto9, Umanjali Damke10, Pralhad Prabhudesai11

Abstract
Post COVID-19 sequelae includes breathlessness, weakness, fatigue, decreased exercise tolerance and impaired quality of life. Physiotherapy based rehabilitation program is an essential component for post COVID-19 patients in facilitating maximum functional recovery. Expert consensus statements are available from the developed countries. There is a need for a guidelines to manage post COVID-19 sequelae in Indian context. The objective of this consensus statement is to provide evidence informed guidelines for post COVID-19 physiotherapy management as a component of pulmonary rehabilitation. This consensus statement was developed by expert panel across India. Published literatures were appraised and used to prepare the recommendations. This is the first of its kind of work providing preliminary guidelines for post COVID-19 physiotherapy.

Preamble
The rapid spread of novel coronavirus (SARS CoV-2) disease across the globe has created an unprecedented public health crisis. Healthcare delivery systems across globe nations are still struggling to fight the pandemic. Involvement of respiratory system during the acute stage of infection, especially with the onset of adult respiratory distress syndrome (ARDS) requires admission to critical care settings. However, there is a glimmer of hope as recovery rates from the infection are steadily increasing and so are the drop in the mortality rates. Previous experience with the epidemics of SARS in 2002-2003 and MERS in 2012 has revealed the prolonged disabling effect brought in due to involvement of respiratory system and multi-system complications resulting in impaired physical, social and mental functioning amongst the critical care survivors.1-3

The post-acute effects of COVID-19 are being recognised by patient groups, clinicians and researchers alike. Though post-acute COVID-19 is presenting as a syndrome affecting multiple organs and systems including Respiratory, Cardiovascular, Gastrointestinal, Central, Peripheral and Autonomic Nervous Systems; lung impairment seems to be at the core of functional limitations. Fatigue caused by various systemic and organic factors, reductions in muscle strength and endurance, activity limitation, and participation restriction, is becoming a major concern as they are known to affect the quality of life significantly.4 It is important to restore function to premorbid state by timely and appropriate intervention. Since this is a new health emergency, the evidence base for effective intervention strategies are limited. Full-fledged randomised clinical trials to test the effects of interventions, though essential, are not feasible to be executed within a short period of time. However, professional recommendations are essential to guide clinicians to cater to their patients using the most appropriate scientific methods, until high-quality evidence is available through RCTs.

Purpose
The purpose of this document is to systematically review the available evidence on the role of physiotherapy in post COVID-19 pulmonary rehabilitation, and map the evidence with experts consensus.

This evidence based consensus statement is aimed to:-
1. Identify the screening and assessment strategies for Post COVID-19 physiotherapy care
2. Propose an evidence-based protocol for Post COVID-19 physiotherapy management as a part of pulmonary rehabilitation.
3. Identify research need and priorities in Post COVID-19 physiotherapy care

Introduction
Preliminary literatures report that post COVID-19 sequelae includes breathlessness during activities, fatigue, impaired functional activities and decreased quality of life.5 Long term impairments documented during SARS and MERS outbreaks is applicable to the
current COVID-19 pandemic. Similar to earlier respiratory infections restrictive lung pathology due to residual fibrosis is identified as a classical feature of COVID-19. Associated sarcopenia, cardiometabolic dysfunction along with Critical illness neuropathy and myopathy causing lower extremity weakness and cognitive impairments are observed in post COVID-19 survivors.

Pulmonary Rehabilitation is an established intervention in management of patients with chronic respiratory dysfunctions as it alleviates dyspnoea, reduces symptoms and improves functional capacity.

**Need**

Loss of muscle mass, weakness deconditioning, associated tachycardia and fatigue are observed in post COVID-19 patients. Impaired functional capacity observed in post COVID-19 sequel prevents carrying on activities to prior level. Early rehabilitation during acute COVID-19 care is recommended once the patients are stabilised.

