

Chelsea physical assessment tool for evaluating functioning in post-intensive care unit COVID-19 patients

To the Editor,

By this letter, we aimed to address the need of an adequate assessment of functional status in post-intensive care unit (ICU) coronavirus disease 2019 (COVID-19) patients. COVID-19 patients are at risk for postintensive care syndrome, with an impaired functional status. Physical and Rehabilitation Medicine (PRM) physicians have to face both acute and postacute COVID-19 patients and provide them with an adequate respiratory and neuromotor rehabilitation plan. To date, specific assessment tools are warranted to provide information regarding COVID-19 patients' functioning. Chelsea Critical Care Physical Assessment Tool (CPAx) is a bedside assessment tool specifically designed to assess function in post-ICU patients and has demonstrated validity, reliability, and responsiveness in critical care population. Taken together, we retain that the CPAX, due to its characteristics, might be used by PRM physicians for assessing functioning in post-ICU COVID-19 patients. COVID-19 pandemic has reached more than 96.2 millions of cases and more than 2 millions of deaths at the moment of writing, putting under heavy stress health systems worldwide, especially ICUs. COVID-19 survivors are at risk for postintensive care syndrome, including ICU-acquired weakness and a consequent impairment in terms of functioning.¹

In this scenario, PRM physicians have to adequately face both acute and postacute COVID-19 patients, even considering that, as well as ICUs, the rehabilitation units were also burdened. Indeed, postacute COVID-19 patients requiring an adequate respiratory and neuromotor rehabilitation, leading PRM professionals to become frontline health workers to reduce COVID-19 complications.^{2,3}

Postacute COVID-19 patients are commonly transferred from ICU to postacute specialized COVID-19 rehabilitation units or other hospital wards. In this context, an adequate transfer of information regarding patients' condition and functional status at the time of ICU discharge during handover is mandatory for both ICU and rehabilitation physicians.²

However, as showed by a series of rapid living systematic reviews conducted by Cochrane Rehabilitation Field, the evidence on the type of outcome measures for limitations and functioning is still scarce.⁴ Post-ICU COVID-19 patients could suffer from severe disabilities, firstly dyspnea during the activities of daily living and difficulty in walking and require an adequate pulmonary rehabilitation⁵⁻⁷; however, the most severe cases require assisted ventilation, thereby limiting the ability to administer the common assessment tests to evaluate functional status.

To date, there is a need of specific assessment tools that provide information regarding patients' functioning is to plan an adequate rehabilitation intervention and to monitor changes with treatment. The present assessment tools used in patients after ICU are: muscle strength tests, walking tests for physical function, and health-related quality of life instrumental tools.⁸ Most of them require awakening and an appropriate mental health that could be not always considered as appropriate in COVID-19 patients. Moreover, walking tests, such as 6-min walk test or Timed Up and Go, might be impractical because some postacute COVID-19 patients showed to not be able to perform them, due to their severe impairment.^{5-7,9} Furthermore, these tests require space to perform and may require management of several drips, drains, and oxygen delivery systems, while the patient is walking and turning that render the test difficult to carry out.⁹

Nevertheless, CPAX¹⁰ and the Physical Function in Intensive Care Test (PFIT)¹¹ are two instrumental tools specifically designed to evaluate physical function in critical ill patients after ICU. A recent systematic review, performed by Parry et al.¹² on 26 different outcome measures, the CPAX and the PFIT demonstrated the strongest psychometric properties in evaluating impairment and activity limitations in the critically ill, albeit the PFIT has a significant floor effect.

More in detail, CPAX is a bedside assessment tool firstly reported in 2013¹⁰ to measure physical morbidity in critical care population, consisting of 10 items (respiratory function, cough, moving within the bed, supine to sitting on the edge of bed, dynamic sitting, standing balance, sit to stand, transferring from bed to chair, stepping, and grip strength) rated on a 6-point scale from complete dependency (level = 0) to independency (level = 5), as depicted by Figure 1. Therefore, the CPAX sum score ranges from 0 (worst condition) to 50 (best functioning/independence).¹⁰

Taking into account the short time required for being administered and the relatively minimal use of equipment and space, it has been recently suggested as outcome measure for COVID-19 patients.⁹ However, to date, there is considerable variability in the choice of adequate outcome measures for assessing impairment in physical function and the consequent limitations in acute and postacute COVID-19 patients. We are aware of the need of findings that might improve the scientific knowledge in this field, considering the lack of extensive multicenter studies investigating CPAX.

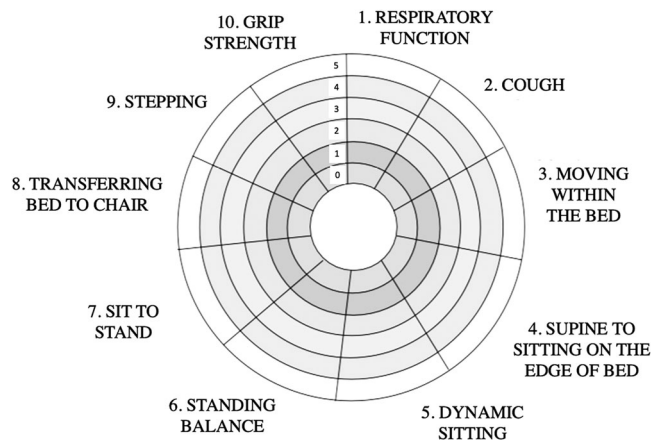


FIGURE 1 Diagram of the Chelsea Critical Care Physical Assessment tool items

However, the main characteristics of CPAX, including the classification of respiratory status, led us to consider this test as potentially indicated and more suitable in the assessment of functional status in COVID-19 patients discharged from ICU, that might not have the ability to perform submaximal exercise tests. This issue should be considered as crucial in this challenging period.

Hence, based on CPAX sum score and particularly on CPAX subitems scores (i.e., respiratory function, standing balance, and sit to stand), different rehabilitation plans might be prescribed to improve gas exchanges, reduce dyspnea, improve muscle strength and performance in COVID-19 patients, always ensuring an adequate peripheral oxygen saturation (at least 90%) with an adequate monitoring of oxygen therapy.

Before using CPAX in different languages and different countries, there is still a need of evidence on effectiveness, validity, and reliability of this instrumental tool compared to other functional assessment outcomes commonly used in the clinical practice (e.g., PFITs, Medical Research Council score, 1-min sit-to-stand test) in COVID-19 patients.

Taken together, our considerations suggested that CPAX might be a potential cornerstone in functional assessment of COVID-19 patients, thus facilitating PRM physician to plan an appropriate patient-tailored rehabilitation in post-ICU COVID-19 patients. Multicenter studies are warranted to better investigate the effectiveness, validity, and reliability of CPAX compared to other functional assessment systems in COVID-19 patients.

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

AUTHOR CONTRIBUTIONS

Study conceptualization and design: Alessandro de Sire and Ozden Ozyemisci Taskiran. *Literature research:* Alessandro de Sire and Esra Giray. *Writing manuscript:* Alessandro de Sire and Esra Giray. *Critical revision:* Ozden Ozyemisci Taskiran. *Writing revised version:* Alessandro de Sire. *Revision and approval of the final draft by all the authors.*

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