



# COGNITIVE PERFORMANCE IMPROVES IN PATIENT WITH DEPRESSION AND EARLY DEMENTIA DURING FOUR YEARS OF COMBINED TREATMENT: A CASE STUDY

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Valentin Bragin, Marina Chemodanova, Narmina Dzhafarova, Ilya Bragin  
Stress Relief and Memory Training Center, Brooklyn, NY, USA. Contact e-mail: val\_bragin@bigfoot.com

## Introduction

For the last decade the emerging data on brain plasticity showed the possibility of more active treatment approach in elderly people with dementia (1, 2, 3, 4). The integrative treatment could protract cognitive decline in patients with mild cognitive deficit and depression throughout 24 months of the treatment (5).

The outcome of continuous long-term treatment (more than two years) in the routine clinical settings remains to be investigated (6, 7, 8).

Here we present a case study of the patient during 48 months of treatment.

## Subject / Methods

The patient "E" is a male 67-years old, right-handed, high school graduate, who came to our office with complaints of memory problems and depression. His medical history was noted to have Diffuse Arteriosclerosis, High Blood Pressure, Head Trauma with LOC after car accident.

The patient had severe stress, related to the illness and death of his wife following the first 12 - 24 months of the treatment.

He has been taking antihypertensive medications. In our office, he was treated with Bupropion and Rivastigmine. Patient was encouraged to modify his diet and lifestyle and perform mild sensory-motor and breathing exercises and to take food supplements, multivitamins, vitamin E, alpha-lipoic acid, omega-3 and coenzyme Q-10 (9).

Neuropsychological test battery was administered at baseline, 6, 12, 24, 36, 48 months after beginning of treatment.

### The following tests were used for cognitive assessment:

1. A full version of the Mini-Mental State Examination(MMSE)(10).
2. Neurobehavioral Cognitive Status Examination (Cognistat) was used along with MMSE to assess 10 cognitive domains: attention (digit span), orientation, language abilities, construction abilities, memory (four items), calculations, similarities and judgment (11).
3. Ruff 2&7 Selective Attention Test was designed to measure sustained and selective attention on trials of visual search and cancellation tasks. (12).
4. Word List Memory Learning Test (WLMLT) was used to assess verbal memory. There were scores of immediate memory, learning process, and delayed recall (5 min).
5. Ruff-Light Trail Learning test (RULIT) is designed to measure visual spatial learning and memory, related to right hemisphere function (13). There were scores of immediate memory, learning process, and delayed recall (60 min).
6. Word retrieval category of animals and letter tests
7. Ruff Figural Fluency Test (RFFT) provides information regarding nonverbal capacity of the right prefrontal lobe to produce unique designs (14).
8. Wisconsin Card Sorting Test (WCST), computerized version was used (15).

## Results

On initial evaluation (Table 1), patient's MMSE score was 29, however he had deficit in all cognitive domains: attention (Cognistat), memory (Cognistat, WLMLT and RULIT) and frontal lobe functions (Word Fluency tests, RFFT, WCST).

By the end of 48 months, there were no significant changes in MMSE (27) and Repetition, Calculation, Comprehension and Judgment (Cognistat).

## Attention Domain

Attention was improved during the period of 24 - 48 months of the treatment (Cognistat). There were signs of increase in detection and search speed, accompanied by decrease accuracy (2 & 7 Selective attention test).

## Memory Domain

Naming and memory (4 words) (Cognistat) increased by 24 months and remained at the same level till 48 months. Construction remained about the same for the 36 months and has increased by the end of 48 months.

On the WLMLT, immediate recall decreased during all treatment period. Five minutes recall remained the same level till 24 months of the treatment and increased by 36 - 48 months.

On the RULIT score, visual-spatial memory test, immediate and 60 minutes recall improved by 24 months of the treatment and remained at the same level till the 48 months. The numbers of total correct trials increased during the whole treatment period.

The numbers of complete categories on WCST test remained the same by the end of 24 months and then increased (36 - 48 months).

## Executive Function Domain

On the Cognistat, performance on similarities increased by the end of 36 months.

Word Fluency Test (letters and animals) showed an improvement by the end of 12 months and remained at this level till the end of the study.

Unique design (RFFT) increased by the end of 24 months and remained the same till the end of the study. Error ratio (RFFT) increased by the end of the study.

On the WCST, there was an increase in total correct and conceptual responses with decrease in total errors, perseverative responses, perseverative and non-perseverative errors.

Table 1: Performance on Cognitive Tests during 48 Months of Treatment

Tests		Base	6 mo	12 mo	24 mo	36 mo	48 mo
<b>General</b>							
MMSE		28	29	29	29	26	27
<b>Attention</b>							
Cognistat	Attention	2	2	2	3	5	4
Cognistat	Repetition	11	11	11	10	10	11
Cognistat	Calculations	4	4	4	4	4	4
2&7 Test	Automatic Detecton Speed				86	98	108
2&7 Test	Automatic Detection Accuracy				86.9	88.3	84.4
2&7 Test	Controlled Search Speed				71	79	73
2&7 Test	Controlled Search Accuracy				73.2	76	70.2

