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Early mobilization in hospitalized adult patients affected by COVID-19: a literature review

Aldemir Santos da Silva[1]; Dheyson Christian de Paula Lima[2]; Érika Lins da Silva[3]; Emanuel Souto Maior Santos Filho[4]; Paulo Rosemberg Rodrigues da Silva[5]; Mariana de Barros Correia[6]; Hortência Héllen de Azevedo Medeiros[7]; Kadja Elvira dos Anjos Silva Araujo[8]; Lucia Mariana Albuquerque Soares[9]; Ingrid Awanny de Oliveira Moura[10]; Paloma Nogueira Rodrigues Crispim Alvares[11]; Marton Kaique de Andrade Cavalcante [12]; Hélida Larissa Cavalcante Rolim Oliveira[13]*

1-2 Bachelor's degree in Physiotherapy, University Center of Vitoria de Santo Antão-UNIVISA
3 Bachelor's degree in Physiotherapy - Estácio do Recife
4 Bachelor's degree in Physiotherapy, University Center of Vitoria de Santo Antão-UNIVISA
5 Nurse and Coordinator - SAMU- Umbuzeiro/PB Nurse emergency
6 Bachelor in Nursing from UFPE, specialist in Women's Health from SES-PE
7 Bachelor in Nursing from UFPB
8 Bachelor's degree in Nursing from UFPE, specialist in Midwifery from the IMIP/SES-PE residency
9 – 11 Bachelor's degree in Physiotherapy, University Center of Vitoria de Santo Antão-UNIVISA
12-13 Professor in Physiotherapy, University Center of Vitoria de Santo Antão-UNIVISA

E-mail adresse: Aldemir Santos da Silva (aldemirsillva@yahoo.com.br), Dheyson Christian de Paula Lima (dheysonlimadd@hotmail.com), Érika Lins da Silva (erikafisio2008@hotmail.com), Emanuel Souto Maior Santos Filho (emanuelsouto17@gmail.com), Paulo Rosemberg Rodrigues da Silva (paulorosemberg2007@hotmail.com), Mariana de Barros Correia (marianabarroac@gmail.com), Hortência Héllen de Azevedo Medeiros (hellenhortencia17@gmail.com), Kadja Elvira dos Anjos Silva Araujo (anjoskadja@gmail.com), Lucia Mariana Albuquerque Soares (marixcat18@gmail.com), Ingrid Awanny de Oliveira Moura (awanny20@gmail.com), Paloma Nogueira Rodrigues Crispim Alvares (palomacrispim180@gmail.com), Marton Kaique de Andrade Cavalcante (m.kaiquecavalcante@hotmail.com), Hélida Larissa Cavalcante Rolim Oliveira (helidaoliveira@univisa.com.edu.br)
*Corresponding author

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Abstract: COVID-19 in humans presents distinct stages of evolution and may develop the most severe form of acute respiratory distress syndrome (ARDS) causing imbalance of body hemodynamics and sarcopenia, which corroborate muscle weakness acquired in the ICU. Immobility in the ICU worsens health status and reduces quality of life. It seeks to analyze whether early mobilization minimizes the deficit of cardiovascular and muscular functions of individuals affected by COVID-19. This is a narrative literature review, scientific articles in Portuguese and English from journals indexed in the Databases PubMed, SciELO, LiLacs, and PEDro published between the years 2012 to 2022. Of this demand were found 32 articles and after the selection steps, 09 studies were included and analyzed. It can be concluded that mobilization is essential in the process of weaning from mechanical ventilation, accelerating hospital discharge and facilitating the return to daily activities.

Keywords: Muscle Weakness. Early Mobilization. SARS-CoV-2.

1. Introduction

Coronavirus is a virus with RNA characteristic of the order Nidovirales, of the *family Coronaviridae that* causes an inflammatory cascade of respiratory main characteristic, where it was studied in 1937 and described as in 1965 (LIMA, 2020).

However, on December 31, 2019, the World Health Organization (WHO) issued a worldwide alert for a new case of increasing pneumonia exponentially in wuhan city, Hubei province, People's Republic of China. A new variant of coronavirus never studied in humans and on February 11, 2020, it was named SARS-CoV-2 according to the Pan American Health Organization (PAHO, 2021).

In humans' inflammation presents stages of evolution and can develop the most severe form of acute respiratory distress syndrome (ARDS) and cause an imbalance of body hemodynamics, in addition to the appearance of sarcopenias evolving to myopathies and malnutrition caused by sedation and neuromuscular blockers that irar corroborate the muscle weakness acquired in the ICU (FMA-UTI), (PEDROSA, 2021).

