

QUALITY AND SAFETY: AIRWAY MANAGEMENT AND PHYSIOTHERAPY PERFORMANCE

Airway management and physiotherapy performance

COVID-19 context (SARS-CoV-2)

The great increase in the number of cases of coronavirus infection (SARS-CoV-2) has brought a great challenge to health institutions. Although most people with COVID-19 develop the disease mildly or without complications, approximately 14% will develop its severe form which requires hospitalization, oxygen support and 5% will require hospitalization to the intensive care unit.

SARS-CoV-2 is transmitted through respiratory secretions (coughing, sneezing or runny nose) and can be present on surfaces up to 2m away from the infected person. SARS-CoV-2 remains viable for at least 24 hours on hard surfaces and up to 8 hours on soft surfaces.

The current situation has generated great stress to the population and a lot of pressure to health professionals, which, combined with the exhaustion resulting from overwork and the possibility of contamination, has this risk increased in situations such as: aerosol generating procedures (example: aspiration of upper airways, inhalation, among others).

The team must perform a thorough anamnesis to identify clinical risk factors / comorbidities that may favor the development of Severe Acute Respiratory Syndrome (SARS).

It is important that the health care team is trained to recognize patients' clinical deterioration early, so that preventive measures and anticipate ventilatory support measures are taken if necessary.

Conventional Oxygen Therapy

In relation to conventional oxygen therapy, it is not recommended to use nasal cannulas and Venturi masks, micro or macro nebulization, which can cause a greater dispersion of the droplets in relation to other systems. The use of a face mask is recommended. ARIR (Italian Physiotherapy Association) suggests, if it is extremely necessary, to use the Venturi mask or nasal catheter, that some contingencies be applied:

- Venturi mask - suggests use concurrently with a surgical mask covering the patient's face, especially where greater dispersion of droplets is evident. The mask must be correctly positioned and must be changed every 6-8 hours.
- Nasal cannulas - suggests using a surgical mask by the patient over the cannulas, covering the mouth and nose. The mask must be correctly positioned and must be changed every 6-8 hours.

Non-Invasive Mechanical Ventilation (NIV)

According to the Brazilian Association of Cardiorespiratory Physiotherapy and Physiotherapy in Intensive Care (ASSOBRAFIR), the use of non-invasive mechanical ventilation (NIV) and the High Flow Nasal Cannula (HFNC) have not been recommended in the treatment of patients with COVID-19, once that the spraying of the virus is greater due to the positive pressure air jet.

However, ASSOBRAFIR recently issued a statement on a clinical update for the treatment of patients with COVID-19 and states that in environments with limited access to invasive ventilation, or before patients develop severe respiratory failure, NIV or HFNC may be useful alternatives. However, as the air flow of these devices is less contained than in closed circuits, typical of invasive

ventilators, there is an increased risk of aerosol virus dispersion in the care environment. Thus, the determination of the magnitude of this risk and the strategies for mitigating the problems must be considered.

ASSOBRAFIR understands that NIV and HFNC should not be ventilatory strategies of first choice for patients with COVID-19. In specific situations, defined by the multiprofessional team, a response test to NIV, lasting 30 minutes, can be performed if SpO₂ <93% and / or RF > 24 irpm already with oxygen therapy.

In this situation, as recommended by ASSOBRAFIR, masks without an exhalation valve must be used, connected to ventilatory circuits with a double branch, through Heat and Moisture Exchanger (HME), also employing barrier filters on the distal ends of the branches ventilation circuits, before the exhalation valves of mechanical ventilators. Preferably, these resources should be applied to patients allocated to respiratory isolation beds with negative pressure, if available, or to an individual room / box with the door closed.

The use of High Flow Nasal Cannula (HFNC) can reduce the need for Orotracheal Intubation (OTI) in cases of hypoxemic respiratory failure when compared to conventional oxygen therapy and with results superior to Non-Invasive Ventilation (NIV) (5).

The use of HFNC will only be considered given up strictly to three requirements:

1. Device ready for immediate use in the unit;
2. Team has been trained, that is, experienced in the technique and;
3. Personal protective equipment (PPE) for aerosolizing procedures is being used correctly by the team.

