INTRODUCTION

Visual rehabilitation is a therapeutic approach that has been applied to different ocular diseases characterized by visual deterioration and loss of visual acuity. Nowadays the Effects of neural photostimulation during visual rehabilitation are well known. Neuroelectrical information can by–pass disfunctional retinal cells reaching indirectly visual cortex. Visual training, through reiterated stymuli, activates existing synapses, increases the identification of these stimuly allows the formation of new synapsis. \(^1\)

The neural photostimulation contributes to the creation of neurovisual nets, causing an amplification of visual perception when compared with visual perception obtained with previous retinal conditions. \(^1\)

The principle is to electrically stimulate neurons along the visual pathway. Ocular approaches target the remaining retinal cells whereas brain stimulation aims at stimulating higher visual structures directly. \(^2\)

The classical Visual Training is a set of methods aimed at optimising residual vision, or improving fixation quality and stability (sound healing biofeedback), or visual field sensitivity (photostimulation) by stabilizing and/or relocating the preferential retinal location (PRL) in a much more useful area of the retina thus increasing fixation stability, probably using the residual cerebral plasticity in the adult visual cortex. \(^3\)

The neural photostimulation methods use cerebral plasticity and neurosensorial adaptation to the central scotoma of patients with macular diseases to improve their visual abilities and more manageable visual aids. Audio feedback and pattern stimulus facilitates transmission between intraretinal neurons as well as between the retina and the brain, where the highest degree of stimuli processing takes place, thereby supporting a “remapping phenomenon”. \(^4\)

Microperimetric biofeedback trains the neurotransmission chain to increase intercellular neurotransmitters and to restore neuro-brain connections faster than in normal conditions. \(^5-6\)

In addition to the classic systems of visual training there are news home device. The aim of these home devices is to continue the visual stimulation at home strengthen the traditional outcomes and facilitate the visual training of visually impaired patients. One of the first news home devices available is Mnomosline®, use in neurology.

PRUPOSE:

To evaluate the effects of intermittent light stimulation delivered by therapeutic glasses MNEMOSLINE ® on Visually Impaired patients.

The mnemosline device is an eye mask which in place of the lenses contains two red LEDs (650 nanometres, 7 uW of radiant power at 2 cm, pulsed) with flash frequency centred on the frequencies of the brain's alpha rhythm.

Over Time, this prolonged stimulation causes an increase in the amplitude and a shift in the frequency of the alpha waves of the person subjected to pulsed radiation \(^7-8\)

The statistical data collected showed that with this stimulation it was possible to obtain an improvement of memory and, simultaneously, an increase in the amplitude and regularity of the alpha rhythm (measured through spectral density). \(^9-10-11\)
The aim of this work is to demonstrate if the light stimulation MNEMOSLINE® are able to promote an increase in visual performance.

METHODS:
We included in the research 7 patients (13 eyes) visually impaired for different diseases (dry AMD, RP, Best, stroke, glaucoma and high myopia) (mean age 66.7 range 48-85 aa)
For each patient was evaluated before stimulation with MNEMOSLINE® (T0) BCVA (logMAR) , close up visione (cp) and reading speed (p / m) with a magnifying aid.
Each patient wore the glasses MNEMOSLINE® for a complete cycle of intermittent stimulation (10 minutes) so (T1) BCVA, close up vision and reading speed have been revalued (reading text was different from the previous one, same pts).
We also asked patients a subjective comment about the immediate results post-stimulation.

RESULT:
Functional changes following MNEMOSLINE stimulation are:

REFERENCES


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Ferro Milone F., V. Nofrate, A. Porro: Enduring intermittent photic stimulation enhances dynamic activity of the EEG and memory processes. Rivista Ital. Neurobiol., (4), 209-218, (2004). “…spectral analysis in AD patients shows a non-significative difference between photo-stimulated and non photo-stimulated EEG at the initial stage, but significative between the last stage and more significative between the initial and final stage of stimulation (ANOVA p<0,01)… Rivermead test application (double form) shows significative improvement of the behavioural memory between initial and final stage (6 month SLI)(ANOVA p<0,01)…”

Balduzzo,M., F. Ferro Milone, T.A. Minelli, I. Pittaro Cadore and L. Turicchia: Mathematical phenomenology of neural synchronization by periodic fields, Nonlinear Dynamics, Psychology and Life Sciences 7, 115-137, 2003. “…Neuron synchronization has been hypothesized as the basic mechanism leading neurological phenomena like low electroencephalographic rhythm dimension and high coherence….cognitive processes such as associative memory can also be explained in term of neuron synchronization…”


Klimesch, W.: EEG-alpha rhythms and memory processes. Intern. J. Psychophysiol., 26 (1997) “…the calculation of changes in band power indicate further that the upper alpha band is particularly sensitive to semantic memory demands….the lower alpha band seems to reflect attentional processes…these findings are discussed on the basis of an hypothesis, which assumes that EEG frequencies within the alpha band, stem at least in part from the thalamus, and that the activity of the thalamo-cortical networks reflects processes that are related to searching, accessing and retrieving information from semantic long term memory…”