

Editorial

Transcutaneous Electrical Nerve Stimulation Parameters in Spasticity

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Editorial

As an Editorial Board Member, I am writing this letter in order to discuss recent research findings on the efficacy of TENS in spasticity.

Spasticity is characterized by a velocity-dependent increase in tonic stretch reflexes (muscle tone) with exaggerated tendon jerks as a sequel of upper motor neuron disorder [1]. According to Nielsen et al, it is a common disorder which develops in about 85% of patients with multiple sclerosis, in 65–78% of patients with spinal cord injury and in 35% of stroke patients [2].

Spasticity can not only cause a variety of serious complications such as pain, muscle contracture but also contribute to difficulty in the rehabilitation process. No single pathophysiological mechanism can yet explain all the observable aspects of spasticity and no standard measurement method is available yet to cover the multi-faceted nature of spasticity [3].

Depending on the severity, the focal or generalized nature and the predominant component (tonic vs. phasic), various methods has been recommended for the improvement of spasticity such as physiotherapy, pharmacotherapy and surgical treatment. The treatment option with the fewest side-effects should be given the priority in the spasticity management [4].

Due to the perceived advantages of neuromodulation and very few side-effects, Transcutaneous Electrical Nerve Stimulation (TENS) has been studied in different spasticity models with the positive results [5-7]. Recently, it has been reported that TENS has synergistic action in reducing the spasticity when coupled with physical therapy [5].

On searching the literature on the efficacy of TENS, different effect sizes have been reported, depending on the parameters of stimulation, outcome measure used and spasticity models included [8]. In this communication, I would like to emphasize the stimulating parameters of TENS as these parameters are very crucial in the neuromodulation.

Although there is evidence that high frequency TENS but not low-

frequency was effective in spasticity reduction [9], there is still a lack of randomized clinical trials regarding with the other parameters of TENS. Across the various studies, the pulse duration was applied in a range from 0.1 to 0.3 milliseconds, resulting in spasticity reduction. It is very intriguing which pulse duration parameter would be optimal for spasticity improvement. The same speculation is applicable to the stimulating intensity, duration of treatment session and total duration of clinical trial.

According the published studies, TENS seems to be beneficial in reducing the muscle tone score and clonus score substantially but produces little effects in tendon jerk score [5-10]. The underlying mechanism behind this scenario is still mysterious and necessitates further studies.

In conclusion, although TENS is effective in decreasing the spasticity as an adjunct to physical therapy and medical treatment [5-7,9], further exploration of optimal stimulation parameters is still required to provide the paramount benefits for the spastic patients.

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