

## Review Article

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## Physiotherapy on Cardiorespiratory Rehabilitation Post-Convalescence by COVID-19: A Review

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### ABSTRACT

COVID-19 could be defined as a infectious disease caused by the new coronavirus, identified in December of 2019, in Wuhan, China. The symptoms more common of the disease are: fever, fatigue and dry cough. Some patients could present pain, nasal congestion, headache, throat pain, diarrhea, taste or smell lost, cutaneous eruption in the skin or hand or feet fingers discoloration. These symptoms generally are light and begin gradually. Perhaps, according the Health World Organization 2021, one of each six infected persons by COVID-19 still seriously ill and develop cardiorespiratory diseases. The elderly people and ones that have other comorbidities as high presson, cardiac and lung problems, diabetes or cancer, have more risk of stay seriously ill. Perhaps, any person could take COVID-19 and remain ill. Persons of all ages that presented fever, associated cough to respiratory difficulty, chest pain or loss of the movements must search the health service more closely immediately. The asymptomatic patients and stable clinically don't need hospitalization and intensive care. The physiotherapist must do part of the care team, give help in the treatment and recovering.

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**Received:** February 12, 2022; **Accepted:** February 21, 2022; **Published:** February 25, 2022

**Keywords:** COVID-19, Coronavirus, cardiorespiratory rehabilitation, Physiotherapy

### Considerations

According with the health ministry (2020), the COVID-19 affect more than 181 countries in all the world and the number of cases grow exponentially. In April of 2020, there was a total of 1015403 registered cases globally and 53030 deaths. In the same period the Brazil computed 8044 confirmed cases and 324 deaths and mortality of 4% [1]. The virus could affect the cardiovascular system and cause consequences as myocardium damage, heart attack, arrhythmias, myocarditis and chock. The damages caused in the cardiovascular system normally manifest because associated factors and occurs mainly in the patients with pre-existence cardiovascular risk as advantage age, hypertension, and diabetes or installed cardiovascular disease [2].

The initial manifestation occurs by flu symptom with cough and fever that could to evolve to pneumonia and in some cases to acute respiratory discomfort syndrome. The organism answer to the virus with a systemic inflammation and cardiac dysfunction that could to evolve to acute cardiac insufficiency (ACI), myocarditis, thrombosis and arrhythmia. The conditions could to evolve to cerebral vascular accident (CVA), coronary arterial disease (CAD), Acute respiratory discomfort syndrome (ARDS), in addition of obit and organs multiple failure. The course of disease is variable and potentially serious, that some patients evolved to ARDS, the

risk increases in internal people by the disease could evolve to myocarditis injury [2].

Oftentimes the patients more serious need of respiratory support that could vary from the oxygen therapy to prolongate invasive mechanical ventilation. The mechanical ventilation is recommended in the hypoxemia presence, as well as the hemodynamic monitorization in all intern patients in Intensive Therapy Unit (ITU). With the prolonged hospitalization that could follow these intensive cares, the patients could present serious systemic injuries. The latest evidences show the need of special attention to the patients of the risk group and the importance of a adequacy management of the cardiovascular complications, is necessary initial medical evaluation with rapid identification and implementation of adequacy clinic treatment. All the health professionals that are in contact with patients must follow the national and local orientations to infection control and individual protection equipment (IPE) [3,4].

Although the sequels post-COVID-19 will be more common in patients that developed the grave form, individuals with moderate disease and that not need of hospitalization also could have some grade of functional compromising [5]. The physical-functional patient compromising and few symptoms are dyspnea, loss oxygen saturation, cough, respiratory and peripheric muscular weakness, beside of tiredness and fatigue could persist for weeks before the hospital discharge. In addition of the loss of hospitalization or

prolonged inactivity, the persistent high inflammatory charge and the previous conditions of health would be negatively influencing the recuperation of the patients. Considerable actions must be implemented to the disease treatment, comorbidities control and prevention of the injuries [6].

The 6 minutes' walk test (6WT), that can precede the prescription of physical exercises, could be realized in the patient home with security. The functional limitation is available through the perceived effort, vital signs and oxygen peripheric saturation. The result of the test give data about the patient condition and contribute for the prescription and treatment progress [7]. The cardiorespiratory and metabolic rehabilitation is a strong ally in the improvement of the patients. It means promote quality and full attention, this way the patient could have more chances to return their life diary activities with safety.

Mainly to stablish or re-establish a function respiratory standard with the goal of decrease the energetic spending during the respiration and helping the individual to realize the most different life activities (DLAs) without to promote big disorders and negative repercussions in his organism, the respiratory physiotherapy has clearing techniques, as well as, pulmonar re-expansion and ventilatory muscles fortification, capable of improve the respiratory mechanic with the objective of increasing the pulmonary ventilation [8]. The incentive respirometry could be a tool to help in the treatment. There are basically two types of incentive respirometers: volume orientated respirometers, in which a pre-determinate volume must be reached, and flux orientated respirometers, in which a pre-determinate flux must be reached. The volume incentive respirometers have quality indicators of the inspiratory flux; therefore, one must prescribe the volume to be reached and to orient about the inspiratory flux. The flux incentive respirometers not have a volume mark, but only numeric scales indicating the inspiratory flux [9].

