



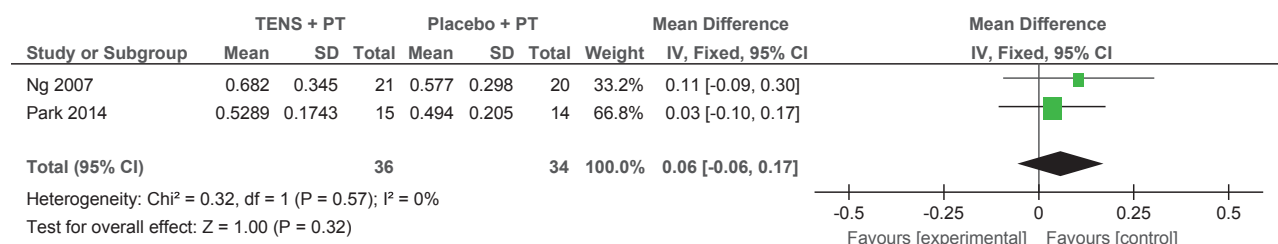
**UPDATES AND COMMENTS ON: INFLUENCE OF TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION ON SPASTICITY, BALANCE, AND WALKING SPEED IN STROKE PATIENTS: A SYSTEMATIC REVIEW AND META-ANALYSIS**

We read with interest the recent article by Lin et al., entitled “Influence of transcutaneous electrical nerve stimulation on spasticity, balance, and walking speed in stroke patients: a systematic review and meta-analysis” (1). In this review the authors included 7 studies analysing the effect of transcutaneous electrical nerve stimulation (TENS) (3–9).

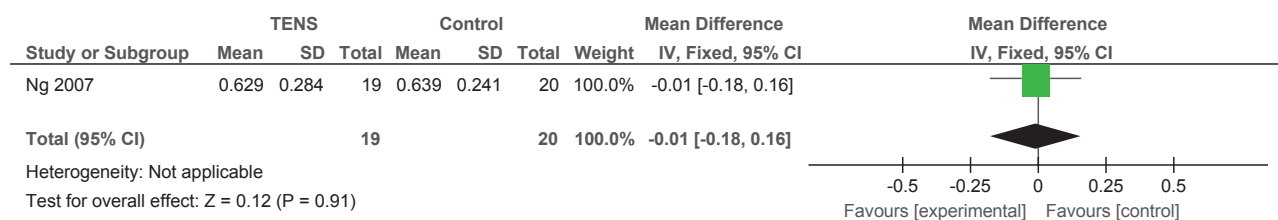
It is important to note that there is a limited number of studies on the presented topic; thus, this review appears to be very important for both clinicians and researchers. However, the article has several issues that need to be addressed. Some of these have already been mentioned by Etoom (2), but we would like to update the previous letter to the editor with the following issues.

The authors reported that “A TENS group was found to significantly improve static balance with open eyes (SMD=−1.26; 95% CI=−1.83 to −0.69;  $p < 0.0001$ ; Fig. 4) and closed eyes (SMD=−1.74; 95% CI=−2.36 to −1.12;  $p < 0.00001$ ; Fig. 5), as well as walking speed (SMD=0.44; 95% CI=0.05 to 0.84;  $p = 0.03$ ; Fig. 6)”. However, Fig. 6 shows that the control group results were significantly better than the TENS group results, while the authors claimed that better results were obtained by the TENS group. This affirmation is repeated several times in the discussion section. Furthermore, from the studies included in this analysis (3–5), the study by Burridge et al. (3) analysed changes in

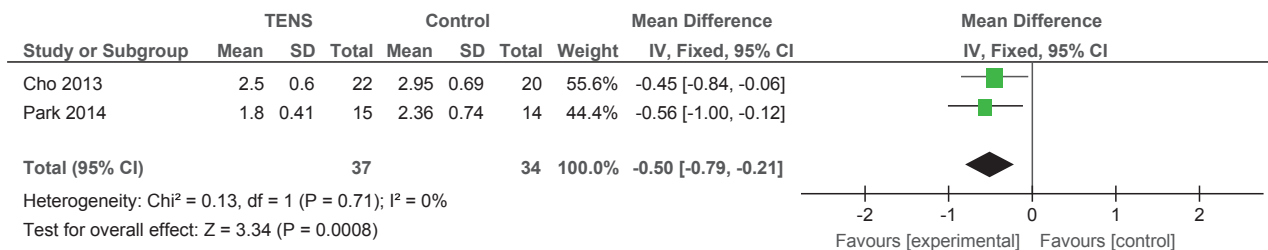
walking speed through functional electrical stimulation (FES) and not TENS. Thus, according to the authors’ inclusion criteria, this study should not be included in meta-analysis. Furthermore, the study by Ng et al. (4) showed that TENS combined with task-related training (TRT) significantly improved gait velocity, but not in the group of patients where TENS alone was applied. Also, the number of patients analysed differs from those stated in the study by Ng et al., and should be 19 for TENS group and 21 for the TENS+TRT group. Similarly, the study conducted by Park et al. (5) analysed the influence of TENS combined with therapeutic exercises on gait speed, and not TENS alone. None of this information was specified adequately by the authors of this review. The meta-analysis of walking speed is presented incorrectly; the authors adapted results from follow-up assessment and compared them with those obtained at the end of therapy presented in another study. Therefore, we conducted a new meta-analysis in order to update this information, considering both TENS vs control group (Analysis 1) and TENS combined with additional physiotherapy (PT) vs control group, i.e. placebo combined with physiotherapy (Analysis 2). Considering the same outcome measure, we used the difference in means with a fixed effects model for meta-analysis to measure the absolute difference between the mean value in the 2 groups and to observe the mean change.



**Analysis 1.** Comparison of transcutaneous electrical nerve stimulation vs control group: effect on walking speed post intervention.



**Analysis 2.** Comparison of transcutaneous electrical nerve stimulation combined with additional physiotherapy (TENS + PT) vs placebo combined with physiotherapy (Placebo + PT): effect on walking speed post intervention.



**Analysis 3.** Comparison of transcutaneous electrical nerve stimulation vs control group: effect on lower limb spasticity post intervention.

The results show that there is no basis to claim that TENS treatment is superior to physiotherapy training, or that TENS combined with additional physiotherapy is superior to placebo combined with physiotherapy.

For meta-analysis of lower limb spasticity change, the authors have mistakenly included outcomes related to the upper extremity (6). Therefore, we updated this meta-analysis with appropriate results (Analysis 3).

Finally, the authors stated that papers were searched according to the following key words: transcutaneous electrical nerve stimulation or TENS, and stroke or hemiplegic within PubMed, Embase, Web of Science, EBSCO, and the Cochrane Library. The authors identified 923 articles. However, combining these key words (i.e. MeSH) on PubMed only we identified 79 RCTs. Thus, the annex of the search strategy would be very helpful for future reproduction of this meta-analysis.

All the issues and findings presented in this review should be updated and stated clearly to clarify the information.

*The author have no conflicts of interest to declare.*

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*Pawel Kiper, PhD\* and Andrea Turolla, PhD*

From the Laboratory of Neurorehabilitation Technologies, Fondazione Ospedale San Camillo IRCCS, Venice, Italy.

\*E-mail: pawel.kiper@ospedalesancamillo.net

The authors of the original articles (Lin et al.) were given the opportunity to comment in response to this Letter, but chose not to do it.