if available

THE FIRST INTERNATIONAL CONGRESS ON HEALTH SERVICES TRANSFORMATION

اولین کنگره بین المللی تحول خدمات سلامت

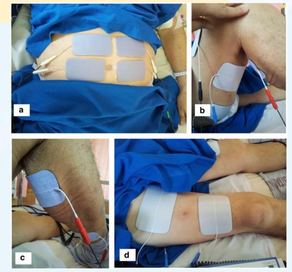
۲۷ و ۲۸ مهر ماه

ISC 05251-58426 Scopus CIVILICA



The Effect of Neuromuscular Electrical Stimulation on Muscle Strength and Functional Independence in Patients Hospitalized in Intensive Care Units

Code: 1653



Maedeh Nasirifar (1)

. Master's student in Internal-Surgical Nursing, Faculty of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran
Maedeh73nasiri@gmail.com

Backgrounds

Weakness of muscles due to hospital stay in intensive care unit is one of the main effects of critical condition of patients leading to the loss of muscle strength and mobility as well as functional independence. A technique known as neuromuscular electrical stimulation, it is possible to make muscles contract while not fully participating in the act voluntarily, is becoming more popular lately. At the same time, there are no clear results regarding the effect this method has on muscle strength and to which extent it actually effects the state of the patient.

Methods

This review is carried out as a narrative one with the intention of collecting evidence on the impact neuromuscular electrical stimulation had on muscle strength and functional capabilities or functional independence of patients in intensive care units. To conduct this search, the articles published starting from 2018 onwards in scientific databases such as PubMed, Scopus, Web of Science, and Google Scholar were searched with the help of searching combinations of words related to NMES, electrical stimulation, critically ill patients, intensive care, ICU-acquired weakness, muscle strength, functional capacity, and functional independence.

Findings

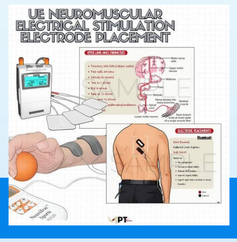
Overall, the results showed that while NMES had a consistent positive effect on muscle strength, its impact on functional results was not as consistent. Some studies have shown that NMES can help preserve or increase muscle strength and cause less ICU-acquired weakness, and the combined data also highlighted the fact that NMES had a statistically significant positive effect on MRC scores. However, high heterogeneity among the studies indicated that the size of the effect could vary depending on the severity of the disease, time of intervention, and muscle group targeted, as well as other factors. However, the results related to functional performance and independence were more variable. Some research showcased improved outcomes in terms of FSS-ICU and Barthel scores while some studies did not find improved functional results despite increased muscle strength at the time of discharge.

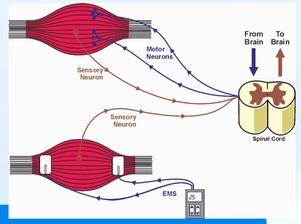
Findings

From various research studies, it is observed that NMES is more beneficial if used in conjunction with early mobilization and range of motion exercises along with regular rehabilitation rather than using it alone. Recent research suggests that parameters of the protocol, particularly the intensity and frequency of stimulation, may impact the functional benefit obtained. Overall, the evidence does not show that there is a direct and clear relationship between increased muscle strength and functional independence, indicating that the effects of NMES on the muscle may or may not translate into actual functional outcomes when used with other procedures like mobilization and rehabilitation on the part of the patient.

Conclusion

To summarize, NMES is an attractive option for maintaining muscle strength in critically ill patients, but the extent of its influence on functional independence will depend on the manner in which NMES has been implemented in the rehabilitation program. Evidence suggests that NMES should be used as part of an early rehabilitation program instead of on its own. Standardization in applying NMES regarding the timing, intensity, frequency, duration, and target muscle groups may lead to the development of more effective NMES protocols.





References

Nakamura K, Kihata A, Naraba H, Kanda N, Takahashi Y, Sonoo T, et al. Reducing muscle volume loss in critically ill patients: efficacy of belt electrode skeletal muscle electrical stimulation-a randomized controlled trial. J Rehabil Med. 2019;51:705-711. doi:10.2340/16501977-2594.

McCaughey EJ, Jonkman AH, Boswell-Ruys CL, McBain RA, Bye EA, Hudson AL, et al. Assisting ventilator weaning in critical illness: a double-blinded, randomized pilot study on abdominal functional electrical stimulation. Crit Care. 2019;23:261. doi:10.1186/s13054-019-2544-0.

dos Santos FV, Cipriano G Jr, Vieira L, Güntzel Chiappa AM, Cipriano GBF, Vieira P, et al. Neuromuscular electrical stimulation combined with exercise decreases duration of mechanical ventilation in ICU patients: a randomized controlled trial. Physiother Theory Pract. 2020;36:580-588. doi:10.1080/09593985.2018.1490363.

Sumin AN, Oleinik PA, Bezdenezhnykh AV, Ivanova AV. Early rehabilitation with neuromuscular electrical stimulation for patients with postoperative complications after cardiovascular surgery: a randomized controlled trial. Medicine (Baltimore). 2020;99:e22769. doi:10.1097/MD.0000000000022769.