

management, and present initial findings from recently completed and ongoing clinical trials.

#### Abstract

When COVID-19 first emerged, many researchers were focused on its impact on the lungs. As we have learned more about SARS-CoV-2 and resulting COVID-19, we have discovered that patients present a greater complexity in the context of the neurotrauma and the pulmonary lesions can become an aggravation of the neuroinvasion of the coronavirus and originate from cerebral injury. Recently, it has been suggested that noninvasive brain stimulation could be a valuable tool for the management of the early and postacute phase of patients with COVID-19. This session will present the results of our investigation of the High-definition transcranial direct current stimulation effects during the acute and chronic recovery phase from COVID-19. The prognostic factors and clinical predictors that contribute to greater response to treatment will be presented and directions for future research will be discussed.

#### Research Category and Technology and Methods

**Clinical Research:** 9. Transcranial Direct Current Stimulation (tDCS)

**Keywords:** HD-tDCS, Coronavirus disease, Noninvasive brain stimulation, Long COVID-19

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Abstract key: PL- Plenary talks; S- Regular symposia oral; FS- Fast-Track symposia oral; OS- On-demand symposia oral; P- Posters

#### OS07.2

### POTENTIAL APPLICATION OF TRANSCRANIAL ELECTRICAL STIMULATION (TES) TECHNIQUES IN THE CONTEXT OF COVID-19 CLINICAL COURSE: FROM THEORY TO REAL-WORLD APPLICATION

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#### Abstract

The novel SARS-CoV-2 virus has infected millions of people around the world, and will become endemic, resulting in an urgent need to discover and validate inexpensive and accessible treatments that can reduce morbidity and persistent post-infectious symptoms. Noninvasive brain stimulation methods, such as transcranial electrical stimulation (tES), may have a potential role in the treatment of Coronavirus Disease 2019 (COVID-19) related symptoms. This potential is theorized based on the known mechanisms of biological action and demonstrated benefits in non-COVID-19 patients for various known sequelae of COVID-19 illness and recovery (e.g., fatigue, cognitive dysfunction, central sensitization, and emotional dysregulation), with now several initiatives of its application in the context of COVID-19 clinical course. Here, we will summarize the technological advantages, the rationale, and mechanism of action of using tES techniques to manage COVID-19 infection through four pathways: (1) Acute intervention, (2) Add-on treatment to augment rehabilitation following critical illness, (3) Post-Acute Sequelae of SARS-CoV-2, and (4) Treatment of outbreak related mental distress exacerbated by surrounding psychosocial stressors related to COVID-19 pandemic.

#### Research Category and Technology and Methods

**Clinical Research:** 9. Transcranial Direct Current Stimulation (tDCS)

**Keywords:** tES, PASC, SARS-CoV-2 Infection

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#### OS07.3

### EFFICACY OF TRANSCRANIAL DIRECT CURRENT STIMULATION AND COGNITIVE TRAINING FOR THE NEUROCOGNITIVE SYMPTOMS OF LONG COVID-19

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#### Abstract

COVID-19 has been associated with cognitive dysfunction and psychiatric disorders. The subjective cognitive complaints can occur in approximately 90% of these individuals after the infection by COVID-19. In this context, there is an urgent need to develop treatment for Post-Acute Sequelae of Sars-Cov2 (PASC). The transcranial direct current stimulation (tDCS) is a non-invasive brain stimulation intervention with potential as a PASC treatment as it can modulate neuronal excitability, brain vascular function, which can result in modulation of neural circuits cognitive, and psychiatric disorders. Preliminary results from a pilot study a decrease of cognitive and emotional complaints evaluated by A-PASC inventory. The neuropsychological assessment showed that the participants had a better performance for delayed and immediate recall in the verbal episodic memory task. They showed an improving trend in lexicon assess, and in phonemic verbal fluency. The same was observed for the sustained attention task. Also, the participants showed a trend in becoming faster and more accurate in processing speed, and in executive function (inhibitory control, cognitive flexibility and time management). Based on these findings, we are performing a pilot randomized sham-controlled trial consisting of 20-minute, 2mA, 20 daily sessions of bilateral prefrontal (anodal-left/cathodal-right) tDCS (1x1 Mini-CT, Soterix Medical, New York, NY) plus online cognitive training using the BrainHQ platform (Posit Science, San Francisco, Glenn Smith). We will compare the efficacy of active vs. sham tDCS, combined with cognitive training, to improve these neurocognitive symptoms.

#### Research Category and Technology and Methods

**Translational Research:** 9. Transcranial Direct Current Stimulation (tDCS)

**Keywords:** tDCS, Long COVID-19, Neurocognitive Symptoms

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#### OS07.4

### TDCS AS TELEHEALTH INTERVENTION TO REACH PATIENTS WITH POST-ACUTE SEQUELAE OF SARS-COV-2 (PASC)

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#### Abstract

There is a critical need for therapeutic interventions for Post-Acute Sequelae (PASC) of SARS-CoV-2 infection patients worldwide. tDCS has the potential for therapeutic targeting of these PASC symptoms, with devices that can be portable and wearable for home-based access. At-home tDCS access is highly relevant to complete the necessary clinical trials for PASC and has the potential to provide patients with an immediate treatment option. We have led the field in rigorous, reliable, and standardized home-based brain stimulation with the development of the remotely supervised or RS-tDCS platform. Participants are provided with remotely-controlled devices, trained in safe and effective operation, and then supervised for daily use through live videoconference. Extensively tested over >8 years (>12,000 at-home tDCS sessions in >500 patients to date), the feasibility of our RS-tDCS procedures has been verified for use across all ages (18-80 years), including those with advanced cognitive or motor disabilities and/or limited technical experience, and also reaching those at socioeconomic healthcare disadvantage for inclusion in RCTs. The RS-tDCS platform has allowed for the continued enrollment in ongoing RCTs during the COVID-19 onsite clinical research pause (with >100 participants by completing all study procedures from home). The telehealth delivery of the intervention results in rapid enrollment and high retention and adherence for repeated and extended sessions (e.g., >97% completion rates across RCTs to date). While tDCS remains under investigational status in the U.S., in 2019, we also launched tDCS as a clinical telehealth service as innovative care. In this at-home service, tDCS is delivered to patients at home and stimulation parameters can be individualized to be paired with interventions such as physical exercise, online adaptive computerized cognitive training, and guided mindfulness meditation. Patients with PASC, seen through our tDCS program, will be presented as examples of the at-home tDCS treatment approach.