ATTENTION: If one of these 3 requirements is not met, HFNC should NOT be used under the risk of aerosolization of pathogens and contamination of the

environment, other patients and health professionals. In this case, tracheal intubation should be performed.

Invasive Mechanical Ventilation (IV)

- If tracheal intubation is necessary:
 - Airway access must be careful, fast and carried out by the most experienced professional;
 - Always organize all the material necessary for the procedure, in order to avoid displacement of professionals to search for other urgent materials, increasing the risk of breaking precautions, as well as spreading the virus in the unit;
 - Limit the number of professionals in bed during tracheal intubation, and only those who will participate in the procedure should remain;
 - If possible, it is recommended at the time of tracheal intubation to leave a professional at the door of the room (outside), in case any equipment, material or request for help is needed;
 - Whenever possible, the most experienced doctor should be selected to perform tracheal intubation;
 - It is recommended to give preference to video laryngoscopy (if available), aiming to protect health professionals to the maximum and increase the chance of successful intubation on the first attempt. In the absence of this resource in the unit, intubation with a conventional laryngoscope should be performed (5);
 - One should always think about the possibility that the patient has a difficult airway, therefore, it is important that the material to manage this complication is available;

- The choice of drugs to perform intubation is also an important point that precedes the procedure, as some drugs are cardiodepressants and can lead to some complication;
- Pre-ventilation with bag-valve-mask (BVM) is not recommended due to the risk of generating aerosols.
- The Rapid Sequence Intubation (RSI) must be performed;
- After checking the placement of the tracheal tube and insufflating the cuff, the patient must be connected to the ventilator provided with an appropriate filter at the outlet of the expiratory circuit to the environment;
- The use of the closed suction system should be used whenever available, to avoid disconnection of the mechanical ventilation circuit and, thus, the dispersion of virus to the environment;
- If the patient progresses to cardiorespiratory arrest during the period on mechanical ventilation, do not disconnect the ventilator tube during cardiopulmonary resuscitation maneuvers for ventilation with a bag-valve-mask (BVM).
- Non-disposable equipment contaminated or potentially contaminated by SARS-CoV-2 (laryngoscope and blades, manual ventilators, etc.) must not be taken from the contaminated area to a clean area. They must be packaged and disinfected following strict guidelines.
- The evolution to ventilatory weaning should be discussed among the multidisciplinary team, as well as the practice and the best time for daily awakening, so as not to cause complications or worsening of the breathing pattern. It is recommended that during extubation, for safety reasons, the cuff deflate test should not be performed.

ASSOBRAFIR recommends the use of a Heat and Moisture Exchanger filter when the patient is on invasive mechanical ventilation. The use of a barrier filter at the distal end of the expiratory branch of the ventilatory circuit, before the exhalation valve of the mechanical ventilator is recommended to prevent virus release into the intensive care environment.

Regarding the ventilatory management of patients with severe forms of pneumonia in COVID-19, submitted to tracheal intubation, the WHO recommends some measures aimed at reducing the incidence of bacterial pneumonias associated with mechanical ventilation and reducing the risk of dissemination:

- Patient maintenance with bed head raised to 30-45 °
- Use of closed suction system in all cases;
- Changing the Heat and Moisture Exchanger filters when changing their function, when dirty, or at every regular interval of 5 to 7 days;
- Use of a barrier filter at the distal end of the expiratory branch of the ventilation circuit, before the exhalation valve of the mechanical ventilator.

After the institution of invasive mechanical ventilation, the adoption of a protective strategy should be prioritized to minimize the risk of mechanical ventilation-induced lung injury, according to institutional protocols. Interventions should be reinforced with a focus on reducing the time of mechanical ventilation, after improvement of the acute condition, through the use of weaning protocols that include daily assessment of the ability to tolerate spontaneous breathing.

Newborns (NB):

Despite the potential risk of mother-to-child vertical transmission, studies based on an extremely limited case series have so far failed to demonstrate the presence of the virus in the placenta, amniotic fluid, cord blood or breast milk. All authors who reported cases of NB who developed the disease conclude a probable postnatal acquisition (1).

