ΠΑΝΕΠΙΣΤΗΜΙΟ ΔΥΤΙΚΗΣ ΑΤΤΙΚΗΣ

ΣΧΟΛΗ ΕΠΙΣΤΗΜΩΝ ΥΓΕΙΑΣ ΚΑΙ ΠΡΟΝΟΙΑΣ

Τμήμα Φυσικοθεραπείας

PhD THESIS ABSTRACT

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PhD THESIS THEME

«The effect of High versus Low Frequency Neuromuscular Electrical Stimulation (NMES) on levels of stroke-induced spasticity and functionality in hemiplegic upper limb patients with chronic cerebrovascular disease»

Cerebrovascular Disease is thought to be one of the most dangerous diseases in the modern era. Through its variety of the symptoms the most major is hand's spasticity. Despite the pharmacological treatment, physiotherapy is the key for its effective management, with the Neuromuscular Electrical Stimulation (NMES) being dynamically included in rehabilitation plan.

Most of the studies have tried to evaluate the effectiveness of neuromuscular electrostimulation on spasticity levels in upper and lower extremities (Lynne R. Sheffler et al,2007; Yahuan Huang et al, 2020). The application of electrical stimulation for spasticity's management might be performed either with direct stimulation of spastic muscles or with the stimulation of the antagonist in spasticity muscles (Jack W. Tsao et al, 2020). The dominate perspective is that the administration of neuromuscular electrical stimulation protocol on the antagonist to spasticity muscles reduces the spasticity levels to spastic muscles and prevents from pain appearance, without any major long-lasting results (Nilay Sahin et al, 2011; Shwerta Malhorta et al, 2013). As for the application parameters there is a variety of them, with emphasis on the electrical stimulation's frequencies which are used to stimulate the muscle.

All things considered it is necessary to build a Neuromuscular Electrical Stimulation protocol focusing on the direct stimulation of spastic muscles in order to show any effectiveness to spasticity as well as to be widely used in everyday clinical practice of stroke's rehabilitation.

In conclusion, the main goal of the study is to broaden the effectiveness of two different Neuromuscular Electrical Stimulation protocols (one with high and the other with low frequency) on spasticity and functionality levels of the hemiplegic hand with direct stimulation of the spastic muscles.

Furthermore, we can learn if the direct stimulation of spastic muscles can reduce the spasticity levels and increase the functionality of the hemiplegic hand in patients after stroke in chronic phase. Moreover, we will compare the effectiveness of these two different frequencies of neuromuscular electrostimulation (one low and one high) on hand's spasticity levels. At the end, we will promote a Neuromuscular Electrical Stimulation therapeutic protocol for spasticity's reduction and functionality's increase on hemiplegic hand in patients after stroke in chronic phase.

The clinical significance of the study rises on the following points. Firstly, it will be the first study which will examine the effectiveness of Neuromuscular Electrical Stimulation with the direct stimulation of the spastic muscles of the hemiplegic hand. Secondly, we will promote a complete therapeutic protocol of electrical stimulation, with parameters which will correspond to muscle groups without causing muscle

fatigue. Lastly, through electromyography and evaluation scales, this therapeutic protocol will try to promote the therapeutic effectiveness of neuromuscular electrostimulation on hand's spasticity and functionality. Consequently, this protocol will be used by clinical scientists in daily clinical practice for spasticity management as well as for functional rehabilitation of the hand on patients after stroke in chronic phase with a view to their faster return to the activities of daily living.

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