



Neurophysiological Respiratory Facilitation (NPF) and Respiratory Muscle Dynamics: Neural Mechanisms for Enhancing Pulmonary Rehabilitation

Alsaeeid NA*

Physical Therapy Specialist and Researcher, Master Degree in Physical Therapy for Cardiovascular/Respiratory Disorder and Geriatrics, Faculty of Physical Therapy, Cairo University, Egypt



OPEN ACCESS

*Correspondence:

Nourhan Alsaeeid Alsaeeid, Physical Therapy Specialist and Researcher, Master Degree in Physical Therapy for Cardiovascular/Respiratory Disorder and Geriatrics, Faculty of Physical Therapy, Cairo University, Egypt, E-mail: nourhanalsaeeid@gmail.com

Received Date: 04 Mar 2026

Accepted Date: 25 Mar 2026

Published Date: 27 Mar 2026

Citation:

Alsaeeid NA. Neurophysiological Respiratory Facilitation (NPF) and Respiratory Muscle Dynamics: Neural Mechanisms for Enhancing Pulmonary Rehabilitation. *WebLog J Sports Med Physiother.* wjsmp.2026.c2703. <https://doi.org/10.5281/zenodo.19319499>

Copyright© 2026 Nourhan Alsaeeid

Alsaeeid. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

The interaction between the central nervous system and respiratory musculature is pivotal in managing critically ill patients. This review examines the functional anatomy of primary and accessory respiratory muscles and evaluates the role of Neurophysiological Respiratory Facilitation (NPF). We discuss how external tactile and proprioceptive stimuli trigger reflex respiratory movement sequences, potentially through the activation of "Central Pattern Generators" (CPGs) and medullary respiratory centers.

Functional Anatomy of Respiration

Inspiration is primarily driven by the diaphragm, while accessory muscles like the sternocleidomastoid and scalenes are recruited during respiratory distress (De Troyer et al., 2005). Understanding this architecture is essential for developing targeted physiotherapy, especially for patients with neuromuscular weakness or those recovering from severe pneumonia.

Mechanisms of NPF

Originally proposed by Bethune (1975), NPF involves external application of cues to elicit reflex reactions in the rib cage.

- Neural Control: Proprioceptive feedback from respiratory muscles regulates medullary centers via long-loop reflexes (Angela et al., 2013).
- Neuroplasticity: NPF techniques promote neuroplastic alterations in the motor cortex and brainstem, strengthening breathing patterns (John et al., 2006).

Clinical Techniques in NPF

As synthesized by Anas Mohamed (2020) and Arjun Patel (2021), six key procedures define the NPF approach:

1. Basal Lift: Anterior stretch lifting of the posterior basal area.
2. Abdominal Co-contraction.
3. Thoracic Vertebral Pressure.
4. Perioral Pressure.
5. Intercostal Stretch: Utilizing the stretch reflex to initiate inhalation.
6. Hand Pressure.

Conclusion

NPF represent a paradigm shift from passive ventilation to active neural rehabilitation. By stimulating reflexive movement responses, these techniques improve oxygen saturation and vital capacity, significantly reducing hospital stay duration.