



Integrative rehabilitation maintains cognitive function in patients with Alzheimer's disease and mild cognitive impairment: Case studies

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Introduction

Many studies have identified several pathophysiological processes developed simultaneously in Alzheimer's dementia along with beta amyloid and tau protein pathology. Hypoxia, cerebral blood flow insufficiency, white matter changes, mitochondria failure, sensory input and balance deficit, hypodynamia, stress, microbiome (gut-brain connections) and eating habits play an important role in development and progression of AD. We developed an integrative rehabilitation program for people with AD taking in consideration the possibility of positive modifications on factors named above (Bragin 2000-2005). This program is specifically designed for people, living at home, with all interventions being implemented every day for many years ahead (1).

This maintenance therapy is a rehabilitation process, which activates the brain via sensory motor and other bodily systems to prevent people with AD from cognitive and physical decline, to help them maintain quality of life and delay admission to nursing homes for as long as possible (2).

The aim of this case study presentation is to demonstrate stability of cognitive functions in people with mild AD and mild cognitive impairment (MCI) by measuring reaction time for different computerized cognitive tasks for a period up to 8 years of therapy.

Methods: Case Report

Our rehabilitation treatment model is a combination of medications and non-pharmacological modalities (3).

Non pharmacological modalities consist of physical exercises, cognitive training, breathing exercises, diet modification and other sensory modalities.

Physical exercises are done in sitting position by engaging parts of the body in order, corresponding to our development (ontogenesis) starting from mimic, facial muscle activities and continuing with hand exercises (4).

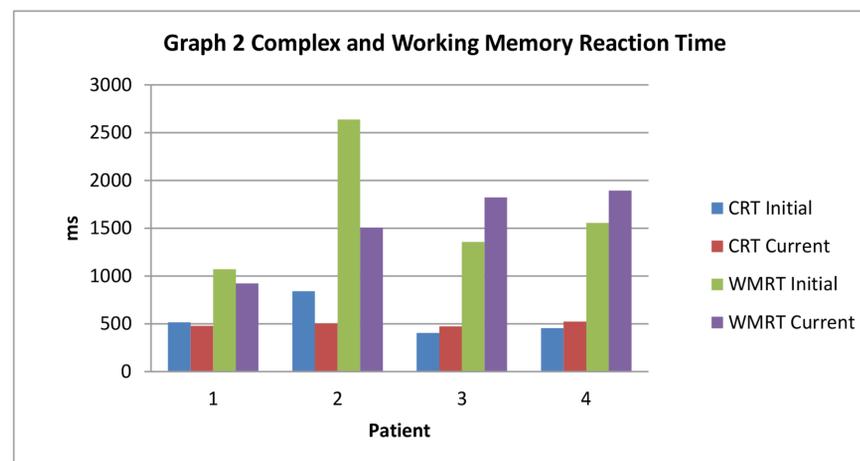
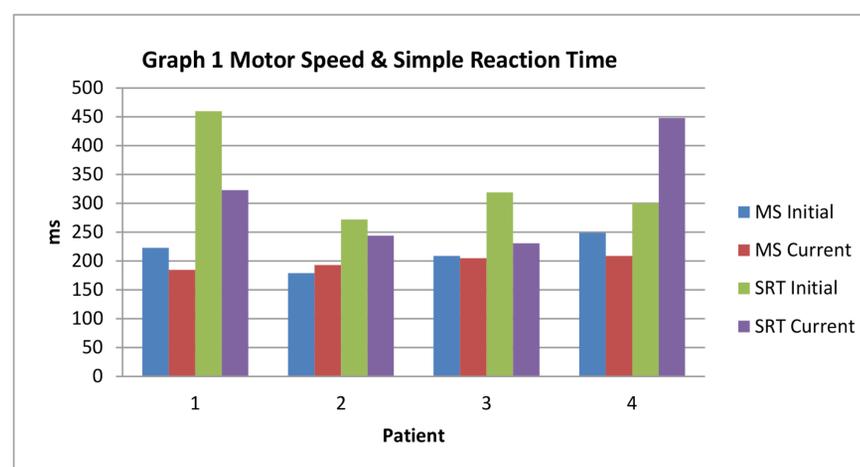
Our computerized training software consists of different tasks, aimed at eye and hand coordination and visual field expansion training, selective attention, learning and working memory training.

The pen and paper tasks as well as registration of motor speed (MS), reaction time (RT), test performance and errors were used to follow the treatment progress. RT includes simple and complex RT (SRT and CRT) and working memory RT (WMRT) for different targets (words, numbers, pictures, textures and others).

Results

We present 4 people with different duration of therapy: patient 1 – 8 years, patient 2 – 4 years, and patient 3 and 4 – 7 years of treatment. In this group, the MMSE score, clock drawing test (CDT), and verbal fluency (animals – VFA and letters - VFL) were stable for the whole period of treatment, except in patient 4, where a decrease in VFL was noticed.

The MS was stable in all patients, SRT - only in patients 1,2,3. (Graph 1). The CRT was stable in all patients, and WMRT - only in patients 1 and 2 (Graph 2).



Discussion

The research related to non pharmacological interventions as a part of integrative treatment is growing (5). The theoretical suggestion behind this rehabilitation program is the notion that increased cerebral blood flow is a highly modifiable factor as well as a crucial element to decrease hypoxia, improve energy production and protein synthesis in dementia. It could be achieved by simultaneous administration of different treatment modalities aimed at increasing vitality of brain cells by activating sensory flow into the brain and improving cerebral blood circulation. Previously, we demonstrated an improvement and stabilization of cognitive functions in people with mild dementia and depression for 6 years by using pen and paper tests (6).

Discussion (continued)

The novelty of this presentation is the data, related to a combination of pen and paper tests with reaction time based computerized tasks along with task performance and errors. This case study presentation is preliminary and needs to be replicated in the future.

Based on presented clinical cases, we could suggest that the brain in dementia still has an ability to maintain cognitive functions for 8 years in response to a full spectrum of all available treatment modalities.

Conclusion

Stabilization of cognitive functions in patients with AD and MCI was achieved as a result of utilization of integrative rehabilitation program. Presently, it could be a feasible treatment option for dementia patients to stabilize their cognition and improve their quality of life until new effective approaches become available.

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