

**TOOLKIT
GUIDE**

Rapid responses in the context of COVID-19

Early Physical Medicine and Rehabilitation management, in the Intensive Care Unit, the Intermediate Care Unit or the post-ICU Rehabilitation Department

Validated by the HAS Board on 30 April 2020

Key points

- **Rapid response No. 1:** The contagious nature of the SARS CoV2 coronavirus means that it is necessary to apply additional strict hygiene precautions tailored to the types of care and protocols in force in the department in which the patient is hospitalised. The objective is to protect caregivers and patients.
- **Rapid response No. 2:** In patients hospitalised in intensive care and intermediate care units, the most severe deficiencies are respiratory, cardiovascular, hepatic and renal, neurological, cognitive, musculoskeletal, metabolic (undernutrition) and behavioural. The objectives of physiotherapy/rehabilitation at this stage are to prevent and limit the functional consequences of these deficiencies.
- **Rapid response No. 3:** In intensive care and intermediate care units, physical medicine and rehabilitation (PM&R) management of the patient and physiotherapy/rehabilitation procedures are performed once vital signs have stabilised and in collaboration with the doctors responsible for the patient's care. It is possible that conditioning may be required before the physiotherapy/rehabilitation session, in particular, modification of the ventilation mode, increase in oxygenation, or addition of analgesic treatment.
- **Rapid response No. 4:** The continuous monitoring of vital signs is maintained in intensive care and intermediate care units during physiotherapy/rehabilitation; if any deterioration occurs, the physiotherapy/rehabilitation session must be adapted, or even stopped immediately, and intensive care treatments are adapted.

- ➔ **Rapid response No. 5:** Physiotherapy/rehabilitation sessions are adapted to the clinical condition and capacities of patients. In sedated or unconscious patients, passive mobilisation and limb postures are aimed at limiting loss of joint range of motion and cutaneous complications. For conscious patients (ventilated or otherwise), physiotherapy/rehabilitation sessions also include active muscle exercises, cardiorespiratory reconditioning exercises, sitting and standing, and preparation for the resumption of functional activities.
- ➔ **Rapid response No. 6:** The objective of respiratory rehabilitation is to improve ventilation quality in order to prepare for the withdrawal or assisted ventilation and low-intensity muscle effort.
- ➔ **Rapid response No. 7:** Due to the risk of aerosolization, instrumental respiratory physiotherapy techniques, in particular lung clearance, are only used where essential and respecting additional hygiene precautions including "air"-type protection.

Context

The severe respiratory deficiency encountered in SARS CoV2 coronavirus may be associated with multi-organ failure and decompensation of comorbidities. In addition, ICU treatment usually involves mechanical ventilation, sedation and neuromuscular blocking and periods in the prone position, which can result in deficiencies that is necessary to prevent as far as possible and then try to improve. The possible sequelae are secondary to the specific damage caused by the viral infection, as well as complications inherent to acute respiratory distress system (ARDS), ICU-acquired complications and immobility.

The principles for rehabilitation in the ICU or intermediate care unit of patients infected with the SARS CoV2 virus are similar to those for patients with severe ARDS, with certain specific characteristics related to the contagious nature of the virus and the severity of the ARDS, with a high number of patients requiring neuromuscular blocking agents, placement in the prone position and long-term ventilation. Observation of the first patients leaving French intensive care units, a proportion of whom present complications, suggests that there may be a need for specific, long-term rehabilitation.

The specific characteristics of severe SARS CoV2 illness include:

- bronchial obstruction that is uncommon in the initial phase;
- a risk of sudden decompensation;
- a dissociation between the severity of the hypoxaemia and the patient's perceived dyspnoea;
- a frequent need to place the patient in the prone position;
- a high risk of thromboembolic complications;
- the need for massive sedation and neuromuscular blocking agents;
- increased incidence of intensive care delirium and cognitive disorders, manifested by disorientation on awakening.

The rules for prevention and protection of professionals during the contagious period of the virus are based on the recommendations of the *Société française d'hygiène hospitalière* (SF2H - French Hospital Hygiene Society, 28 January 2020).

Appropriate precautions should be taken when applying rehabilitation methods:

- All instrumental respiratory physiotherapy methods, in particular lung clearance techniques, should only be used in situations where they are essential due to the patient's clinical situation, and with modifications to the circuit of the devices. In principle, they are not recommended due to the risk of aerosolization. If they are essential, they must respect additional hygiene

precautions including "air"-type protection (FFP2 mask), head cover, goggles, long-sleeved waterproof gown.

- Manual techniques accompanying active respiratory work should be performed with caution due to the risk of contamination for the healthcare professional and of cardiorespiratory decompensation for the patient.
- Particularly close continuous monitoring of vital signs during rehabilitation is required due to the risk of haemodynamic and respiratory intolerance, or sudden decompensation. It may be necessary to modify the ventilation mode, the inspired oxygen fraction or sedation and analgesia before or during physiotherapy/rehabilitation sessions.