<b>Memory</b>							
Cognistat	Naming	5	5	5	8	8	8
Cognistat	Constructions	3	3	3	2	2	8
Cognistat	Memory	7	10	10	11	12	12
WLMLT	Immediate recall	6	4		3	6	2
WLMLT	5 minute recall	3	4		3	6	5
RULIT	Immediate recall	5	8		12	12	13
RULIT	60 minutes Recall Correct	10	10		14	11	13
RULIT	60 minutes Errors	5	5		1	5	2
RULIT	Total Correct (Trials 2-10)	87	98		119	110	101
WCST	Categories Complete	1			1	6	6

<b>Frontal Lobe</b>							
Cognistat	Comprehension	5	6	6	6	6	6
Cognistat	Similarities	6	6	6	5	8	8
Cognistat	Judgement	6	6	6	3	6	6
Word Fluency	Letters	2		7	8	7	7
Word Fluency	Animals	9		9	13	12	15
RFFT	Unique Designs	26	28	27	35	30	41
RFFT	Error Ratio	0.53	0.57	0.81	0.26	0.67	0.63
WCST	Total Correct	47			53	91	73
WCST	Total Errors	81			75	28	27
WCST	Pers. Responses	46			42	19	20
WCST	Pers. Errors	45			38	15	17
WCST	Non-Pers. Errors	36			37	13	10
WCST	Conceptual Responses	24			28	80	71
WCST	Trials to Complete 1st Category	52			15	10	16

## Discussion

The study evaluated the effect of an integrative treatment on cognition in medically ill individual who suffered from depression and cognitive impairment. This 48 months treatment brought together pharmacological and non-pharmacological interventions.

The positive changes were observed in all cognitive domains, mostly in memory, frontal lobe domains. Results on all different tests were all consistent. The positive results of long term combination treatment (medications and neuropsychological rehabilitation for a period of 2 years and 10 months) in a demented patient were demonstrated in a single case study. (7)

In the next few years we will undoubtedly learn more about the preservation and activation of cognitive functions in patient with Alzheimer's disease. Even now, it is clear that an integrative treatment approach prevent cognitive decline in patients with depression and early dementia (16).

## Conclusion

The integrative treatment of this patient with mild to moderate cognitive impairment and depression has prevented further cognitive decline and even showed improvement in different cognitive domains.

Further extensive research regarding cognitive rehabilitation for dementia patient needs to be done.

## References

1. Jones S, Nyberg L, Sandblom J. Cognitive and neural plasticity in aging: general and task-specific limitations. *Neurosci Biobehav Rev*. 2006;30(6):864-71.
2. Calera MD, Navarro E. Cognitive plasticity as a modulating variable on the effects of memory training in elderly persons. *Arch Clin Neuropsychol*. 2007 Jan;22(1):63-72.
3. Requena C, López Ibor M.I., et al. Effects of Cholinergic Drugs and Cognitive Training on Dementia Dementia and Geriatric Cognitive Disorders 2004;18:50-54.
4. Hofmann M., Rosler A., Schwarz W., et al. Interactive computer training as a therapeutic tool in Alzheimer's disease. *Comprehensive Psychiatry* J. 2003; 44: 213-219.
5. Bragin V., Chemodanova M., Dzhafarova N., Bragin I., Czerniawski J.L., Aliev G. Integrative treatment approach improves cognitive function in demented and clinically depressed patients. *Am J Alzheimers Dis Other Demen*. 2005 Jan-Feb;20(1):21-6
6. Wallin AK, Andreasen N, Eriksson S, et al. Donepezil in Alzheimer's disease: what to expect after 3 years of treatment in a routine clinical setting. *Dement Geriatr Cogn Disord*. 2007;23(3):150-60. Epub 2006 Dec 18.
7. Fernandez AL, Manóloff LM, Monti AA Long-term cognitive treatment of Alzheimer's disease: a single case study. *Neuropsychol Rehabil*. 2006 Feb;16(1):96-109.
8. Bottino CM, Carvalho IA, Alvarez AM, et al. Cognitive rehabilitation combined with drug treatment in Alzheimer's disease patients: a pilot study. *Clin Rehabil*. 2005 Dec;19(8):861-9
9. Bragin V. How to activate your brain. A Practical Guide for Older Adults, Book I, Bloomington, IN: AuthorHouse, 2007.
10. Folstein MF, Folstein SE, McHugh PR: "Mini-Mental State": a practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* 1975; 12:189-198.
11. Kiernan RJ, Mueller J, Langston W: Cognistat (Neurobehavioral Cognitive Status Examination), Odessa, Fla. Psychological Assessment Resources, 2002.
12. Ruff RM, Allen CC: Ruff 2 & 7 Selective Attention Test, Odessa, Fla., Psychological Assessment Resources 2002.
13. Ruff RM, Allen CC: Ruff-Light Trail Learning Test (RULIT), Odessa, Fla., Psychological Assessment Resources 2002.
14. Ruff RF: Ruff Figural Fluency Test (RFFT), Odessa, Fla. Psychological Assessment Resources, 2002.
15. Heaton RK, Chelune G.J, Talley JL, Kay GG, Curtiss G: Wisconsin Card Sorting Test Manual. Odessa, Fla., Psychological Assessment Resources, 1993.
16. Burke D, Hickie I, Breakspear M, Gotz J. Possibilities for the prevention and treatment of cognitive impairment and dementia *Br J Psychiatry*. 2007 May;190:371-2.

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