


## PHYSIOTHERAPY INTERVENTIONS IN NEONATAL INTENSIVE CARE UNITS: REVIEW OF APPROACHES AND EFFICACY

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### ABSTRACT

Neonatal physiotherapy plays a crucial role in the Neonatal Intensive Care Unit (NICU), especially in the management of premature newborns or those with respiratory complications. This study reviews the main physical therapy interventions used in NICUs, such as airway suction, vibratotherapy, and thoraco-abdominal rebalancing, highlighting their indications, efficacy, and safety. In addition to breathing techniques, sensorimotor stimulation is emphasized as an essential complementary approach to optimize the recovery and development of neonates. However, there is still a gap in the literature on the optimal timing to initiate these interventions, which reinforces the need for further studies. Alignment between physicians and physiotherapists, combined with the application of evidence-based practices, is essential to ensure safe and effective neonatal care.

**Keywords:** Neonatal physical therapy. Neonatal Intensive Care Unit. Respiratory complications. Prematurity.

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## INTRODUCTION

The Neonatal Intensive Care Unit (NICU) represents a highly complex environment, in which newborns, especially premature infants or those with critical conditions, are submitted to intensive care to ensure clinical stabilization and promote adequate development. Physiotherapy plays a key role in this scenario, since respiratory complications are among the main causes of neonatal morbidity. According to Johnston et al. (2012), physical therapy interventions, such as airway suction, the use of inhalation therapy, and lung reexpansion techniques, are essential for maintaining airway permeability and for weaning from mechanical ventilation, favoring the functional recovery of neonates.

Among the physical therapy techniques most used in NICUs, vibratotherapy and thoraco-abdominal rebalancing (ART) stand out, which have demonstrated efficacy in the clinical stabilization of newborns. According to Bittencourt (2017), these techniques can be used alone or associated with other interventions, with the aim of optimizing respiratory function and reducing hospitalization time without offering significant risks to patients. This set of strategies is essential not only for immediate respiratory recovery, but also to prevent secondary complications that can compromise the long-term development of neonates.

Although there are several established techniques in clinical practice, there is still a gap regarding the definition of the ideal time to start physical therapy interventions in neonates hospitalized in NICUs. Kessler et al. (2019) point out that, although some evidence indicates benefits in the early initiation of physical therapy, especially in the first 72 hours of life or after the administration of exogenous surfactant, more robust studies are still needed to establish clear criteria on when and how to start these interventions. The absence of consensus highlights the need for more research that can guide clinical practice based on consistent scientific evidence.

In addition to respiratory interventions, sensorimotor stimulation has been increasingly valued as a complementary approach in neonatal physical therapy care. Pedro et al. (2013) highlight that the association of respiratory and motor techniques is particularly relevant in the management of premature newborns, who often present respiratory and neurological morbidities. The integrated role of the physiotherapist in the multidisciplinary team of the NICU contributes to the reduction of complications associated with prematurity and to the improvement of neonatal health indicators.

On the other hand, the prescription of physical therapy in NICUs is not always based exclusively on scientific protocols or criteria. Figueirola et al. (2018) point out that, in clinical practice, the criteria for prescribing physical therapy are often based on the experience of the physicians on duty and on the clinical characteristics of the patients, such as the

presence of respiratory alterations and the need for motor stimulation. Although this practice has been shown to be effective in many cases, the importance of alignment between physicians and physical therapists is reinforced to optimize clinical outcomes and ensure safer and more effective care.

Another relevant aspect to be considered is the safety of the techniques used in neonatal physical therapy. Fleig et al. (2017) show that, although physiotherapeutic interventions have important benefits, such as reducing heart and respiratory rate and improving oxygen saturation, they can also be associated with risks, such as a drop in arterial oxygenation levels and the adverse impact of aspiration on cardiopulmonary function. Thus, it is essential that interventions are carried out by qualified professionals who follow well-established protocols, minimizing risks and enhancing benefits for neonates.

Finally, Medeiros et al. (2023) highlight that, despite advances in respiratory physiotherapy techniques and intervention protocols in NICUs, there is still a need for greater caution in the application of some practices, especially in relation to airway suctioning. Although this technique is essential for airway clearance and the prevention of pulmonary complications, its inadequate performance can have significant adverse impacts on the cardiopulmonary function of neonates. Therefore, it is essential that clinical practice is guided by up-to-date scientific evidence and that the multidisciplinary team is prepared to act in an integrated and safe manner.

Thus, physical therapy in the NICU is essential to ensure the recovery and proper development of hospitalized newborns. This study seeks to review the main therapeutic approaches used in NICUs, highlighting their indications, efficacy and safety, with the aim of contributing to evidence-based practice and to the improvement of neonatal care.

