

# Physiotherapy treatment for Dysphagia

Subjects: **Sport Sciences**

Contributor: Isabel Diéguez-Pérez , Raquel Leirós-Rodríguez

Dysphagia (DP) is a condition characterised by the loss of swallowing function, due to the alteration of the oral route and of the pharyngeal and esopharyngeal phases, hindering or impeding the passage of the alimentary bolus from the mouth to the stomach. DP affects 13% of people over 65 years of age and approximately 33% of people over 80 years of age, although it has a prevalence of 55% after a stroke. The most common complications associated with this disorder are: suffocation, aspiration pneumonia, malnutrition and decreased physical activity; these must be addressed with special care and individually.

Rehabilitation

Neurology

Orofacial disease

## 1. Introduction

The surface or neuromuscular electrical stimulation (NMES), due to its capacity to increase muscular performance, is a technique to be taken into account to improve the efficacy of the physiotherapeutic treatment in DP patients. However, its appropriate application parameters have not yet been described, such as intensity (sensitive threshold, motor or a specific range), frequency, impulse time and electrode placement. Therefore, it was considered necessary to carry out a literature review of the scientific research published in the last years, with the aim of evaluating the efficacy of the various parameters of application of the NMES in DP generated after a stroke.

## 2. Methods

The PICO question was then chosen as follows: P-population: DP patients after stroke; I-intervention: NMES; C-control: conventional physiotherapy techniques; O-outcome: swallowing efficacy (level of oral intake presence and severity of penetration and aspiration, oral and pharyngeal transit times...); S-study designs: experimental studies. The systematic search of publications was conducted in March 2020 in the Pubmed, Cinahl, Medline, Web of Science and Scopus databases, using the following words as search terms of the Medical Subject Headings (MeSH) thesaurus: *Electrical stimulation therapy*, *Deglutition disorders* and *Stroke*; and *Dysphagia* as a free term.

## 3. Results

A total of 21 articles were found, of which eleven were focused on experimental researchs [1-11] and nine were randomized-controlled trials [12-21].

The studies that applied NMES as a single treatment technique [2-4, 9] reported the beneficial effect of this method on DP, as had already been corroborated in a previous meta-analysis [22]. However, the benefits are multiplied when its application is combined with other interventions, such as manual therapy [8, 10, 11, 14-16, 18, 19, 21] and conventional swallowing therapy [1, 5, 6, 8, 11, 12, 14-16, 18-21]. The greater efficacy of the treatments that combine conventional techniques with NMES had already been observed with longer-lasting effects and shorter intervention times [23, 24].

Regarding the different variables analysed, one of the most repeated ones was the analysis of the level of oral intake [7, 14, 15, 17, 19, 20]. This variable improved significantly with all the interventions [14, 15, 17, 20], except for the studies of Mituuti et al. [7], who did not define the impulse time (a parameter that, if chosen incorrectly, can lead to the loss of intervention efficacy), and Guillèn-Sóla et al. [19], who used the sensitivity threshold as the impulse intensity, thus they may have not achieved an effective stimulation of the muscle fibres. It is important to highlight that Sproson et al. [17], in their evaluation of this variable three months after the intervention, observed that the initial improvements achieved were conserved.

The presence and severity of penetration and aspiration was also evaluated [2, 7, 9, 11, 15, 17, 19], obtaining significant improvements in all cases, except in the study that applied NMES at low intensity [7], in which the sessions were excessively long [19], and in the study in which the authors did not use individualised parameter regarding intensity [11].

The oral and pharyngeal transit times are very important parameters for the valuation of patients with DP, since these indicate the time that the alimentary bolus takes to reach the upper esophageal sphincter from the oral cavity. These improved with all the analysed interventions [2-5, 7, 9, 12, 21], except, once again, in the study in which NMES was applied up to the sensitivity threshold [7].

NMES has positive effects on the treatment of DP associated with a stroke: it improves the quality of life of the patient, reduces aspirations, restores the capacity to intake solids and reduces the socioeconomic impact of this condition. This technique has beneficial effects as a single treatment, although the attainment of therapeutic objectives is faster when it is combined with active work from the patient, simultaneously, and also when applied as part of a programme that includes other swallowing techniques or exercises.