The involvement of the rehabilitation team helps limit the medium and long-term consequences of a prolonged stay in the ICU. Its presence at review meetings and medical staff meetings may be one of the levers for access to early physiotherapy (Dubb, 2016).

Objectives

The prevention of ICU-acquired weakness is essential and is based partially on physiotherapy (Hodgson, 2017; Vanhorebeek, 2020).

The prevention of complications related to immobility and decubitus is very important: disadaptation for orthostatism (loss of the ability to stand up), musculoskeletal disorders, pressure ulcers, thromboembolic complications, swallowing disorders, undernourishment, cardiorespiratory and muscular deconditioning.

Reminder

These rapid responses drafted on the basis of available knowledge on the date of publication are liable to evolve on the basis of new data.

Assessments, scales and scores

- Consciousness: RASS (Richmond Agitation Sedation Score) (Vasilevskis, 2016).
- Delirium: Cam ICU (Kharat, 2013).
- Respiratory tolerance:
 - Respiratory rate, SpO₂, oxygen requirements (l/min), need for ventilatory support (non invasive ventilation (NIV), intermittent invasive ventilation *via* a tracheotomy tube).
 - Counting during exhalation until next inhalation.
- Haemodynamic tolerance: Heart rate (HR), mean blood pressure (MBP), cardiac output if it is measured continuously.
- Screening for and prevention of ICU-acquired weakness provided that the subject participates: MRC sum-score /60 (Vanpee, 2014) or Jamar. A score <48/60 indicates weakness and a score <36/60 indicates severe weakness (Connolly, 2013).
- Assessment of the orthopaedic condition of all four limbs.
- Assessment of swallowing disorders: GuSS-ICU tool (Christensen, 2018); volume-viscosity swallow test VVST (Rofes, 2014).
- Kinetics and impact of nutritional measures.

Physiotherapy protocols

The following care may be offered to the patient, based on the initial assessment and the patient's failures and deficiencies. It is adapted to the patient's clinical condition, level of consciousness and awareness, the severity of the respiratory failure, the ventilation method and the extent of the life support measures.

Increased vigilance and the presence of an ICU doctor or nurse are necessary for patients given neuromuscular blocking agents and in the prone position or on ECMO. In all cases, the session takes place with constant monitoring of vital signs (SKR, 2020; Hickmann, 2016; Hodgson, 2017; Roeseler, 2013; Mikkelsen, 2020; Kayambu, 2015; Anekwe, 2020; Denehy, 2008; CARM/CSPMR, 2020; Thomas, 2020). In the event of instability or a deterioration in vital signs (MBP < 60 mmHg, PaO₂/FiO₂ < 150 mmHg, SpO₂ < 88%), intensive care treatments are adapted and the physiotherapy/rehabilitation session is postponed or stopped. Physiotherapy/rehabilitation sessions can be conducted in patients on assisted ventilation.

Respiratory rehabilitation

- Position-changing assistance: prone position, lateral decubitus position and three-quarters prone position (SIAARTI, 2020; Postiaux, 2014). The contribution of physiotherapists or occupational therapists may be useful to optimise positioning of the patient. Outside these sessions, the patient is placed in a semi-sitting position (30 to 45°) for the prevention of ventilator-associated pneumonia (VAP).
- Assisted lung clearance decided upon on a case-by-case basis, on medical prescription only and performed by physiotherapists experienced in respiratory physiotherapy. The risk of aerosolization needs to be taken into account and measured on a case-by-case basis.
- Physiotherapy protocols around the withdrawal of ventilation and extubation phase are decided upon by ICU doctors. In the event of gradual withdrawal of assisted ventilation, the weaning protocol may be jointly supervised by other medical specialisations (Levy, 2020).
- Depending on the strategies of each team, a weaning protocol may involve nurses and/or physiotherapists.
- The replacement of mechanical ventilation by non-invasive ventilation or the use of high-flow humidified oxygen therapy may be necessary following extubation. Precautions with respect to the risk of aerosolization need to be taken.
- A temporary weaning tracheotomy may be indicated, particularly in the event of prolonged mechanical ventilation. The indication is rare.
- In conscious patients, particularly those with spontaneous ventilation, respiratory rehabilitation exercises should favour verbally guided autonomous methods. Conscious controlled breathing exercises (awareness of diaphragmatic breathing and respiratory muscle training) may be proposed.
- The objective is to improve the quality of ventilation (volume, inspiration/expiration rate and time, thoraco-abdominal coordination, no use of accessory muscles) in order to prepare for low-intensity, short-duration muscle effort. Ideally, the patient should be in the sitting or semi-sitting position (Fowler's position).

