MRI and Neuropsychological Outcomes following a Functional Medicine Intervention with Cognitive Training in Mild Cognitive Impairment (MCI): A Multiple Case Study

Amy Lawson Moore, PhD1, Randolph James, MD2, Terissa Miller, MS1, Dick Carpenter, PhD3 & Christina Ledbetter, PhD4

1Gibson Institute of Cognitive Research, Colorado Springs, CO; 2True Life Medicine, Woodland Park, CO; 3UCCS, Colorado Springs, CO; 4LSU Health Sciences Center, Shreveport, LA;

INTRODUCTION

Background: Neuro-inflammation is a prominent finding in Alzheimer’s Disease (AD). Mild Cognitive Impairment (MCI) is a precursor to AD with up to 50% of individuals with MCI converting to AD within 1 to 3 years. Promising work has investigated MCI outcomes following a multi-modal anti-neuro-inflammatory protocol. The current study examined MRI and cognitive outcomes for five cases with varying degrees of MCI following diet, exercise, optimized sleep, relaxation, and cognitive training protocol.

Research Problem: We have reported improvements in cognition and/or neural connectivity in multiple studies on LearningRx cognitive training programs1-6 including the example below, but no studies using LearningRx for mild cognitive impairment (MCI) have examined neural correlates of cognitive change with this population, and we have not tested the intervention in combination with functional medicine protocols.

METHODS

Design: Using a multiple case study design, we examined neural connectivity, executive function, memory, attention, reasoning, everyday functioning, and overall IQ score for 5 clients with Mild Cognitive Impairment (MCI) before the intervention, after 12 weeks on functional medicine (FM) protocols without cognitive training, and again following completion of 72 hours of cognitive training. The intervention was conducted by a clinician—not on a computer—and targeted working memory, long-term memory, processing speed, visual processing, auditory processing, logic and reasoning, and attention skills.

Participants: Participants spent the first 12 weeks following diet, supplements, and lifestyle changes, including the Institute for Functional Medicine (IFM) food plan. Participants then began Cognitive Training: Function-Adult (BRIEF-A). MRI was performed on a Siemens 3T MR scanner and included Woodcock Johnson Tests of Cognitive Abilities, and Behavior Rating Inventory of Executive Function (BRIEF-A) – Spouse version.

ASSESSMENT RESULTS

Montreal Cognitive Assessment (MoCA)

Dementia Kaplan Executive Function System (DKEFS) – Tower Test

Behavior Rating Inventory of Executive Function (BRIEF-A) – Spouse

REAL LIFE CHANGES

• Case 1 reported improved social interactions and marital relationship
• Case 2 reported restored ability to write professionally and teach effectively
• Case 3 reported increased mental energy and launched a new business
• Case 4 reported increased energy, restoration of hope, and confidence to finish a doctorate
• Case 5 reported decreased depression and improved confidence

CONCLUSIONS

• In all five cases, improvement in both cognitive and life skills was achieved with a functional medicine protocol that included cognitive training.
• Participants exhibited modest training-induced changes in neural connectivity.
• Normalization of the Default Mode Network (DMN) was evident along with the appearance of anti-correlations and decreased hyperconnectivity.
• A multidisciplinary approach to slowing or reversing cognitive decline appears to be promising.

REFERENCES


CONTACT

Amy Moore, PhD amymoore@gibsonnserach.org or Christina Ledbetter, PhD cledbetter@uothc.edu