ROLE OF PROPIOCEPTIVE NEUROMUSCULAR FACILITATION TECHNIQUES OF RESPIRATION IN INTENSIVE CARE UNIT PATIENTS—A REVIEW

ABSTRACT

Chest complications are very common in patients of intensive care unit. To prevent these complications various physiotherapy techniques are used. Propioceptive neuromuscular techniques for respiration are one of those techniques. The aim of this paper is to comprehensively review the literature concerning this topic and summarise existing knowledge on the role of proprioceptive neuromuscular facilitation techniques of respiration in intensive care unit patients. This paper provides a narrative review of literature in this area. Furthermore, this review identifies areas for further research and makes recommendations for clinical practice.

INTRODUCTION

Respiration is defined as the movement of oxygen from the outside environment to the cells within tissues, and the transport of carbon dioxide in the opposite direction. Air-breathing in humans includes four stages: Ventilation, Pulmonary gas exchange, Gas transport and Peripheral gas exchange. 

Chest physiotherapy along with PNF technique in the management of mechanically ventilated patients with pulmonary complication proved efficient for preventing pulmonary complications, clearing the mucous secretions and better prognosis in patients with OP poisoning. One more study by Vaishali et al (2010) showed that the proprioceptive and tactile stimuli produced expansion of the thoracic cage, reduced asymmetry and decreased respiratory rate in a 24 day old full term female baby with atelectasis and pulmonary hemorrhage.

In a study done by Payal Gupta et al (2013), it has been found that IC Stretch is more effective in reduction of respiratory rate and heart rate and improving oxygen saturation over anterior basal lift technique. Eklund G et al (1970) concluded that IC Stretch increases alpha motor neuron activity, causing the muscle fibers to contract.

N. B. Thakkar (2006) and Jennifer A. Pryor discussed that there is an advantage of application of PNf stretch technique in ICU patients as it helps in lowering the raised RR and HR and in improving SPO2 levels within near to range which is acceptable for ventilator weaning process thereby it is helpful in reducing the hospital stay of patients and social isolation.

Lanza Fde et al. (2014) analysed that chest mobility in healthy subjects is related to respiratory muscle strength and lung function; the higher the axillary cirtometry and thoracic cirtometry subjects is related to respiratory muscle strength and lung function.

In a study done by Wada et al (2016), it has been found that respiratory muscle stretching improves the ventilatory capacity and functional capacity of the individual by reducing dyspnoea in COPD. Minoguchi et al. (2002) compared the effect of respiratory muscle stretch proposed as a possible additional form of rehabilitation for patients with chronic obstructive pulmonary disease (COPD), with that of inspiratory muscle training and concluded that respiratory muscle stretch were clinically beneficial than inspiratory muscle training.

According to a study done by Dr. Sneha S Chordiya et al (2017), chest Physiotherapy along with PNf technique in the management of mechanically ventilated patients with pulmonary complication proved efficient for preventing pulmonary complications, clearing the mucous secretions and better prognosis in patients with OP poisoning. One more study by Vaishali et al (2010) showed that the proprioceptive and tactile stimuli produced expansion of the thoracic cage, reduced asymmetry and decreased respiratory rate in a 24 day old full term female baby with atelectasis and pulmonary hemorrhage.

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Lanza Fde et al. (2014) analysed that chest mobility in healthy subjects is related to respiratory muscle strength and lung function; the higher the axillary cirtometry and thoracic cirtometry values, the greater the maximum inspiratory pressure, maximum expiratory pressure, and lung volumes in healthy subject.
in COPD. Michael T. Put, et al (2008) also found that PNF stretching technique increases ROM in the chest and shoulder girdle and increases vital capacity in COPD patients in the short term. Marli M. Knorst et al (2012) also showed that PNF of accessory muscles improves the intercostal and thoracic expansion in subjects without COPD and COPD, the increase PMax in COPD patients. Rekha et al (2016) determined that respiratory accessory muscle stretching significantly improved chest expansion, reduced dyspnoea, and increase exercise tolerance level in patients with COPD.

Gui bin Song et al (2015) showed that both chest resistance and chest expansion exercises were effective for improving respiratory function and trunk control ability in stroke patients; however, chest resistance exercise is more efficient for increasing trunk control ability.

In a study done by Gopi Parth Mehta et al (2015) and Dr. Dhara B Desai et al (2017) on geriatric population to study the effect of respiratory Proprioceptive Neuromuscular Facilitation (PNF) exercises on the pulmonary function showed that respiratory PNF exercise improves the pulmonary function in geriatric population.

Anup Bhat et al (2014 formulated a questionnaire to assess the current chest physiotherapy practices in neurological ICUs of India. According to this survey, nearly 85% of physiotherapists practiced PNF techniques in neurological ICU patients for lung expansion therapy when appropriate.

REFERENCES

7. Nicolino Ambrosino, MD and Dewi N. Makhabah MD. Physiotherapy in the ICU. Physical Therapy journal. 2014;87(2):80
11. Deane kayan Proprioception: the forgotten sixth sense; Respiration and Proprioception. 1995;5:89

CONCLUSION

Many researchers have shown that using respiratory PNF techniques is beneficial for patients under various conditions.

In line with previous studies, it can be concluded that Proprioceptive Neuromuscular Techniques for respiration are effective for patients in intensive care unit.

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