## METHODOLOGY

A literature review was developed with the theme "**PHYSIOTHERAPY INTERVENTIONS IN NEONATAL INTENSIVE CARE UNITS: REVIEW OF APPROACHES AND EFFICACY**", PUBLISHED IN THE LAST 15 YEARS. To carry out the study, the online databases Biblioteca Eletrônica Científica Online (*SCIELO*), International Literature in Health Sciences (*MEDLINE/PUBMED*) and *Google Scholar* were searched.

The data search was performed using the following keywords: "respiratory physiotherapy, neonatal intensive care unit, motor physiotherapy".

The inclusion criteria established for the selection of articles were: original articles published in Portuguese, full texts, free access and literature books. Abstracts and articles

that, despite meeting the inclusion criteria, deviated from the key point of the study were excluded.

## RESULTS AND DISCUSSION

09 articles were identified that respond to the objective of the research and that fit within the need of the theme.

Chart 1 presents the author/year, title, objective and conclusion of each article, aiming to show data developed by authors who have carried out work related to the role of nurses in suicide prevention.

Chart 1 – References selected according to author/year, title and objectives and conclusion.

Author/Year	Article	Goal	Conclusion
JOHNSTON et al, 2012	BRAZILIAN PHYSIOTHERAPY RECOMMENDATION RESPIRATORY IN PEDIATRIC AND NEONATAL INTENSIVE CARE UNIT	Guide physiotherapists about some interventions prevention/treatment of respiratory physiotherapy.	Importance of physical therapy in the pediatric and neonatal ICU for the functional recovery of critically ill patients, especially on mechanical ventilation and post-extubation.
BITTENCOURT, 2017	PHYSIOTHERAPY TECHNIQUES RESPIRATORY IN THE NEONATAL INTENSIVE CARE UNIT	Describe physiotherapy techniques most commonly used respiratory diseases in the Neonatal Intensive Care Unit (NICU), as well as their main outcomes.	Vibratotherapy and thoracoabdominal rebalancing (ART) are the most used techniques, associated or not with other techniques. However, all the techniques addressed presented clinical stability, without significant changes and do not pose risks to newborns.
KESSLER et al, 2019	INTEGRATIVE REVIEW: PHYSIOTHERAPY IN NEONATAL INTENSIVE CARE	Identify the scientific indication on the beginning of physical therapy intervention in neonatal ICUs.	The start of physiotherapy for newborns admitted to ICUs needs more studies experimental criteria to outline clear criteria when the physiotherapist should start the intervention.
PEDRO et al, 2013	PHYSICAL THERAPY ASSISTANCE IN PREMATURE NEWBORNS HOSPITALIZED IN PUBLIC NEONATAL ICU	Verify the performance of physiotherapy in the Therapy Unit Profile of mothers and preterm infants, respiratory and neurological morbidities.	Physical therapy was performed in most of the hospitalized newborns, with an association between the respiratory and motor techniques, demonstrating that, as premature birth represents one of the causes of infant morbidities, physical therapy has become increasingly necessary.
FIGUEIROLA et al, 2018	PHYSICAL THERAPY IN THE NEONATAL ICU: THE MEDICAL REASONS USED TO PRESCRIBE PHYSIOTHERAPY	Investigate the criteria by which physicians on duty of a Neonatal Intensive Care Unit prescribe physiotherapy to patients under their care.	The criteria used for the prescription of physiotherapy are consolidate both in clinical practice and in evidence in the literature, with clear specific criteria persisting in neonatal intensive care.

FARIAS et al, 2010	PHYSICAL THERAPY ASSISTANCE IN ICU NEONATAL. A LITERATURE REVIEW	Analyze most commonly used techniques performed by physiotherapists in the newborns inside a neonatal ICU.	The techniques most used by the physiotherapist of a Neonatal Intensive Care Unit are non-invasive mechanical ventilation, bed positioning, and aspiration.
MAN et al, 2023	PERFORMANCE OF PHYSIOTHERAPY RESPIRATORY IN THE NEONATAL INTENSIVE CARE UNIT	Analyze based on the literature The benefit of the Physical Therapist in the Neonatal Intensive Care Unit when using the therapy techniques available Respiratory.	Based on the results obtained in the present study, it is possible to conclude that respiratory physiotherapy can act in several different cases, with multiple techniques aimed at improving respiratory distress and hemodynamic status.
FLEIG et al, 2017	SYSTEMATIC REVIEW ON RESPIRATORY PHYSIOTHERAPY IN NEONATAL INTENSIVE CARE UNITS	To raise bibliographic references on physiotherapy prescription, indications, contraindications and physiotherapeutic effects in neonatal intensive care units.	There are specific indications in the literature that can be used to guide physical therapy prescription.