**Scope**

This consensus statement, underpinned with emerging and past evidence, provides recommendations for physiotherapy management in Pulmonary Rehabilitation of Post COVID-19 patients within the Indian Context. These Recommendations would benefit the health care teams, especially physiotherapists, across various health care setups involved in Post COVID-19 care.

**Methodology**

For the purpose of developing this evidence-based consensus guidelines, a four-phase process was adopted.

**Phase I**

The lead authors identified a core group of experts to prepare this guideline. The core group of experts were selected on the basis of their speciality, experience and involvement in COVID-19 rehabilitation. Few members of this guidelines also contributed to publishing the first consensus guideline on physiotherapy management of acute COVID-19 care. An initial online meeting of the subject experts was conducted on 05/08/2020 where the need for this consensus guidelines was reiterated. The meeting also finalised the process to be adopted for development of the consensus guidelines and defined the objectives.

**Phase II: Evidence Synthesis**

A sub group was formed and was tasked with systematic search of literature and review of evidence.

**Search Strategy:**

A systematic literature search was carried out on the common electronic database COVID-19 Medline, EMBASE, Emcare, PubMed - LitCovid and Cochrane. The literature search was executed on 12th August 2020 using the following terms:

- “COVID-19 or SARS-CoV-2 or SARS-CoV-2 OR SARS or MERS
- Recovery or post COVID syndrome
- Physiotherapy or Breathing exercise or Respiratory muscle training
- Exercise prescription
- Pulmonary rehabilitation
- Rehabilitation
- And #2 and #3 and #4 and #5 and #06

The search was restricted to English language. Three members (PJ, PJS, SK) screened the abstract independently for inclusion using Rayyan QCRI web application. Screened abstracts were further analysed by authors MJ and NS. Consensus on including the full text screening was arrived through a web conference, where all the members of the team participated in the deliberations. Full texts were screened, summarised and graded independently by four members (NS, MJ, PJ, PJS) of the team. The process of flow of literature search is as in Figure 1.

**Phase III: Delphi Process**

Phase II and III ran concurrently. For phase III, a modified Delphi approach was used to gain consensus on various aspects of post COVID-19 physiotherapy assessment and treatment. For this purpose, two web meetings were conducted for developing a, structured questionnaire to obtain consensus from the therapists practising in India. The questionnaire was prepared following detailed deliberations among experts involved in Post COVID-19 care and having expertise in respiratory physiotherapy.
The questionnaires consisted of five sections:

a. consent to participate in the Delphi exercise;

b. demographic details of the participants;

c. details of their experience in COVID-19 care;

d. components of physiotherapy assessment and investigation; and

e. outcomes and management of Post COVID-19 rehabilitation.

In addition to snowball sampling strategy via email and professional social media groups, a concerted attempt was made to reach out to practicing cardiorespiratory physiotherapy experts across the country. In order to ensure adequate representation of therapist from across the country, potential experts were contacted through phone and requested to participate in the Delphi exercise.

Four members (BA, PS, GB and NP) independently analysed the response to the Delphi process and summarised their findings using a consensus process. The results of the Delphi exercises were discussed and summarised during the third meeting. The results of the Delphi exercise were mapped against the evidence synthesised through systematic literature search and was used for drafting the recommendations.

**Phase IV: Expert Consensus Process**

Physiotherapy experts in the field of cardio respiratory across India were approached through online survey. 48 recommendations prepared based on the preliminary evidence search, were circulated among the experts for consensus. Experts also provided their personnel opinions on physiotherapy management of Post COVID-19 diagnosis

Survey was administered between 19 August to 10th September 2020 by using google form. Physiotherapists across India based on their clinical expertise and involved in managing COVID-19 patients were approached. A consensus on assessment, outcome measures and physiotherapy intervention were obtained. Total number of 79 physiotherapists responded to the survey.