The application parameters of NMES should be: a frequency of 60-80 Hz, 700  $\mu$ s of impulse time, an intensity above the motor threshold (respecting the patient's tolerance) and an application time of 20-30 minutes, placing the electrodes in the anterior side of the neck. Simultaneously, the patient must be requested to make voluntary contractions of the deficient muscles in order to optimise the increase of muscular strength. Finally, if this technique is part of a treatment that also includes conventional swallowing treatment techniques or strengthening exercises, the treatment objectives can be attained sooner (with treatment durations of four weeks).

It is recommended to carry out further studies with reliable methodology to establish the most adequate application parameters for NMES and determine the most appropriate combination of techniques to be performed

simultaneously and in the same session. This will allow protocolising the use of NMES for the treatment of DP with the aim of reaching the best effects in the shortest time possible.

## REFERENCES

1. Byeon, H. Effect of the Masako maneuver and neuromuscular electrical stimulation on the improvement of swallowing function in patients with dysphagia caused by stroke. *J Phys Ther Sci* **2016**, *28*, 2069-2071. doi: 10.1589/jpts.28.2069.
2. Park, J.; Hwang, N.; Kim, H.; Lee, G.; Jung, Y. Effect of neuromuscular electrical stimulation combined with effortful swallowing using electromyographic biofeedback on oropharyngeal swallowing function in stroke patients with dysphagia: A pilot study. *Medicine* **2019**, *98*, e17702. doi: 10.1097/MD.00000000000017702.
3. Choi, J. Effect of neuromuscular electrical stimulation on facial muscle strength and oral function in stroke patients with facial palsy. *J Phys Ther Sci* **2016**, *28*, 2541-2543. doi: 10.1589/jpts.28.2541.
4. Oh, D.; Park, J.; Kim, W. Effect of neuromuscular electrical stimulation on lip strength and closure function in patients with dysphagia after stroke. *J Phys Ther Sci* **2017**, *29*, 1974-1975. doi: 10.1589/jpts.29.1974.
5. Byeon, H. Combined Effects of NMES and Mendelsohn Maneuver on the Swallowing Function and Swallowing-Quality of Life of Patients with Stroke-Induced Sub-Acute Swallowing Disorders. *Biomedicines* **2020**, *8*, 12. doi: 10.3390/biomedicines8010012.
6. Kim, H.; Park, J.; Nam, K. Effortful swallow with resistive electrical stimulation training improves pharyngeal constriction in patients post-stroke with dysphagia. *J Oral Rehabil* **2017**, *44*, 763-769. doi: 10.1111/joor.12538.
7. Mituuti, C.T.; Arone, M.A.S.; Rosa, R.R.; Berretin-Felix, G. Effects of sensory neuromuscular electrical stimulation on swallowing in the elderly affected by stroke. *Top Geriatr Rehabil* **2018**, *34*, 71-81. doi: 10.1097/TGR.0000000000000176.
8. Bahceci, K.; Umay, E.; Gundogdu, I.; Gurcay, E.; Ozturk, E.; Alicura, S. The effect of swallowing rehabilitation on quality of life of the dysphagic patients with cortical ischemic stroke. *Iran J Neurol* **2017**, *16*, 178-184.
9. Park, J.; Oh, D.; Hwang, N.; Lee, J. Effects of neuromuscular electrical stimulation combined with effortful swallowing on post-stroke oropharyngeal dysphagia: A randomised controlled trial. *J Oral Rehabil* **2016**, *43*, 426-434. doi: 10.1111/joor.12390.
10. Byeon, H.; Koh, H.W. Comparison of treatment effect of neuromuscular electrical stimulation and thermal-tactile stimulation on patients with sub-acute dysphagia caused by stroke. *J Phys Ther Sci* **2016**, *28*, 1809-1812. doi: 10.1589/jpts.28.1809.
11. Lee, K.W.; Kim, S.B.; Lee, J.H.; Lee, S.J.; Park, J.G.; Jang, K.W. Effects of neuromuscular electrical stimulation for masseter muscle on oral dysfunction after stroke. *Ann Rehabil Med* **2019**, *43*, 11-18. doi: 10.5535/arm.2019.43.1.11.
12. Li, L.; Li, Y.; Wu, X.; Wang, G.; Yi, X.; Zhao, Y.; et al. The Value of Adding Transcutaneous Neuromuscular Electrical Stimulation (VitalStim) to Traditional Therapy for Poststroke Dysphagia: A Randomized Controlled Trial. *Top Geriatr Rehabil* **2018**, *34*, 200-206. doi: 10.1097/TGR.0000000000000195.
13. Hamada, S.; Yamaguchi, H.; Hara, H. Does sensory transcutaneous electrical stimulation prevent pneumonia in the acute stage of stroke? A preliminary study. *Int J Rehabil Res* **2017**, *40*, 94-96. doi: 10.1097/MRR.0000000000000206.