In the NB of mothers with suspected or confirmed COVID-19 who need respiratory support in the neonatal ICU, maintain the unit's routine. There is no contraindication to the use of non-invasive support. The measures below are recommended for neonates:

- Adjust the need for respiratory support, case by case, maintaining the current trend “less is more, as they result in fewer complications and better results.
- There is no need to change the criteria for tracheal intubation and initiate early invasive ventilation, not least because invasive ventilation does not slow down the spread of aerosols due to gas leakage around the tracheal cannula. Note: The use of cuffed tracheal tubes to prevent gas leakage during ventilation is not indicated in the neonatal period (from the delivery room to the ICU), even in this COVID-19 pandemic scenario.
- At first, opt for the less invasive support - nasal catheter, nasal CPAP and non-invasive ventilation and, if necessary, conventional invasive ventilation and high frequency.

Personal Protective Equipment (PPE)

WHO recommends standard precautions, which include hand hygiene and the use of personal protective equipment (PPE) when in indirect and direct contact with blood, body fluids, secretions and skin.

- Use of a N95 protective mask or equivalent, when entering a room where patients are suspected or confirmed to have SARS-CoV-2 infection, or in any situation of care provided to a suspected or confirmed case.
- Use of a N95 protective mask or equivalent, when it is necessary to perform procedures that promote aerosol generation.
- The use of goggles or face shields (covering the front and sides of the face).
- Use of long-sleeved aprons, mesh or elastic cuffs and back opening.
- Use of procedure gloves, which should be used during care for any suspected patient, or confirmation of infection by SARS-CoV-2.

PPE must be for the exclusive use of each professional responsible for care, requiring proper hygiene, or disposal after use.

Note: WHO recommends that, whenever possible, professionals working in direct care to suspected or confirmed cases should be organized to work only in the isolation area, avoiding circulation to other assistance areas.

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Physiotherapy Care

Hospital Environment

Physiotherapists, especially respiratory physiotherapists, are among the health professionals involved in the management and care of patients infected with SARS-CoV-2, and play a key role in the non-invasive process, through postural changes and mobilization, as well as during follow-up and weaning from invasive

ventilatory support, which is why they must follow safety recommendations to minimize their risk of contamination.

Physiotherapy can be beneficial in the respiratory treatment and physical rehabilitation of patients with COVID-19. The recommendation of physiotherapeutic treatment should be evaluated, case by case, and the interventions applied based on clinical indicators. Due to the intensive medical treatment of some patients with COVID-19, including prolonged use of mechanical ventilation, sedation and use of neuromuscular blockers, the risk of developing muscle weakness is high, which worsens morbidity and mortality and makes it essential that rehabilitation is started early in order to limit the severity of acquired symptoms and promote rapid functional recovery. Physiotherapeutic treatment will have a fundamental role in the safe discharge of these patients.

WHO, along with other worldwide intensive care societies, has developed guidelines for the physiotherapeutic management of patients with COVID-19, which were published in March 2020, and endorsed by the World Confederation for Physical Therapy. Due to the recent presentation of COVID-19, clinical signs and guidelines may change as more is learned about this disease.

Physiotherapy Team

WHO recommends that the governance of hospital institutions prepare their physiotherapy teams to act during the COVID-19 epidemic in a planned, fast, safe and effective manner. And it suggests the following actions:

- Plan to increase the strength of the physiotherapy team, as it may become necessary.
- Identify employees who may be displaced to the areas with the highest incidence of COVID-19 admissions. Prioritize those who have

cardiorespiratory experience and in intensive care. Physiotherapists must have specialized knowledge for decision making to be assertive.