The respiratory (inspiratory and expiratory) muscle strength exercises are indicated, could be adopted the instruments Threshold or Power Breathe, when training the inspiratory muscles with linear charge, utilize the intensity of 30% to 70% of the Maxime Inspiration Pressure (PI<sub>max</sub>) (being added 10% by week) and training the expiratory muscles use the intensity of 40% of the Maxime Expiration Pressure (PE<sub>max</sub>) (being added 10% by week). The prescription is done accord result of the physiotherapeutic evaluation. It varies between 3 to 5 series of 5 to 20 repetitions in each serial, with at least 3 sessions by week [10].

The rehabilitation with emphasis in the supervised physical exercises has as main goal providing improvement to the functional condition and increase the cardiorespiratory capacity [11]. Therefore, aerobic exercises and muscle strength exercises are prescribed. The prescription is done of judiciously and involve the intensity, duration, frequency and type of exercise. The equipment more used are conveyor belts and cycloergometer of inferior members, but also could be utilized cycloergometer of superior members, rowing machines, ski ergometer, elliptic between others. Aiming the global health, considering the cardiac, pulmonary compromise and other systemic associate complications. The aerobic training must be proportionated with soft intensity and gradual increase; 3-5 sessions by week; 20-30 minutes duration; and intermittent training for patients with strong fatigue [12].

The muscular fortification exercises to superior members (SSMM) and inferior members (IIMM), could do part of the program, there are a variety types of equipment that could be utilized for the

muscular fortification. Although, is possible to realize exercises utilizing only the corporal weight, that represent an effort, in general, sufficient in the patients more debilitated. A practical example is the exercise of sit and get up, whose realization require only a chair or a bench. The use of ropes or suspended tracks, fixed to the ceiling or high of the wall, could permit a wide variety of exercises with the utilization of free weights, dumbbells or skins guards with varying weights are frequently adopted in programs of RCV and make possible a large variety of movements and proper incentives of different muscle groups. It could be also used specific gadgets, with weights attached to cables and pulleys. Other equipment that also could be used: bars, sticks, balls with weights, (medicine balls), swiss balls and elastic bands with different resistance grades.

The muscle strength training must be proportionate with progressive resistance in 2-3 sessions by week with 8-12 repetitions, as well as free exercises that utilize the whole-body weight as: sit and get of the chair, squat, go up and down a flight of stairs or to use a step to up and down. Equilibrium and coordination training, passive and active global stretching aiming archiving flexibility also must be incorporate to the program [12].

The duration of training session is stipulated between 45 and 50 minutes, with frequency of 3 times by week in alternating days. The exercise program is divided in 3 steps: warming-up (about of 10 to 15 minutes including, walk, low intensity exercises, peripheric muscle resistance localized exercises of superior and inferior members and of stretching); training phase (20 to 30 minutes, with muscle resistance training, great group muscle exercises, running machine and ergo metric bike) and the cool down (with duration of 5 to 10 minutes, stretching exercises and corporal conscientization).

The miniaturization of the patient during the rehabilitation program it is necessary, for that could be utilized the following instruments: sphygmomanometer and stethoscope, frequency meters for monitoring of cardiac frequency (CF) and digital oximeters. Is recommended the solid evaluation of the patient to determine the risk, as well as the individualized direction to the physical exercise supervise modalities. In hemodynamic instable situations or symptoms during the physical training like dyspnea, low of saturation and fatigue must be observed, the exercises must, when interrupted, direct the patient to emergency immediately [13].

Preventive security measures must be added during all the attendance by professionals, patients and parents, with the use of alcohol gel, social distance and use of individual protection equipment are fundamentals during the evaluation and presential following in the rehabilitation of patients with risk of virus transmission or in risk of re-infection [1, 2, 12, 13]. Patients more weakened also could be favoured by home rehabilitation when avoiding their moving to the outpatient, that could difficult the adhesion to the program and increase the re-infection risk. Other than that, the health professionals could adopt the training of the parents that could assist the patients in their residences [9, 11]. Taking into account the systemic compromises, patients post-COVID-19 must be followed by multi-professional team with the finality of been assisted integrally.

## Conclusions

The physiotherapy in the recover physical functional of the patient's post-hospitalization by COVID-19 through the supervised physical exercises, has demonstrated benefit effects in the clearing and pulmonar reexpansion, respiratory and peripheric muscular

strength, increasing of the cardiorespiratory capacity and return to the daily life activities. However, still there aren't sufficient evidences to determine protocols efficient of treatment, in this way, the published concepts in the guidelines and consensus of previous rehabilitation still been applicated and recommended.

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