The study of Bonorino; Cani, (2020), states that immobility in the ICU tends to aggravate the state of health due to the disuse of the limbs and thus reduces the patient's quality of life. It was observed through tests that the impairment ranges from physiological and metabolic deficit, to the reduction of cardiac output, in addition to the increased probability of infections. Another important point is the level of low consciousness of the patient, in which the patient does not perform active exercises and consequently causes the loss of tone and impaired physical conditioning.

Early mobilization is a resource of physiotherapy, which aims to reduce the harmful effects of immobilization in the hospital environment, where it is up to the physiotherapist to evaluate the patient's conditions and propose the objectives and conducts, through resources such as kinesiotherapy, among other tools aimed at mitigating hypotonia, joint stiffness and reducing the hospital stay time. (RABBIT; MENDES 2021).

According to Feliciano, *et al*; (2012) the incorporation of mobility by the physiotherapist reduces the time of hospitalization in hospital units, provided that the patient is monitored by applying the therapeutic exercises according to the objective and the conduct progressively outlined. These aim to improve the motor, respiratory, sensory, proprioceptive, hemodynamic and psychic system, working holistically and humanized.

In view of the above, it seeks to analyze whether early mobilization minimizes the deficit of cardiovascular and muscular functions of individuals affected by COVID-19.

2. Methodology

This is a study of a narrative literature review from the reading of scientific articles, based on early mobilization in patients hospitalized by COVID-19. Therefore, the question aims at the systematic qualitative and quantitative descriptive analysis of the protocol models adopted with their efficacies regarding early mobilization.

For which scientific articles in Portuguese and English of journals indexed in PubMed, Medline, SciELO, lilacs and PEDro databases published between 2012 and 2022 were used. The search for the articles took place from January 2022 to October 2022.

For the present review, articles based on the following Descriptors in Health Sciences (DeCS) were considered: Muscle Weakness, early mobilization, SARS-CoV-2 and in English: *Muscle Weakness, early mobilization*, COVID-19. We used 19 studies in general and with the inclusion criterion were: papers accessible in Portuguese and English and complete language, as well as documents that address the theme and within the scope of the years 2012 to 2022. Exclusion criteria included: years lower than 2012, duplicates, incomplete, case studies, systematic reviews and studies that have as a pediatric or neonatal target public object, patients using ECMO.

We used the VHL Regional Portal, adding the descriptors in Portuguese and using the advanced search tool in addition to using the Boolean operator "AND" we had 03 finds, using the same resources in the PUBMED database were found 24, while in SciELO and LiLacs was found 01 works each and in the PEDro database we found 03, totaling 32 jobs.

3. Results and Discussion

In this review, 09 studies that addressed early mobilization in hospitalized patients affected by COVID-19 were selected according to the search criteria, according to Figure 1.

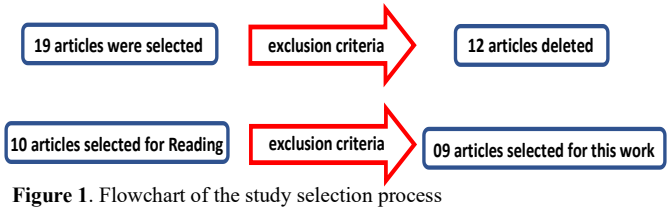

Figure 1. Flowchart of the study selection process

To elucidate the information of the results through the 09 articles selected following all the criteria adopted, table 1 was composed of the following:

Table 1. Result of the adopted criteria

	Authors / year	Article title	Goal	Considerations / thematic
01	BONORINO; CANI; (2020)	Early mobilization in times of COVID-19	Clarify that covid-19 inflammation, resulting from ICU treatment, may occur in the development of muscle weakness acquired in the ICU	Critically ill patient admitted to the ICU enters a vicious cycle between immobilism, mechanical ventilation, comorbidities, adverse complications resulting in functional