Respiratory physiotherapy plays a fundamental role in the Neonatal Intensive Care Unit (NICU), being essential for the rehabilitation and clinical stabilization of newborns. As described by Bittencourt (2017), the application of techniques such as vibratotherapy and thoraco-abdominal rebalancing (ART) has shown efficacy in reducing the length of hospital stay without posing risks to neonates. These practices aim not only at respiratory recovery, but also at promoting functional independence for these frail patients.

The panorama of physical therapy in NICUs is reinforced by the recommendations of Johnston (2012), who highlights the importance of interventions based on well-defined protocols, such as airway suction, use of inhalation therapy, and lung reexpansion techniques. Such practices not only help in clearing the airways, but also contribute to weaning from mechanical ventilation and post-extubation recovery.

In a complementary way, Kessler's (2019) integrative review suggests the need for more robust studies to establish precise criteria on the ideal time to start physical therapy intervention. The findings indicate different approaches, such as intervention in the first 72 hours of life or after the application of exogenous surfactant, showing that there is no clear consensus, although the evidence points to benefits with early onset.

Pedro (2013) emphasizes the relevance of physical therapy in the management of premature infants, who often present respiratory and neurological morbidities. The association of respiratory techniques with sensorimotor stimulation, as observed in his

research, has been shown to be indispensable in the management of these patients, indicating a multidisciplinary approach as a strategy to reduce complication rates.

On the other hand, Figueirola (2018) analyzes the medical criteria for the prescription of physiotherapy, highlighting that respiratory changes and motor stimulation are the main reasons for this indication. This practice, based on both clinical experience and scientific evidence, reinforces the need for alignment between physicians and physiotherapists to optimize outcomes.

Farias (2010) contributes by demonstrating the benefits of respiratory physiotherapy in the neuropsychomotor development of newborns, being especially effective in respiratory dysfunctions. However, it highlights the lack of methodologically rigorous studies that explore new perspectives for physical therapy in the NICU.

Fleig (2017), in his systematic review, also identified both positive and negative effects related to physical therapy interventions in NICUs. Among the benefits are the reduction of heart and respiratory rate, increased oxygen saturation, the prevention of atelectasis and the facilitation of neurological development. However, the author warns of potential risks, such as decreased arterial oxygenation levels and possible adverse impacts of aspiration on cardiopulmonary function. These findings reinforce the need for well-defined protocols to guide clinical practice, ensuring greater safety and efficacy in the care of neonates.

Finally, Medeiros (2023) addresses the positive and negative effects of physical therapy, highlighting that, although the techniques used promote improvements in cardiorespiratory variables and ventilation-perfusion, there is a need for greater caution in practices such as aspiration, which can have adverse impacts on cardiopulmonary function.

The results discussed show the importance of physical therapy in the NICU, and it is essential that interventions are guided by evidence-based protocols and that the multidisciplinary team is well prepared. Continued research into the techniques and their outcomes is crucial to improve care and ensure the well-being of neonates.

## FINAL CONSIDERATIONS

This literature review highlighted the importance of physical therapy in Neonatal Intensive Care Units (NICU), emphasizing the main techniques used, their indications, and efficacy in the management of critically ill newborns. The analysis of the nine selected articles showed that physical therapy interventions, both respiratory and motor, play a

fundamental role in the recovery and clinical stabilization of neonates, especially those who are premature or have respiratory and neurological morbidities.

As described by Bittencourt (2017), vibratotherapy and thoraco-abdominal rebalancing (ART) are widely applied, with results that indicate clinical stability and absence of significant risks to neonates. Johnston et al. (2012) reinforce the relevance of respiratory interventions, such as airway aspiration and lung reexpansion, to facilitate ventilatory weaning and post-extubation recovery.

Despite the advances, the review by Kessler et al. (2019) revealed the need for further experimental studies to define the optimal time to start physiotherapy interventions in NICUs, especially in critical cases that require an early approach. The study by Pedro et al. (2013) also highlighted that multidisciplinary action, integrating respiratory and motor techniques, is indispensable in the management of premature infants, contributing to the reduction of complications associated with premature birth.

Figueirola et al. (2018) and Farias et al. (2010) reinforce that the indication of physiotherapy should be based on clear clinical criteria and scientific evidence, ensuring that interventions are safe and effective. Fleig et al. (2017) warn of possible risks associated with some practices, such as aspiration, highlighting the need for well-defined protocols to minimize complications, such as changes in arterial oxygenation and impact on cardiopulmonary function.

Finally, Medeiros et al. (2023) concluded that, although respiratory techniques promote improvements in cardiorespiratory variables and hemodynamic balance, it is essential that the health team adopts an evidence-based approach, with caution in the application of certain interventions.

Thus, this review reinforces that physiotherapy is an essential practice in NICUs, contributing significantly to the recovery and development of newborns. However, continuous scientific investigation into the techniques used, their optimal timing of application, and their clinical outcomes is essential to improve neonatal care and ensure better patient outcomes.



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