Enhancing Executive Functions after mTBI using Noninvasive Vagal Nerve Stimulation

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Study design

This is a single-blind sham-controlled randomized crossover pilot study. Participants will first be interviewed to establish eligibility and screen for depression (using the PHQ-9[24]) and dementia (using the Montreal Cognitive Assessment, MoCA[25]). Eligible participants will be invited to two sessions, 2-7 day apart. In each session either tVNS or sham stimulation will administer while the participants are preforming tasks of executive functions. The order of the sessions (tVNS vs Sham) will be counterbalanced across participants.

Transcutaneous vagus nerve stimulation

In line with the commonly reported procedure[4], transcutaneous electrical stimulation will be applied to the cymba conchae of the left ear, an area thought to be exclusively innervated by the auricular branch of the vagus nerve[5,6]. In the sham condition, the device will be applied to the left ear lobe, an area considered free of vagal innervation. To ensure stimulation over the entire task performance, the stimulation will be delivered continuously with a pulse width of 200 t300 ms at 25 Hz. Stimulus intensity of the tVNS will be adjusted]v]À] µ oo Ç • }v self-reports, so that it is above the detection threshold but do not cause discomfort[26].

Executive functions task

Participant will complete tasks of set shiftingan 669.22 Tm0 g0 G[7)]TJETQq0.00000912 0 6sh.(m)-d sham

References

1. Howland RH. Vagus Nerve Stimulation. Curr Behav Neurosci Rep 2014;1(2):64-73. doi:10.1007/s40473-014-0010-5
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