			(AMF-ICU), and its consequences extend beyond the hospitalizatio n period.	impairment
02	VALENZUEL; JOYNER; (2020).	Early mobilization in hospitalized patients with COVID-19	To investigate the functional reserves of the body, especially in elderly patients, due to severe infections or other acute conditions in the hospital environment due to forced inactivity.	Simple early mobilization programs were useful to mitigate the deleteerie consequences of disuse observed at discharge in elderly adults (> 60 years) hospitalized for an acute medical condition.
03	NANKAKU , *et al;* (2020)	A First View of the Effect of a Trial of Early Mobilization on the Muscle Strength and Activities of Daily Living in Mechanically Ventilated Patients With COVID-19.	This study aimed to investigate whether early mobilization in patients with COVID 19 on mechanical ventilation affects the recovery of ADLs, muscle strength and functional mobility.	It is important to clarify when rehabilitation should be initiated to maximize the effectiveness of early mobilization in the ICU. Several studies recommend early mobilization for patients with severe COVID-19.
04	DE BIASE, *et al;* (2020)	The COVID-19 rehabilitation pandemic.	Analyze the probable impacts of the COVID-19 pandemic and thereby outline the best rehabilitation strategies.	Rehabilitation services must adapt to a world living with COVID. rehabilitation should provide an individualized and needs-based approach.
05	WITTMER, *et al;* (2021)	Early mobilization and physical exercise in patients with COVID-19: A narrative literature review	Describe the indication and safety of early mobilization and exercises in patients with mild,	It highlights the need for early mobilization and exercise for patients hospitalized with COVID-19
			severe and critical COVID-19.	to prevent, reduce and rehabilitate the consequences of the disease and post-intensive care syndrome.
06	PEDROSA, *et al;* (2021)	Physiotherapeuti c management of hospitalized patient with covid-19	Describe the physical therapy approach in the functional recovery of patients hospitalized with COVID-19.	Early mobilization is recommended in patients at significant risk of developing functional limitations, or with evidence of installed limitations, such as frail patients, with multiple comorbidities, or at risk of developing muscle weakness acquired in the ICU.
07	RABBIT; MENDES, (2021)	Early mobilization for rehabilitation of patients affected by COVID-19 in intensive care unit: integrative review	To analyze the importance of early mobilization techniques in patients affected by COVID-19 hospitalized in THE ICU, as well as the barriers and difficulties encountered by professionals to perform this intervention.	The practice of early mobilization can directly impact patient functionality, contribute to decreased hospitalization time and invasive mechanical ventilation. Barriers such as sedation, hemodynamic instability have become a challenge to be overcome for early mobilization within the ICU.
08	LIU, *et al;* (2022)	Mobilization and Rehabilitation Practice in ICUs During the COVID-19.	To analyze the applicability of mobilization practices in ICUs and risk factors for the	The presence of COVID-19 infection was not a major barrier to mobilization. Although, the

			patient including time, intensity and the role of MV.	problem lies in a critical patient with hemodynamic instability undergoing mechanical ventilation.
09	KINOSHITA, *et al;* (2022)	The Effects of Early Rehabilitation in the Intensive Care Unit for Patients with Severe COVID-19 Pneumonia: A Retrospective Cohort Study.	To evaluate the effect of early rehabilitation in patients with COVID-19 pneumonia who underwent ventilator management in the ICU.	Studies have suggested that early rehabilitation in the ICU does not increase mortality. Early rehabilitation for patients with COVID-19 receiving ventilator management in the ICU seemed to promote improvement in ADL

According to Table 1, the results presented in this review article highlight the main complications resulting from hospitalization for the disease, in addition to the consequences of early mobilization in patients with COVID-19.

Para the authors Bonorino; Cani; (2020), the physiotherapy team should outline the best objective and conduct in addition to acting in accordance with other professionals in a multidisciplinary environment so that it can perform the physiotherapeutic resources in the patient evaluating the physical condition of the same to avoid/minimize the functional decline arising not only from immobilism but also from the effects of systemic inflammatory processes that released in the pro-inflammatory cytokine stonewin so that they helped in the reduction of muscle tone. The physical therapy approach minimizes the deleterious picture of functional kinetic capacity resulting from the weakness acquired in the ICU, thus reducing the time of use of respiratory devices and amplifies the hospital discharge margin. (VALENZUEL; JOYNER (2020)

Wittmer's study, *et al*,(2021), reports that it is not recommended to use the resources of early mobilization in patients with hemodynamic instability, because according to the guidelines of the American Association for cardiovascular and Pulmonary Rehabilitation, the difficulty lies in the prescription of exercises, duration and intensity that the patient will undergo without causing complications to it. They also state that the BORG scale (stress perception verification scale) should be used to conduct patients affected by the disease with mild (≤ 3) and moderate (< 3) degrees, where the physiotherapist can work on therapeutic kinetic mobilizations/exercises: range of motion, muscle strength, mobility and balance (WITTMER, *et al*; 2021) .

In Pedrosa's analysis, *et al*; (2021), international researchers in the area of intensive care and acute cardiorespiratory care, state that early and primary mobilization for the functional return of their life activities, provided that their applicability is when the patient presents clinical stability, thus the evaluation should take into account: high fever, worsening dyspnea, hypertension, bradycardia or tachycardia, intercurrent arrhythmias, deep shock, and sedation.