- Encourage the entire care team to assist in the screening of patients with COVID-19 who need physical therapy and provide support to the rehabilitation teams.
- Keep the physiotherapy team trained and informed about the plans, protocols and flows established. Communication is crucial for successful delivery and effective clinical services. The preparation of the team must include considerations about the specific requirements of the pandemic, placement and removal of PPE, prevention and infection control procedures, among others.
- Consider, whenever possible, dividing the teams on duty, leaving an exclusive team for the care of patients with COVID-19.
- Create information flow to keep teams always up to date on the rules and guidelines for infection control in health units, international, national, state and municipal.
- Recommend that the physiotherapy team identify the need to purchase additional materials for physical therapy interventions, aiming to reduce the risk of cross-infection (equipment for respiratory training, equipment for mobilization, strengthening and rehabilitation).
- Develop an inventory of rehabilitation materials and equipment and determine the allocation process to prevent equipment from moving between infectious and non-infectious areas.
- Organize the work environment and flow changes in order to reduce the risk of contamination and optimize the availability of PPE.

Safe Rehabilitation

The physiotherapist's intervention in respiratory syndromes is based on:

- Contamination prevention, with appropriate use of PPE (Goggles, N95 mask or equivalent, waterproof apron, procedure gloves).
- Use of oxygen therapy to maintain SpO₂ > 94%.
- Invasive mechanical ventilation in cases of acute respiratory failure with the application of protective ventilation parameters.

International guidelines recommend that precautions be taken during physical therapy interventions. Whenever possible, physiotherapists should position themselves 2m from the patient and out of the likely direction of dispersion of the aerosol or droplets.

Many respiratory physiotherapy interventions can generate aerosols, in all mobilizations or therapies that may result in coughing and mucus expectoration, there is a risk of creating an air transmission of SARS-CoV-2 during treatments. Physiotherapists must weigh the risk versus the benefit of these interventions and always use precautionary measures, and if indicated and considered essential, they must be performed:

- In a negative pressure room, if available, or in a box / single room with the door closed.
- Minimum number of staff must be present and everyone must wear PPE.
- Avoid entering and leaving the room during the procedure.
- During exercises that cause coughing, patients should be asked to cover their mouths with a tissue, at the end of the exercise always perform hand hygiene.

ARIR (Italian Physical Therapy Association) issued a document, endorsed by the WHO, which makes the following warnings about the use of respiratory

physiotherapy as a therapeutic resource to reduce the risks of patients and increase the safety of the professionals involved:

- The high risk of non-invasive procedures must always be considered, and vital signs must be constantly monitored, in order to avoid sudden clinical deterioration. Non-invasive treatments should not be persisted if the patient does not respond quickly to treatment.
- In patients with spontaneous breathing, changes in position can modify the ventilation / perfusion ratio, leading to a sudden change in gas exchange. Careful evaluation and clinical monitoring of patients is therefore extremely necessary after a postural change.
- All strategies adopted must be registered and shared with the multidisciplinary team.
- Unnecessary maneuvers should be reduced, especially procedures that can lead to a reduction in Positive end-expiratory pressure (PEEP) with a subsequent increase in the risk of pulmonary recruitment and atelectasis.
- Passive mobilization must be considered to avoid skin lesions and immobilization sequelae, the care team must always consider the possibility of starting an active mobilization program early.
- It is necessary to limit bronchial hygiene techniques to a few cases, always considering the risk of contamination of the environment and providing appropriate PPE to all present.

Although the main recommendations apply to physical therapy in acute care, long-term follow-up of patients is necessary, in order to better understand their needs.

Clinics and Ambulatory

The Regional Councils of Physiotherapy and Occupational Therapy (CREFITO) recommend:

- Abolition, in the therapeutic environment, of greeting with handshakes, hugs and kisses, clarifying in a pedagogical way, the reason for such a change in habits and customs.
- Request for the companion to be present only in cases where it is considered indispensable, which must be submitted to the same hygiene procedures.
- Strict hand washing with soap and water, before and after care. Gel alcohol can be an additional form of hygiene, but it does not replace hand washing.
- Before starting an appointment or medical care, instruct the patient about washing hands with soap and water, also making alcohol gel available.
- Use of visual alerts (signs, posters, etc.) at the entrance and in strategic places to provide instructions to patients and companions on hand hygiene, respiratory and cough etiquette.
- Organization of consultations or medical care in order to limit, as far as possible, the simultaneous presence of several people, taking into account the size of the facilities and the ventilation of the rooms with the highest number of people, giving preference to individual care.
- Observation of environment conditions, regarding air circulation, keeping windows and doors open whenever possible.
- Organization of the waiting room, maintaining a minimum distance of 1 (one) meter between the chairs.
- Strengthening of the environmental cleaning and sanitation plan, with interventions carried out at regular intervals, especially before and after each service.