Forty Items which reached more than 80% consensus with Cronbach’s alpha more than 0.74 were included in the recommendations. ISCCM guidelines were used to grade the recommendations. For items that reached requisite cut-off but did not have evidence, they were considered for inclusion as useful practical points (UPP). The criteria adopted for grading the quality of evidence are summarized in Figure 2.

**Patients likely to benefit**

The core group recommends the following inclusion and exclusion criteria for enrolment into physiotherapy programme along with physician consultation:

**Inclusion**

- Patients who had prolonged hospital stay
- Received ventilatory or oxygen support during acute care.
- Patients with reduced effort tolerance
- Patients on supplemental oxygen
- Patients having hypoxemia on activity and or rest
- Having any of the following symptoms or complains
  - breathlessness on exertion
  - fatigue
  - leg /muscle/joint pain
  - weakness
  - sleep disturbance warranting post viral fatigue syndrome

**Exclusion**

1. Post COVID-19 patients with suspected myocarditis or pulmonary embolism should be excluded from the program till stabilization and physician approval.

2. Those who have associated musculoskeletal or neurological or cancer related impairments warranting specific multi-speciality rehabilitation needs should be directed accordingly to the specific care and rehabilitation.

**Settings:** Physiotherapy assessment and intervention may vary depending on the disease severity, patient related daily functional limitation, investigations, infrastructure availability and the setting.

**In patient care:** Refers to individually tailored program provided when the patient is still admitted in the hospital after diagnosis of COVID-19 in the pre-discharge period in continuation of post admission physiotherapy care.

**Home based / Community based care:** Refers to individually tailored program carried out at home post discharge from the hospital or isolation centres or home isolation or community setting not earlier than three weeks post COVID-19 diagnosis or COVID negative laboratory test.

**Centre based:** Refers to individually tailored program provided on outpatient face to face consultation at the institute or rehabilitation centres six weeks after diagnosis of COVID19 or a negative RT-PCR laboratory test.

**Telerehabilitation:** Refers to individually tailored program provided using social media platforms such as video call, zoom, WhatsApp, skype etc or through telemedicine centre can be initiated not earlier than three weeks post COVID-19 diagnosis or COVID-19 negative laboratory test after discharge from hospital or isolation centres or on home isolation based on patient needs. It is preferred mode in view of infection control during the pandemic and for

---

**Fig. 2: Criteria for quality of evidence levels and grading of strength of recommendations used in formulation of current recommendations**

<table>
<thead>
<tr>
<th>Quality of evidence</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence from ≥1 good-quality and well-conducted randomized control trial(s) or meta-analysis of RCTs</td>
<td>1</td>
</tr>
<tr>
<td>Evidence from at least one RCT of moderate quality or well-designed clinical trial without randomization; or from cohort or case-controlled studies</td>
<td>2</td>
</tr>
<tr>
<td>Evidence from descriptive studies, or reports of expert committees, or opinion of respected authorities based on clinical experience</td>
<td>3</td>
</tr>
<tr>
<td>Not backed by sufficient evidence; however, a consensus reached by the working group, based on clinical experience and expertise</td>
<td>UPP</td>
</tr>
</tbody>
</table>

**Strength of recommendation**

- **Strong:** To do or not to do where the benefits clearly outweigh the risk or vice versa for most if not all the patients
- **Weak:** Where benefits and risks are more closely balanced or are more uncertain

**Evidence for quality of evidence levels and grading of strength of recommendations**

- Level A: Evidence from at least one RCT of moderate quality or well-designed clinical trial without randomization; or from cohort or case-controlled studies
- Level B: Evidence from ≥1 good quality descriptive studies, or reports of expert committees, or opinion of respected authorities based on clinical experience
- Level C: Evidence from at least one RCT of poor quality or from one or more case studies or expert opinion
- Level D: Evidence from at least one case series with or without control group
- Level E: Evidence from descriptive studies, or reports of expert committees, or opinion of respected authorities based on clinical experience
- Level F: Expert opinion