In critically ill patients with hemodynamic instability, patients should be mobilized early even without a level of consciousness, making decubitus changes and stretching, in an attempt to maintain muscle tone, the professional can make use of neuromuscular electrical stimulation for lower limbs lasting 50 minutes (WITTMER, *et al*; 2021) .

In Coelho's research; Mendes (2021), the analysis was performed in 32 patients affected by COVID-19, after undergoing early mobilization, showed that 14 patients were able to walk with help, 06 walked completely independent and all patients presented variations in the MRC scale (Medical Research Council – scale of assessment of the limitation imposed by dyspnea in daily activities) modified grade 4 or 5 with reference to post-intensive care syndrome. However, they also state that early mobilization can still reduce the time of use of mechanical ventilation and the time of icu stay on average of 2.25 days.

In the study of Valenzuel; Joyner (2020), mechanical ventilation in adults affected by the severe form of the disease for a period of time longer than 24 hours, already has a reduction in conditioning in addition to generalized hypotonia. Early mobilization corroborates for systemic improvement of the organism such as muscle function, cardiorespiratory function and mobility (BONORINO; CANI, 2020).

Pedrosa, *et al;* (2021), in their study, in their study, used as a strategy for early mobilization without the use of mechanical ventilation: mobilization in the bed, frequent posture changes using continuous rotational therapy, therapeutic postures such as sedation in the bed and the use of the head position, exercises of active limbs using resources such as ergonomic cycle, park walking, dumbbells, elastic bands, strengthening of peripheral muscles and respiratory muscle training in case of inspiratory muscle weakness.

For Liu, *et al;* (2022), the factors that prevented mobilization were pronation positioning in patients on mechanical ventilation and the continuous use of neuromuscular blockers and sedatives in patients with mechanical ventilation. In the critical/acute phase, the patient intubated in the ICU makes use of neuromuscular electrical stimulation, aiming at the lower limbs in the quadriceps region (PEDROSA, *et al;* 2021) . They also observed that mobilization did not differ between ICU days, regardless of the presence or not of COVID-19 and the use of mechanical ventilation. (LIU , *et al*; 2022) .

According to Valenzuel; Joyner (2020), the objectives and conducts of exercises andglobal mobilization evaluating

the clinical picture of the patient to perform amplitude movements, sit, lift and walk. It is worth emphasizing that it is not contraindicated to mobilize patients of the elderly hospitalized in the ICU unit affected by COVID-19, for this conduct the professional can make use of the basic protocol mentioned above, whose are very effective for the prevention of functional decline and in patients with low level of consciousness (VALENZUEL; JOYNER, 2020).

For Nankaku, *et al;* (2022), in its study functional recovery in patients with COVID-19 who started rehabilitation during intubation there was no difference to patients who started rehabilitation after extubation. These results can help determine the ideal time for the initiation of early mobilization in the acute phase of COVID-19, the author also saw that the mean time of mechanical ventilation of patients is two weeks (NANKAKU, *et al;* 2022).

Patients with severe COVID-19 who require ventilation are prone to muscle weakness and exercise intolerance, and early rehabilitation in the acute phase of the disease is essential to improve their physical functions. (VALENZUEL; JOYNER, 2020). Some authors suggest that patients with COVID-19 pneumonia may need rehabilitation since the early stage of the disease (KINOSHITA, 2022).

Early physiotherapy during the pandemic suggests that this intervention is feasible and safe for severe individuals with COVID-19, as well as for health professionals, although it is lagging behind other severe patients, with improvement in CMMT6 (six-minute walk test) (NANKAKU, *et al;* 2022) .

Rehabilitation in patients will be necessary for those who have become unconditioned as a result of movement restrictions, social isolation and inability to access health care for pre-existing or new diseases not only related to COVID-19 (DE BIASE, *et al;* 2020).

Early rehabilitation may be one of the main strategies to prevent the collapse of hospitals, as it reduces hospitalization time (KINOSHITA, 2022). Delivering rehabilitation in the same way as before the pandemic was not practical, nor will this approach meet the probable scale of need for rehabilitation (DE BIASE, *et al;* 2020).

4. Conclusion

The benefits of early mobilization are positive not only for patients admitted to the hospital affected by COVID-19 in the ICU's or in the ward, but also for any other pathology or surgical procedures. Therefore, mobilizing is necessary to reduce worsening functional deficit, reduced conditioning and loss of muscle tone.