- Cleaning of all equipment and devices (stretchers, door handles, handrails, chairs, tatami mats, therapeutic materials / resources, among others) with alcohol, after use.
- Orientation of patients, or their companions, to cancel appointments and consultations if they have symptoms of cold / flu (cough, runny nose, fever, shortness of breath).
- Suspension and referral, to the reference health services for COVID-19, of all patients with respiratory signs and symptoms, such as runny nose, dry and severe cough, tiredness, shortness of breath and fever.
- Suspension of care for patients who are part of the population subgroups considered at risk (age over 60 years; pregnant women; immunosuppressed; patients with chronic pathologies, such as diabetes, hypertension, renal failure, heart failure, neoplasms, chronic respiratory diseases, among others within this spectrum), taking measures for adequate home care if this suspension can contribute to worsening the clinical picture.
- Suspension of care for patients who returned from travel abroad or areas with community contamination, for a period of not less than 14 days (quarantine), even if asymptomatic.
- Use of protective mask (professional and patient); disposable gloves that must be dispensed in a container for contaminated waste, at each service; disposable lab coat / apron / cloak, which, likewise, must be discarded at every service; the use of personal protective equipment - PPE (cap, goggles, face shields, among others) should be expanded whenever deemed necessary and opportune to maintain the safety of the professional and the patient / client / user.

All the measures exposed were based on the evidence available at the time and may be changed in the face of new evidence. It is recommended that additional strategies be based on epidemiological information periodically released by federal, state or municipal authorities.

References

1. Recomendações sobre os cuidados respiratórios do recém-nascido com COVID-19 SUSPEITA ou CONFIRMADA - Sociedade Brasileira de Pediatria - 31 de março de 2020.
2. ANVISA – Nota Técnica (CVIMS/ GGTES/ANVISA No 04/2020 atualizada em 21 de março de 2020. <https://www.sbp.com.br/especiais/covid-19/>) e
3. Protocolo de manejo clínico para o novo coronavírus (2019-nCoV), 2020. Ministério da Saúde.
4. Recomendações para Assistência ao Recém-Nascido na sala de parto de mãe com COVID-19 suspeita ou confirmada – Sociedade Brasileira de Pediatria. Atualização – 01 de abril, 2020.
5. Orientações sobre o manuseio do paciente com pneumonia e insuficiência respiratória devido a infecção pelo Coronavírus (SARS-CoV-2) - Versão n.03/2020* amib.org.br/fileadmin/user_upload/amib/2020/marco/29/Orientacoes_sobre_o_manuseio_do_paciente_com_pneumonia_e_insuficiencia_respiratoria_devido_a_infeccao_pelo_Coronavirus_SARS-CoV-2_-_Versao_n.032020.pdf
6. Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected: Interim guidance V 1.2 -

[https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected)

