World Academy of Science, Engineering and Technology
International Journal of Medical and Health Sciences
Vol:17, No:09, 2023

Comparison and Effectiveness of Cranial Electrical Stimulation Treatment, Brain Training and Their Combination on Language and Verbal Fluency of Patients with Mild Cognitive Impairment: A Single Subject Design

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Abstract : Mild cognitive impairment is one of the neurocognitive disorders that go beyond age-related decline in cognitive functions, but in fact, it is not so severe which affects daily activities. This study aimed to investigate and compare the effectiveness of treatment with cranial electrical stimulation, brain training and their double combination on the language and verbal fluency of the elderly with mild cognitive impairment. This is a single-subject method with comparative intervention designs. Four patients with a definitive diagnosis of mild cognitive impairment by a psychiatrist were selected via purposive and convenience sampling method. Addenbrooke's Cognitive Examination Scale (2017) was used to assess language and verbal fluency. Two groups were formed with different order of cranial electrical stimulation treatment, brain training by pencil and paper method and their double combination, and two patients were randomly replaced in each group. The arrangement of the first group included cranial electrical stimulation, brain training, double combination and the second group included double combination, cranial electrical stimulation and brain training, respectively. Treatment plan included: A1, B, A2, C, A3, D, A4, where electrical stimulation treatment was given in ten 30-minutes sessions (5 mA and frequency of 0.5-500 Hz) and brain training in ten 30-minutes sessions. Each baseline lasted four weeks. Patients in first group who first received cranial electrical stimulation treatment showed a higher percentage of improvement in the language and verbal fluency subscale of Addenbrooke's Cognitive Examination in comparison to patients of the second group. Based on the results, it seems that cranial electrical stimulation with its effect on neurotransmitters and brain blood flow, especially in the brain stem, may prepare the brain at the neurochemical and molecular level for a better effectiveness of brain training at the behavioral level, and the selective treatment of electrical stimulation solitude in the first place may be more effective than combining it with paper-pencil brain training.

Keywords : cranial electrical stimulation, treatment, brain training, verbal fluency, cognitive impairment
Conference Title : ICACPN 2023 : International Conference on Ageing, Cognition, Psychology and Neuroscience
Conference Location : Toronto, Canada
Conference Dates : September 18-19, 2023