However, it is worth mentioning that in the studies there were numerous obstacles to mobilize, since the severity of patients, the initial ignorance of the disease by health teams, the use of neuromuscular blockers, and hemodynamics that prevented the beginning of early mobilization in this population.

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References

[1] BONORINO, K C; CANI, K C. Early mobilization in times of COVID-19. Revista Brasileira Intensiva, Santa Catarina, 2020.

[2] BARBOSA, Priscilla, *et al*; Effects of early mobilization on cardiovascular and autonomic response in the postoperative period of myocardial revascularization. Conscientiae Health, 2010.

[3] COELHO, Laura Maria Andrade; MENDES, Bárbara Lira Bahia; Early mobilization for rehabilitation of patients affected by COVID-19 in the Intensive Care Unit: integrative review. Research, Society and Development. Northern University Center, Brazil. 2021.

[4] CSUKA, Blenda Lóran de Almeida, *et al*; Physiotherapy in the pre and postoperative period of pediatric cardiac surgery: literature review. Revista Ciência Saúde, Pindamonhangaba - SP, 2019.

[5] DANTAS, Camila Moura, *et al*; Influence of early mobilization on peripheral and respiratory muscle strength in critically ill patients. Brazilian Intensive Care Journal, Pernambuco Recife 2012.

[6] DE BIASE, Sarah, *et al*; The COVID-19 rehabilitation pandemic. Published by Oxford University Press on behalf of the British Geriatrics, 1– 5, 2020.Society.

[7] FELICIANO, Valeria de Araújo *et al*. The influence of early mobilization on the time of hospitalization in the Intensive Care Unit. ASSOBRAFIR Science. Pernambuco, PE. August 2012.

[8] HANADA, Masatoshi, *et al*; Effect of early mobilization on postoperative pulmonary complications in patients undergoing video assisted thoracoscopic surgery on the esophagus. The Japan Esophageal Society and Springer Japan KK, part of Springer Nature, 2017.

[9] KINOSHITA, Tokyo, *et al*; The Effects of Early Rehabilitation in the Intensive Care Unit for Patients with Severe COVID-19 Pneumonia: A Retrospective Cohort Study. Journal of Clinical Medicine, 11, 357, 2022.

[10] LIMA, Claudio Márcio Amaral de Oliveira; Information about the new coronavirus (COVID-19). Editorial, Brazilian College of Radiology and Diagnostic Imaging, 2020.

[11] LIU, Keibun, *et al*; Mobilization and Practice in ICUs During the COVID-19 Pandemic. Journal of Intensive Care Medicine, Vol. 37(9) 1256-1264, 2022.

[12] MARTINEZ, Bruno Silver; ANDRADE, Flávio Maciel Dias; COVID - 19 Early mobilization in acute respiratory failure - IRpA. ASSOBRAFIR. April 2020.

[13] MOTA, Caroline Mascarenhas; SILVA, Vanessa Gonçalves; The safety of early mobilization in critically

ill patients: A literature review. Scientific Interfaces - Health and Environment, Aracaju V.01, N.01, October, 2012.

[14] NANKAKU, Manabu, *et al*; A First View of the Effect of a Trial of Early Mobilization on the Muscle Strength and Activities of Daily Living in Mechanically Ventilated Patients With COVID-19. Published by Elsevier Inc. on behalf of American Congress of Rehabilitation Medicine. 4:100201, 2022.

[15] PAHO - Pan American Health Organization, platform: Pan American Health. Available in: https://www.paho.org/pt/covid19/historico-da-pandemia-covid-19 Access on: December 12th. 2021.

[16] PAULO, Francisca Vitória dos Santos, *et al*; Early mobilization to the practice of the intensive physiotherapist: interventions and barriers. Journal of Physiotherapy Research, Salvador, May, 2021.

[17] PEDROSA, Caroline Silva; MORAIS, Elizabeth Rodrigues; CORREA, Krislainy de Sousa; Physiotherapeutic management of hospitalized patients with covid-19. Revista Movimenta, Goiás, Goiânia, 2021.

[18] TORRES, Daniel Costa, *et al*; Effectiveness of an early mobilization program on functional capacity after coronary artery bypass surgery: A randomized controlled trial protocol. SAGE Open Medicine. Volume 4: 1–8, 2017.

[19] VALENZUELA, Pedro L; JOYNER, Michel; LUCIA, Aleander; Early mobilization in hospitalized patients with COVID-19. Annals of Physical and Rehabilitation Medicine. 2020.

[20] WITTMER, Veronica Lourenço, *et al*; Early mobilization and physical exercise in patients with COVID-19: A narrative literature review. Complementary Therapies in Clinical Practice. 2021.