---

**Criteria for enrolment into physiotherapy programme**

**Phase I: Literature Review**

Systematic literature search and web-based survey. 48 recommendations prepared based on the preliminary evidence search, were circulated among the experts for consensus. Experts also provided their personnel opinions on physiotherapy management of Post COVID-19 diagnosis.
patients who are unable to access rehabilitation care.5,17–19

Timing of initiation of Physiotherapy: As per available evidence the timing of initiating rehabilitation can be initiated 6-12 weeks after hospital discharge.17,18 However, experts participated in this consensus process recommends that rehabilitation can be initiated as early as 3 weeks post diagnosis based on patient needs and functional limitations. (Cronbach’s α =0.807; ICC=0.741)

The recommendations are as follows:

1. Recommendations for pre enrolment screening:5,17,18,20 [Level 3A]

1.1. Prior screening for any associated myocardial involvement or pulmonary embolism by the physician is mandatory.

1.2. Any relevant investigations as advised by the treating physician such as D Dimer values, ECG changes, Echocardiography, cardiac enzyme levels should be noted by the therapist.

1.3. Patients with suspected myocarditis, acute chest pain, oedema feet, excessive sweating or any such signs of associated cardiac involvement or with raised inflammatory markers should not be included in Post COVID-19 rehab till physicians order.10

1.4. Patients with symptoms of giddiness should be evaluated for the source of symptoms before enrolment.

2. Recommendations for Initial assessment20–22

It is recommended that a detailed assessment in the post-acute phase (3-12 weeks post diagnosis) based on a consensus (Cronbach’s α =0.807; ICC=0.741).

2.1. Demographic data [UPP]

2.2. COVID-19 history [UPP]

Presentation of COVID-19 symptoms
Duration of COVID-19 symptoms
Severity of COVID-19 symptoms
Type of oxygen support during COVID-19 status
Hospitalization vs home quarantine details

Number of days after COVID-19 lab test negative
Perceived limitations in activities of daily living at discharge or time of assessment post COVID-19.

Medical management including respiratory support

2.3. Co-morbidities10,17,18,20 [Level 3A]

- Metabolic disorders
- Pre-existing respiratory or cardiac ailments
- Pre-existing neuro muscular disorders
- Any other reported co morbidities or new co morbidities post COVID-19

2.4. Investigations:10,17,18,20 [Level 3A]

Haematological reports (Routine Complete Blood Count (CBC) and Lipid Profile and Blood Sugar level and HbA1c in Diabetes)
Inflammatory markers (if available)
Chest X ray, HRCT,
Last available PFT, ABG
Routine cardiac investigations

2.5. Vital signs assessment: All the vital signs (heart rate, blood pressure, oxygen saturation, respiratory rate) should be monitored pre, throughout session and in recovery. [UPP]

2.6. Temperature should be checked for presence of fever.

2.7. Respiratory system: Assessment of respiratory system is recommended for presence of airway secretions, pattern of breathing and overall posture for use of accessory muscles during rest and routine activities. [UPP]

External Oxygen support requirement
Oxygen saturation at rest and during activity
MRC Dyspnoea score
Breath holding capacity

2.8. Neuro-musculoskeletal System:10,17,18,20

It is recommended to assess pain, sensory motor assessment, balance and coordination. In the experience of therapist many patients were observed to report paraesthesia post covid 19. Appropriate outcome measures related to symptoms has to be used.