14. Hendy, R.M.; Elerian, A.E.; Emara, T.H. Effect of transcutaneous electrical nerve stimulation and conventional therapy in post-stroke dysphagic patients: a randomized controlled trial. *Biosci Res* **2019**, *16*, 11-16.
15. Simonelli, M.; Ruoppolo, G.; Iosa, M.; Morone, G.; Fusco, A.; Grasso, M.G.; Gallo, A.; Paolucci, S. A stimulus for eating. The use of neuromuscular transcutaneous electrical stimulation in patients affected by severe dysphagia after subacute stroke: A pilot randomized controlled trial. *NeuroRehabilitation* **2019**, *44*, 103-110. doi: 10.3233/NRE-182526.
16. Meng, P.; Zhang, S.; Wang, Q.; Wang, P.; Han, C.; Gao, J.; Yue, S. The effect of surface neuromuscular electrical stimulation on patients with post-stroke dysphagia. *J Back Musculoskelet Rehabil* **2018**, *31*, 363-370. doi: 10.3233/BMR-170788.
17. Sproson, L.; Pownall, S.; Enderby, P.; Freeman, J. Combined electrical stimulation and exercise for swallow rehabilitation post-stroke: a pilot randomized control trial. *Int J Lang Commun Disord* **2018**, *53*, 405-417. doi: 10.1111/1460-6984.12359.
18. Zeng, Y.; Yip, J.; Cui, H.; Guan, L.; Zhu, H.; Zhang, W.; Du, H.; Geng, X. Efficacy of neuromuscular electrical stimulation in improving the negative psychological state in patients with cerebral infarction and dysphagia. *Neurol Res* **2018**, *40*, 473-479. doi: 10.1080/01616412.2018.1451015.
19. Guillén-Solà, A.; Messagi-Sartor, M.; Bofill-Soler, N.; Duarte, E.; Barrera, M.C.; Marco, E. Respiratory muscle strength training and neuromuscular electrical stimulation in subacute dysphagic stroke patients: a randomized controlled trial. *Clin Rehabil* **2017**, *31*, 761-771. doi: 10.1177/0269215516652446.
20. Carnaby, G.D.; LaGorio, L.; Silliman, S.; Crary, M. Exercise-based swallowing intervention (McNeill Dysphagia Therapy) with adjunctive NMES to treat dysphagia post-stroke: A double-blind placebo-controlled trial. *J Oral Rehabil* **2020**, *47*, 501-510. doi: 10.1111/joor.12928.
21. Konecny, P.; Elfmark, M. Electrical stimulation of hyoid muscles in post-stroke dysphagia. *Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub* **2018**, *162*, 40-42. doi: 10.5507/bp.2017.043.
22. Carnaby-Mann, G.D.; Crary, M.A. Examining the evidence on neuromuscular electrical stimulation for swallowing: A meta-analysis. *Arch Otolaryngol Head Neck Surg* **2007**, *133*, 564-571. doi: 10.1001/archotol.133.6.564.
23. Park, J.; Kim, Y.; Oh, J.; Lee, H. Effortful swallowing training combined with electrical stimulation in post-stroke dysphagia: A randomized controlled study. *Dysphagia* **2012**, *27*, 521-527. doi: 10.1007/s00455-012-9403-3.
24. Kushner, D.S.; Peters, K.; Eroglu, S.T.; Perless-Carroll, M.; Johnson-Greene, D. Neuromuscular electrical stimulation efficacy in acute stroke feeding tube-dependent dysphagia during inpatient rehabilitation. *Am J Phys Med Rehabil* **2013**, *92*, 486-495. doi: 10.1097/PHM.0b013e31828762ec.

---

Retrieved from <https://encyclopedia.pub/entry/history/show/7198>