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TRANSCRANIAL AND TRANSCUTANEOUS MAGNETIC STIMULATION FOR PAIN—WHAT HAVE WE LEARNED FROM THE COVID-19 PANDEMIC SHUTDOWN?

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Introduction: Transcranial magnetic stimulation (TMS) and transcutaneous magnetic stimulation (tMS) offer a non-invasive treatment option for chronic pain(1&2). While the recent COVID-19 pandemic resulted in a temporary interruption of the treatments for patients, it provided an excellent opportunity to assess the long-term sustainability of the treatment, and the feasibility of resuming the treatments after a brief interruption as no such data are available in current literature.

Materials / Methods: First, a list of patients whose pain/headaches have been stably controlled with either treatment for at least 3 months prior to the 6-month pandemic related shut-down was generated. Those who returned for treatments after the shutdown were identified and their underlying pain diagnoses, pre- and post-treatment mechanical visual analogue scale (M-VAS) pain scores, 3-item PEG and Patient Health Questionnaire (PHQ-9) scores were assessed in three periods: Phase I (PI): pre-Covid (P1), Phase II (P2): first treatment visit immediately after Covid shut-down and post Phase III (P3): 3 subsequent post-COVID shut-down treatments (figure 1).

Results: For pre- and post-treatment M-VAS pain scores, mixed effect analyses for both treatment groups demonstrated significant (P<0.01) time interactions across all phases. For pre-treatment MVAS pain score, TMS between-phase analyses indicated a significant (F=13.572, P=0.002) increase from 37.7±27.6 at Phase I to 49.6±25.9 at Phase II, which then decreased significantly (F=12.752, P=0.001) back to an average score of 37.1±24.7 at Phase III (Figures 2a&b). Similarly, tMS between-phase analyses indicated the mean Pre-treatment pain score (mean±SD) increased significantly (F=13.383, P=0.003) from 34.9±25.1 at Phase I to 56.3±27.0 at Phase II, which then decreased significantly (F=5.464, P=0.027) back to an average score of 41.9±26.4 at Phase III. For post-treatment pain score, the TMS group between-phase analysis indicated the mean post-treatment pain score (mean±SD) increased significantly (F=14.206, P=0.002) from 25.0±22.9 at Phase I to 36.2±23.4 at Phase II, which then significantly decreased (F=16.063, P<0.001) back to an average score of 23.7±21.3 at Phase III (Figures 3a&b). The tMS group between-phase analysis indicates a significant (F=8.324, P=0.012) interaction between Phase I and Phase II only with the mean post-treatment pain score (mean±SD) increased from 24.9±25.7 at Phase I to 36.9±26.7 at Phase II. The combined PEG score between-phase analyses demonstrated similar significant (P<0.001) changes across the phases (Figure 4a&b).

Discussion: Both TMS and tMS treatment interruption resulted in an increase of pain/headache severity and interference of quality of life and functions. However, the pain/headache symptoms, quality of life or function can quickly be improved with restarting the treatments.

Conclusions: More long-term outcome studies are warranted.
Supplemental Data:

Learning Objectives:
1) Review the application of TMS and tMS for pain and headache treatment;
2) Illustrate the COVID pandemic related interruption on the treatment outcome;
3) Discuss how to reengage patient with the treatments after a period of treatment interruption and illustrate outcomes;

Keywords: transcutaneous magnetic stimulation, efficacy, COVID, transcranial magnetic stimulation

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