Gait and use of assistive devices should be evaluated in-case of neurological or musculoskeletal dysfunction

2.9. Functional Evaluation:
Six minute walk test (6MWT):21,24 [Level 2A]

In case of Teleconsultation the 6MWT should not be attempted [UPP]

If the patient is unable to walk for six minutes use of two minute walk test to assess activity induced desaturation may be considered.23 [Level 2A]

30 second sit to stand or 1 minute sit to stand test (1-MSTST)26 is recommended as functional test for lower extremity.27 [Level 2A] In case of tele consultation it should be done with caution. [UPP]

Post COVID-19 functional Status score can be used to grade impact of psychological status on functional limitation26 [Level 2A]

2.10. Fatigue evaluation: Visual Analog Scale for Fatigue (VAS-F)29,30 or Fatigue Severity Scale (FSS)31,32 can be used in patients with fatigue as predominant symptom limiting function. [Level 2A]

2.11. Screening for psychological impairment: As psychological impairments are prominent in post COVID-19 patients, it is recommended to screen for anxiety and depression and appropriate referrals to other disciplines is recommended.10,11,13,17,18,20 [Level 3A]

2.12. Nutritional Assessment:
Evaluation of loss of weight and BMI should be considered as patients have reported loss of weight and muscle mass post COVID-19 and referral to the dietician to be considered.17,18,20 [Level 3A]

3. Recommendation for post covid-19 patient categories and physiotherapy treatment goals

In the initial phase from 3-6 weeks the goal would be to promote physical functioning to carry out activities of daily living without desaturation. Patient education and counselling for resumption of activities within and outside the home environment becomes important. Depending on the category of severity, the need and patient goals may differ. Table 1 categorizes the patients into mild, moderate and severe pulmonary impairments and Table 2 identifies physiotherapy treatment goals as per category.

4. Recommendations for Physiotherapy interventions:

The treatment for a post COVID-19 patient should be individualized27 and the protocol would depend on the severity of impairment. Physiotherapy interventions should be directed towards respiratory exercises, endurance and strength training,
energy conservation, and patient education.\textsuperscript{10,17,21,33}

The following management strategies are to be considered for post COVID-19 rehabilitation based on the consensus (Cronbach’s $\alpha =0.758$; ICC for the 13 standardized items = 0.700).

4.1. Respiratory Exercises:

4.1.1. Breathing exercises\textsuperscript{20–22,34} [Level 3A]

Breathing exercise to improve inspiratory capacity and recruit diaphragm are suggested.

Inspiratory breath-holds may prove useful in improving lung compliance and recruiting collapsed alveoli. An inspiratory hold for 3 seconds enables collateral ventilation and increase in opening up of obstructed lung regions.

Breathing control and pursed lip breathing: Patients may be taught pursed lips expiration to control breathing, maintain patency of airways, decrease respiratory rate and dynamic hyperinflation during exercise training.

4.1.2. Positioning;\textsuperscript{10,22,34,35} [Level 3A]

It is recommended to continue with positioning techniques in patients with breathlessness.

Dyspnoea relieving positions are suggested for patients when they feel breathless during exercise sessions.\textsuperscript{36}

4.1.3. Airway Clearance Techniques\textsuperscript{21,22,34} [Level 3A]

Active airway clearance techniques may be prescribed for patients who has retention of secretions or difficulty in expectoration. Techniques such as active cycle of breathing (ACBT) and autogenic drainage (AD) may be considered.

4.1.4. Lung volume expansion exercises\textsuperscript{10,21,22,34} [Level 3A]

Chest expansion exercises with proprioceptive feedback with emphasis on thoracic expansion is recommended.

Thoracic Expansion exercises:\textsuperscript{21} It is important to incorporate thoracic expansion exercise and rib cage mobility in view of anticipated restricted nature

4.1.5. Respiratory Muscle training;\textsuperscript{20,34} [Level 3A]

It is recommended to avoid overloading the muscles during respiratory muscle training.\textsuperscript{23}

Inspiratory Muscle Training (IMT): Devices such as inspiratory muscle trainer that load the respiratory muscles can be used. 2 sessions of 10 minutes of respiratory rehabilitation per week for 6 weeks.\textsuperscript{37} [Level 2A]

Non-threshold load training for the inspiratory muscle, started from 3 cm H$\text{O}$ and slowly increased thereafter, 10 to 15 minutes, 1 time/day.\textsuperscript{21} [Level 3A]

4.2. Exercise prescription: The Frequency, intensity, type and time (FITT) of exercises would vary depending on the patient category.