7. COVID-19 em crianças: envolvimento respiratório. Sociedade Brasileira de Pediatria – Abril 2020 https://www.sbp.com.br/fileadmin/user_upload/22430c-NA_-_COVID-19_em_crianças-_envolvimento_respiratorio.pdf
8. ATENÇÃO ÀS GESTANTES NO CONTEXTO DA INFECÇÃO SARS-COV-2. NOTA TÉCNICA N°6/2020-COSMU/CGCIVI/DAES/SAPS/MS. http://189.28.128.100/dab/docs/portaldab/documentos/nota_tecnica_COSMU_COVID19_26mar2020.pdf
9. Lazzeri M. et al, 2020. RESPIRATORY PHYSIOTHERAPY IN PATIENTS WITH COVID-19 INFECTION IN ACUTE SETTING: A POSITION PAPER OF THE ITALIAN ASSOCIATION OF RESPIRATORY PHYSIOTHERAPISTS (ARIR), Monaldi Archives for Chest Disease 2020; 90:1285 doi: 10.4081/monaldi.2020.1285, acessado em 01/04/2020: <https://www.wcpt.org/news/Novel-Coronavirus-2019-nCoV>
10. Matte, D.L. et al, 2020. O FISIOTERAPEUTA E SUA RELAÇÃO COM O NOVO BETACORONAVIRUS 2019 (2019-nCoV) - Associação Brasileira de Fisioterapia Cardiorrespiratória e Fisioterapia em Terapia Intensiva (ASSOBRAFIR), acessado em 01/04/2020: https://assobrafir.com.br/wp-content/uploads/2020/01/ASSOBRAFIR_BETACORONAVIRUS-2019_v.4.pdf
11. COMUNICAÇÃO OFICIAL, 2020 – Associação Brasileira de Fisioterapia Cardiorrespiratória e Fisioterapia em Terapia Intensiva ASSOBRAFIR - COVID-19 MANEJO FISIOTERAPÊUTICO DA POPULAÇÃO INFANTIL - ASPECTOS EPIDEMIOLÓGICOS E ATUAÇÃO DO FISIOTERAPEUTA NA PREVENÇÃO E TRA-

TAMENTO DA COVID-19 NA POPULAÇÃO INFANTIL EM AMBIENTE HOSPITALAR, acessado em 01/04/2020: https://assobrafir.com.br/wp-content/uploads/2020/03/ASSOBRAFIR_COVID-19_Pediatria.pdf

12. COMUNICAÇÃO OFICIAL, 2020 – Associação Brasileira de Fisioterapia Cardiorrespiratória e Fisioterapia em Terapia Intensiva - ASSOBRAFIR COVID-19 INTERVENÇÃO NA INSUFICIÊNCIA RESPIRATÓRIA AGUDA - INDICAÇÃO E USO DA VENTILAÇÃO NÃO-INVASIVA E DA CÂNULA NASAL DE ALTO FLUXO, E ORIENTAÇÕES SOBRE MANEJO DA VENTILAÇÃO MECÂNICA INVASIVA NO TRATAMENTO DA INSUFICIÊNCIA RESPIRATÓRIA AGUDA NA COVID-19, acessado em 01/04/2020: https://assobrafir.com.br/wp-content/uploads/2020/03/ASSOBRAFIR_COVID-19_Pediatria.pdf
13. Nota Técnica Conselho Regional de Fisioterapia e Terapia Ocupacional da 1ª Região CREFITO-1, 2020 - RECOMENDAÇÕES DO CREFITO-1 QUANTO À PREVENÇÃO PARA REDUÇÃO DOS RISCOS DE CONTAMINAÇÃO NOS DIVERSOS AMBIENTES TERAPÊUTICOS, acessado em 01/04/2020: <http://www.crefito1.org.br/noticias/6265/recomendacoes-do-crefito-1-quanto-a-prevencao-para-reducao-dos-riscos-de-contaminacao-nos-diversos-ambientes-terapeuticos>
14. Nota Técnica Conselho Regional de Fisioterapia e Terapia Ocupacional da 2ª Região CREFITO-2, 2020 - CREFITO-2 ESTÁ NA LUTA CONTRA A COVID-19 (CORONAVÍRUS), acessado em 01/04/2020: <http://www.crefito2.gov.br/clientes/crefito2/fotos//NOTATECNICAATENDIMENTOFISIOTO.pdf>
15. Thomas P, Baldwin C, Bissett B, Boden I, Gosselink R, Granger CL, Hodgson C, Jones AY, Kho ME, Moses R, Ntoumenopoulos G, Parry SM, Patman S, van der Lee L, 2020 - PHYSIOTHERAPY MANAGEMENT FOR COVID-19 IN THE ACUTE HOSPITAL SETTING: CLINICAL PRACTICE RECOMMENDATIONS,

Journal of Physiotherapy, acessado em 01/04/2020, doi:
<https://doi.org/10.1016/j.jphys.2020.03.011>.