INTRODUCTION

Photobiomodulation (PBM) therapy is a safe, non-invasive modality based on research done back in the 1970s. 

RESULTS

RAPID IMPROVEMENT IN NORMAL FUNCTIONING

Brain scanning and EEG data analysis for normal functioning. Significant changes were already observed from the second day at treatment onset. At the sixth week, the test was conducted on the third day of the tenth session, the patient was emerging from slumber and starting to build meaningful conversations and to write by the third week. In line with the clinician's observations, a high quality of life, with much improved ability to communicate. These are shown in Figure 3.

Table 1: Changes in Selected Outcomes: Poblem-Solving, Percentage

Table 2: Changes in Selected Outcomes: Poblem-Solving, Percentage

Cognitive and daily living improvements over 7 weeks

Based on MMSE and ADCS-ADL scores, the greatest rate of improvement were experienced in the first 6 weeks. For this, we managed to collect data in a total of 100 patients. Neuro Gamma and beta rhythms now appeared in the brain wave range at 32 Hz and 40 Hz. The MONET protocol was administered to patients by means of contact sponges. The intensity of the colors reflects the activity of the brain in the frequency band of interest. The EEG scan was taken for 20 minutes after tNIRS, as presented in Figure 1.

METHODS

Power spectrum analysis: 

Power spectrum analysis was performed using Matlab while decimating the frequency range, adjusting the scaling factor to a value of 1.3 for each trial and finally adjusting the power spectrum using a window function to achieve a better resolution of the results.

EEG data processing

EEG data were processed offline using a custom MATLAB script (MathWorks, Inc., MA, USA) and EEGlab toolbox (brainardlab.mit.edu). EEG data were filtered using a band-pass filter of 1.5-70 Hz, and segmented into 2-second epochs. Then, an averaged reference to study the differences in the time course of the potentials recorded from the electrodes.

EEG power spectrum analysis

Power spectrum analysis was performed using Matlab while decimating the frequency range, adjusting the scaling factor to a value of 1.3 for each trial and finally adjusting the power spectrum using a window function to achieve a better resolution of the results.

EEG recording

EEG data were recorded continuously during a 10-minute rest period for 20 minutes after tNIRS, as presented in Figure 1. The data were digitally filtered by using second order, Butterworth, zero-phase shift function as implemented in EEGLAB newtimef() function. The decomposition produced a log power that was calculated for each frequency: Delta (1-3) Hz, Theta (4-7) Hz, Alpha (8-13) Hz, Beta (14-30) Hz and Gamma (30-50) Hz.

DISCUSSION

The significant improvement in outcomes related to AD in this report could substantially be contributed by the 40 Hz pulse, accentuating the importance of the role of high frequency wave: Gamma 40 Hz. This parameter is a modification of the formulas that have been the basis for photobiomodulation (PBM) mechanism. 2 The EEG data in this study significantly supports the potential of transcranial plus intranasal PBM as a safe and effective treatment for AD.

The modulation of the different brain oscillations provides new insights into how PBM has increased cognitive processing capacity. This capability is expressed in enhanced gamma power in the gamma and beta frequency bands. It is the only oscillation that is associated with reduced amyloid load and modulation of other oscillations, so the reduction in the power of these oscillations further supports improved cognition.

This study involved a sample of 16 but pivotal compelling data is more focused in more rigorous investigation with PBM for AD to be studied for longer studies with such a dose to conduct more powerful EEG with these parameters could mediate brain oscillations.

SELECTED REFERENCES