General Considerations:

4.2.1. Exercise Program: In order to achieve maximum benefit, exercise program should be of minimum 6-12 weeks with 2-3 supervised sessions per week of at least 30 minutes duration. [UPP]

4.2.2. Oxygen support and monitoring during exercise: [Level 3A]

Continuous monitoring of oxygen saturation is recommended for Patients who requires oxygen support or at risk of desaturation.\textsuperscript{17} Exercise induced desaturation needs to be evaluated prior to exercise prescription.\textsuperscript{17}

The oxygen requirement should be re-evaluated during the follow-up visit.\textsuperscript{17}

The patient should be advised to maintain Sp$\text{O}_2$ above 88% at rest and during activity.\textsuperscript{34}

4.2.3. Along with saturation, Resting blood pressure should be checked if possible for normally acceptable ranges, and resting heart rate <100 beats per minute. [UPP]

5. Recommendation for termination of Exercises: [Level 2A]

5.1. It is recommended to terminate the exercise session immediately if the patients shows the following\textsuperscript{21,22} (ACSM)

Oxygen saturation (Sp$\text{O}_2$) drops < 88%\textsuperscript{12}

Develops symptoms, such as palpitations, sweating, chest tightness, and shortness of breath

Leg cramps
Physical or verbal manifestation of severe fatigue
Exercise induced hypotension
Uncontrolled hypertensive response to exercises (SBP > 260 mmHg; DBP > 115 mmHg) specially for known hypertensive patients
temperature fluctuation (> 37.2°C), exacerbation of respiratory symptoms and fatigue that are not alleviated after rest


Patients with severe pulmonary impairments as well as patients with moderate pulmonary impairments may benefit from energy conversation techniques following principles:

6.1. Pacing:
Pacing helps to have enough energy to complete activities.
Activities should be broken up into smaller tasks and spread them throughout the day.
Introduce rests in between as a part of activities, that will help to recharge energy. Plan 30–40 minutes of rest breaks between activities.
It is recommended to sit and rest wherever possible between the activities.

6.2. Planning: It is recommended to plan as follows
Plan daily and weekly routine so that activities are spread out throughout.

Pace out more demanding activities. Collect all the items you need before you carry out a particular task to save energy.
Perform strenuous activity when energy levels are high change the time of an activity:

6.3. Prioritizing:
It is recommended to prioritize the activities than doing all together. Also consider another person’s help in completing some activities which can be shared.

6.4. Positioning:
It is recommended to position oneself such that excess energy is not wasted while doing any work.

Breathing should be coordinated with body movements.

Positions to relieve breathlessness as in 4.1.2 should be used.

The patients should be informed about the following:

Disease, its nature and known course of infection, involvement of the lung and other systems of the body.

Interpretation of reports and tests.

Breathing strategies, airway clearance and use of devices.

Role and rationale of medications including oxygen therapy.

Type of exercise to be performed, its frequency and duration of each session.

Benefits of exercise and physical activity. They should also be given general instructions about the program and follow up.

Energy conservation techniques.

Importance of sleep, nutrition and hydration.

Self-monitoring with pulse oximeter (indicate values drop more than 3% or saturation <90 on activity and or rest) and rate of perceived exertion (as per prescription of intensity on Borgs Scale).

Information about symptoms and advisory for immediate reporting to physician and or physiotherapist. The importance of social distancing, hand washing and wearing a mask should be emphasized.

Difficulties faced should be identified and addressed along with changes in health related behaviour.

Appropriate tools of patient education in the form of charts, leaflets and videos in language understood by the patient should be used.

8. Recommendation for relaxation:35,44 [Level 3A]
As these patients undergo stress and emotional fatigue it is suggested to train them in relaxation techniques like Laura Mitchell35,46 or passive relaxation.
It is important that relaxation be practiced daily for a duration of at least 10 minutes.