Motor rehabilitation

- The physiotherapy/rehabilitation session takes place without interrupting SpO₂ monitoring.
- Careful decontamination of equipment and surfaces is performed.

- Position changes, passive mobilisation of all four limbs and postures should be started early, from the first days (Stiller, 2013; Nydahl, 2017; Parry, 2017). Depending on the patient's clinical condition, physiotherapy pedal exercisers can be used, in passive or active mode, in bed or in a chair. Although the level of evidence of their efficacy is low (Mehrholtz, 2015), they can supplement treatments provided by physiotherapists.
- These methods can be performed with breathing support to improve their efficacy. It may also be necessary for the doctor responsible for the patient's care to adapt ventilation. In particular, the oxygen flow rate should be adjusted to maintain an SpO₂ > 90% during physiotherapy/rehabilitation.
- Verticalization in bed may be proposed whenever the patient's haemodynamic status allows this. The duration of verticalization sessions and the verticalization angle (up to 70°) should be adapted on the basis of the patient's blood pressure and respiratory tolerance and must take into consideration the existence of any associated brain injuries. The use of a tilt table in the room or of a verticalization bed is possible. The use of compression stockings is recommended to prevent orthostatic hypotension.
- Patients may be seated on the edge of the bed, then moved to a chair (passively, then with active participation as soon as possible), depending on their clinical tolerance and with medical approval. Cooperation between physiotherapists and care teams is essential for these progressive strategies. The resumption of walking is facilitated by the use of appropriate walkers, which can also be used in patients on mechanical or non-invasive ventilation by a trained team.
- Active muscle use exercises should be started as soon as possible. These exercises should be started without the effect of gravity for muscles in which manual testing is < 3/5. Exercises should be performed with a small number of repetitions and prolonged rest times. These muscle exercises should target the four limbs, with the aim of restoring functionality. The muscle exercises must not cause desaturation of more than 4% compared to resting saturation. Evaluation of dyspnoea by VAS (<3/10), or of exercise intensity using the Borg scale (≤ 3/10), can enable adaptation of the exercises.
- Electrical stimulation is not recommended because it is technically difficult to put in place and the benefit/risk ratio and efficacy have not been established during the inflammatory phase (Wageck, 2014; Hermans, 2014; Burke, 2016; Zayed, 2019).

Other rehabilitative treatments

- Benefit of multi-professional physiotherapy/rehabilitation management with a dietician, occupational therapist, physiotherapist, speech therapist and psychologist, coordinated by a specialist doctor.
- Delirium and other confusional syndromes: cognitive stimulation and reassurance provided by the whole team help improve behavioural disorders and disorientation. The persistence of symptoms may potentially require additional investigations (in particular, metabolic and sometimes neurological), depending on the indications given by the doctors.
- Swallowing: post-intubation swallowing difficulties are common and they recover spontaneously as a rule. Care teams must be trained to screen for these routinely and how to identify warning signs considered to pose a high risk of inhalation. When these difficulties persist for more than a few days, a medical assessment is indicated to guide the intervention of a rehabilitation professional. In this event, the swallowing disorders may have an ENT, neurological or muscular cause.

- In the context of overall rehabilitation, as well as segmental muscle strengthening, it is necessary to pay attention to nutritional intakes: resume enteral nutrition at an early stage (and oral nutrition as soon as possible), dividing and fortifying meals.

Resources

These rapid responses will evolve as knowledge in the field of COVID-19 increases. They supplement the websites, documents and guidelines developed by learned societies.

[See all the French National Authority for Health's rapid responses in the context of COVID-19](#)

Link to the websites of CNPs (National Council for healthcare professionals) and learned societies

- SOFMER (French Society of Physical Medicine and Rehabilitation) <https://www.sofmer.com/>
- CNP-MPR (French National Council for Physical Medicine and Rehabilitation Physicians) <https://sites.google.com/site/cnpdempr/>
- SPLF (French-Language Pulmonology Society) <http://splf.fr/>
- SRLF (French-language Society for Intensive Care) <https://www.srlf.org/>
- CMK (French College of Physiotherapists) <https://www.college-mk.org/>
- CNPE (French National Council for Occupational Therapists) <https://cnp-ergotherapie.fr/>

Documents issued by CNPs (National Council for healthcare professionals)/learned societies/ministry/etc.

- HCSP (French National Council for Public Health) <https://www.hcsp.fr/Explore.cgi/PointSur?clef=2>
- Teleconsultation: <https://solidarites-sante.gouv.fr/soins-et-maladies/maladies/maladies-infectieuses/coronavirus/covid-19-informations-aux-professionnels-de-sante/article/covid-19-et-telesante-qui-peut-pratiquer-a-distance-et-comment>

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Drafting method and warning

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These rapid responses are based on what appears to be preferable or necessary at the time of their formulation. They do not take into account personal protective equipment procurement capacities.