

## Respiratory Physiotherapy in ALS Patients in Brazil During COVID-19 Pandemic

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### Keywords

COVID-19, Respiratory muscles, Lungs, Health.

One of the factors that make the patient diagnosed with Amyotrophic Lateral Sclerosis/ Motor Neuron Disease (ALS/DNM) a member of the risk group to develop the COVID-19 due to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection is the alteration in respiratory muscles associated with reduced lung function [1].

COVID-19 is not a disease that directly affects the respiratory muscles, but it can cause an important injury to the lungs, which will result in an increased work of breathing which can be catastrophic to patients with ALS/DNM due to the previous respiratory muscles weakness [1].

Patients with ALS/DNM often use non-invasive ventilation (NIV) as part of their treatment, because of changes in respiratory muscles and lung function, either at night or for longer periods, depends

on stage of disease [2-4]. At this time of pandemic, special care must be taken to avoid contamination. Hygiene and cleanliness of NIV components must be emphasized so that there is no harm to the patient's health, in addition to the usual care with the correct asepsis such as: 1) masks should be cleaned daily, preferably using a damp cloth, it is up to point out that some foam masks cannot be exposed to water; 2) the water dispenser (humidifier) must have the water changed daily (distilled or boiled); 3) tube / trachea with regular washing (a suggestion is to use a 50% hydrogen peroxide solution). It is of fundamental importance that it is checked whether there are enough filters and windpipes (tubes) in the residence, since supplies related to mechanical ventilation are rare worldwide [5,6].

If the patient with ALS/DNM already uses tracheostomy, we recommend that tracheal suctioning, aiming at maintaining adequate bronchial hygiene. The cleaning of the suction system must also be intensified, the secretion collection container must be cleaned daily, and a suggestion would be the use of 50% hydrogen peroxide solution. It is recommended to use one suction catheter per day [5].

In case of confirmed SARS-CoV-2 infection from a resident of the household where the patient resides, additional measures should be taken: 1) respiratory isolation of the confirmed subject, restricting it to quarantined confinement in a single room in the house and, by no means, there should be contact of this person with the patient; 2) placement of a High Efficiency Particulate Air (Hepa) filter at the exit of the NIV equipment or in the inspiratory branch when the equipment is a double branch, to protect the patient from possible aerosol particles that can be aspirated by the equipment's turbine and taken to the patient's airway [5,7].

At this moment, it is essential that physiotherapists who are in direct contact with patients affected by COVID-19 avoid performing home care in patients with ALS/DNM for precautionary reasons. Despite the regulatory authorities of many countries, have authorized remote guided physical therapy, many patients with ALS/DNM must to continue their care, but preventive measures had to be strictly followed.

If the patient with ALS/DNM develops signs/symptoms of COVID-19, he must immediately contact his doctor and maintain adequate monitoring of peripheral oxygen saturation (SpO<sub>2</sub>) [5]. It is worth mentioning that even though NIV is a form of treatment established in the scientific literature for the treatment of respiratory failure [2-4], in situations where the deficit in gas exchange comes from COVID-19, NIV should not be used due to increasing the spread of viral particles in the air increasing the risk of infection around, since SARS-CoV-2 is disseminated through aerosol generation, especially when inappropriate interfaces

(masks) are used and which promote high leakage [5,8]. Most hospital services are making the choice for orotracheal intubation and invasive mechanical ventilation to prevent the occurrence of aerosol suspension. In relation to the patient with ALS/DNM, the invasive mechanical ventilation can be extremely delicate due to the previous respiratory muscle weakness [5].

Only with the proper structure can NIV be performed in case of respiratory failure due to COVID-19, requiring a room with negative pressure, in addition to a ventilator with two filters using a heat and moisture exchanger (HME) filters (inspiratory circuit) and High Efficiency Particulate Air (HEPA) filter (expiratory circuit) and preferably with the helmet interface, or other interface that does not allow air escape [8].

In need of intubation due to severe pneumonia, ventilators may not be available in hospital units, as we have observed in many countries, so it should be noted that some ventilators for domestic use are compatible with the use of a double branch circuit (inspiratory and expiratory) can be used for invasive ventilation. It is necessary to check the condition and technical skills of the patient's ventilator and if the hospital allows it to be use [5].

Airway suctioning should be performed through a closed suctioning system (in-line suctioning). It is essential that the physiotherapist wear gloves, mask (preferably N95), goggles and protective clothing during physiotherapy attendance [5,6,8].

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