Progressive relaxation techniques is found to have reduced anxiety and improved quality of sleep among COVID-19 patients.

9. Recommendation for Outcome measures: [UPP]

9.1. The following outcome measures are recommended in documenting the progress in post COVID-19 rehabilitation: (Cronbach’s α =0.849; ICC=0.838)

Borgs Scale of Rate of perceived exertion
MRC Dyspnoea grade
Fatigue Severity Scale or VAS-F
Six Minute Walk Test
Two minute walk test
Timed up and go test
L test for Functional Mobility
30 second Sit to stand Test / One minute Sit to stand test
Grip strength
Functional Independence Measure or physical performance battery
Post COVID-19 Functional Status Scale

10. Recommendations for referral for other disciplines as multidisciplinary approach: [UPP]

As per patient needs and associated system dysfunction an multidisciplinary and inter professional collaborative effort should be considered.

Depending up on the assessment findings referral to relevant disciplines should be initiated

Speech and swallowing problems may referred to a speech therapist

Symptoms suggestive of PTSD may need a referral to a psychologist

Lack of taste/appetite may need a referral to a diettian

Severe Fatigue may require a referral to occupational therapist

11. Recommendation for infection control practices:10,21 [Level 3A]

Considering the virulence and infectivity of COVID-19 post 3 weeks being still unknown, we recommend the following

Patients should continue individualized rehabilitation under the premise of strengthening protection and prevention against other infectious diseases.10,21

Therapeutic interventions that can increase the risk of infection, such as instructed cough, expiration training, and tracheal compression, should be minimized.21

A sealed plastic bag should be used to cover the mouth during expectoration to prevent infection.21

Clinicians should follow preventive measures wear appropriate personal protective equipment’s according to
Table 3: Recommendations for Exercise prescription for specific patient categories

<table>
<thead>
<tr>
<th>Components of Exercises</th>
<th>Patient Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe</td>
<td>Moderate</td>
</tr>
<tr>
<td>Frequency(^{3,4,7}) [Level 3A]</td>
<td>2 to 3 times/ day and all days of week</td>
</tr>
<tr>
<td>Intensity [UPP]</td>
<td>Very Low intensity exercises RPE of 9-12 (20-point scale) or RPE of 1-3 (10-point scale)</td>
</tr>
<tr>
<td>Type(^{1,5,46}) Aerobic exercise(^{12,17,20,22,49}) [Level 3A]</td>
<td>Sit to stand activity walking Bed -cycling upper and lower extremity free exercises.</td>
</tr>
<tr>
<td>Resisted exercises(^{12,17,20,22,49}) [Level 3A]</td>
<td>Upper and lower extremities low weight exercises as per patient’s tolerance (RPE). Begin with 2-3 sets with 5 -10 repetitions as per tolerance</td>
</tr>
<tr>
<td>Respiratory Muscle training(^{2,5,14,17,49}) [Level 3A]</td>
<td>The threshold training minimum 2 sessions per week training as per patients tolerance (RPE)</td>
</tr>
<tr>
<td>Time/Duration(^{16,47}) [Level 3A]</td>
<td>Multiple short sessions with adequate rest periods to accumulate10-15 minutes</td>
</tr>
</tbody>
</table>

Available post COVID-19 rehabilitation guidelines are based on the expert consensus. Since the post COVID-19 sequelae is yet to be established, there is need for high quality RCTs to document the effectiveness, type, intervention dosage, safety and feasibility of physiotherapy protocol in post COVID-19 rehabilitation.

Acknowledgements

References


5. Zande, Manisha Hinduja, Hetal Mistry, Tirthadeep Das, Shabana Kazi, Anjali Shastri, Sachin Shetti. The authors also acknowledge, the Deans and the head of department of physical therapy of all the associated institutes for their continuous support.