Dietary Approaches to Reducing MS Related Symptoms

Terry Wahls, MD, IFMCP
Author The Wahls Protocol How I Beat Progressive MS
Using Functional Medicine and Paleo Principles

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Dr. Terry Wahls LLC
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• Please type any technical issue or clinical question into either the “Chat” or “Questions” boxes, making sure to send them to “Organizer” at any time during the webinar.

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  – PenguinRandomHouse Inc.; Integrative Medicine for Mental Health; Institute for Health and Healing; Suttler Pacific; BioCeuticals; NCURA; MCG Health LLC; Genova Diagnostics

• Equity interest
  – Dr. Terry Wahls LLC
  – The Wahls Institute PLC
  – www.terrywahls.com

• Books

The Wahls Protocol
Cooking for Life
The Revolutionary Modern Paleo Plan to Treat All Chronic Autoimmune Conditions

The Wahls Protocol
How I Beat Progressive MS Using Paleo Principles and Functional Medicine

TERRY WAHLS, M.D. and Eve Adamson

www.terrywahls.com
Dietary Approaches to Reducing MS Related Symptoms

- Tell my story
- Review the science behind my protocol
- Review our research
- Review implications for other disease states
Objectives: By the End of Talk You Will Be Able To...

- Name at least one mechanism by which dietary factors may contribute to neuroinflammation and neurodegenerative disease processes and potential worsening of MS related symptoms
- Name at least three specific food groups that can help stabilize and or reverse neuroinflammation and neurodegenerative disease processes and MS related symptoms
- Identify an effective and inexpensive test that clinicians and patient can use to monitor the microbiome
- Identify testing to guide supplement recommendations for MS patients
In 2000, I Became a Patient

- Left leg weakness
- Prior history visual dimming
- Lesions in spinal cord
- Abnormal CSF
- Diagnosis relapsing-remitting MS
Cost of MS to Society/Individual

• RRMS annual cost of disease modifying drugs
  – $45,000 to $72,000/ year
  – Mean cost (Poland $41,400)
• + Annual MRI, labs, therapy, office visits
• Within 10 years of diagnosis
  – 50% exit work force due to fatigue disability
  – 30% gait disability
  – Most convert to SPMS
• SPMS – chemotherapy, progressive disability
• PPMS – no approved treatments

Cost of MS to Society/Individual

- Lost of income from person with MS
- Leading cause of early disability
- Caregiving cost from strangers
- Family caregiver lost income
- Early and lengthy NH care
- Leading diagnosis for those requesting assisted suicide from Dr. Kevorkian
The Cleveland Clinic
# 7 Years of Decline

**NARCOMS QOL Survey**

<table>
<thead>
<tr>
<th></th>
<th>11/23/05</th>
<th>6/2/06</th>
<th>11/28/06</th>
<th>5/5/07</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MS Sx Overall</strong></td>
<td>Worse</td>
<td>Worse</td>
<td>Worse</td>
<td>Worse</td>
</tr>
<tr>
<td><strong>Fatigue</strong></td>
<td>Mod</td>
<td>Severe</td>
<td>Total</td>
<td>Total</td>
</tr>
</tbody>
</table>
Timeline

• 1980 Face pain
• 1987 Dim vision
• 2000 Leg weakness (Copaxone)
• 2002 Paleo Diet prior vegetarian
• 2003 Progressive MS (Novantrone)
• 2004 Added various vitamins (Tysabri)
• 2005 (Cellcept)
• 2007 Discovered E-stim and IFM
• 2008 Reorganized / structured Paleo Diet
12 Months of Structured Paleo Diet, Exercise, NMES, & Meditation
Case report

Neuromuscular electrical stimulation and dietary interventions to reduce oxidative stress in a secondary progressive multiple sclerosis patient leads to marked gains in function: a case report

David Reese, ET Shivapour, Terry L. Wahls, Shauna D Dudley-Javoroski, and Richard Shields

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6Division of General Medicine, Department of Internal Medicine, University of Iowa Carver College of Medicine, 200 Hawkins Drive, Iowa City, Iowa, 52246, USA

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Neuroprotection vs. NeuroRegeneration

• Restoring function is the goal
• Restore the brain / mitochondria
Figure 1. The two routes by which diet can influence our health: (A) the metabolism of our cells and (B) the population of our gut microbiota.
Dairy & MS

Casein, Gluten & Schizophrenia

- Liquid cow milk (not cheese) and MS prevalence was highly correlated (rho = 0.836) across 27 countries and 29 populations

- IgG to casein and gluten were significantly ↑ in recent onset and non-recent onset schizophrenia compared to controls (p≤0.00001-0.004)
Gluten sensitivity is an abnormal immune response to gluten in genetically susceptible individuals and may manifest solely with neurological dysfunction. 90% of gluten sensitive individuals have no GI symptoms.
Gluten Sensitivity: From Gut to Brain

Figure 2. MRI in four patients with gluten encephalopathy. The extent and variability of white matter abnormalities caused by gluten sensitivity can be seen in these four patients (A–D). A and C show diffuse white matter changes, whereas B and D show more f...
MS and Gluten References

- Transglutaminase-6 is an autoantigen in progressive multiple sclerosis and is upregulated in reactive astrocytes. *Mult Scler*. 2016 Dec 1:1352458516684022.
Myelin

36 Key Micronutrients


<table>
<thead>
<tr>
<th>Nutrients</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A, retinol</td>
<td>Alpha carotene</td>
<td>Carnitine</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;1&lt;/sub&gt; (thiamine)</td>
<td>Beta carotene</td>
<td>Lipoic acid</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;2&lt;/sub&gt; (riboflavin)</td>
<td>Beta cryptoxanthin</td>
<td>Creatine</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;3&lt;/sub&gt; (niacin)</td>
<td>Lutein</td>
<td>Cholesterol</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;5&lt;/sub&gt; (pantothenic acid)</td>
<td>Lycopene</td>
<td>Alpha-linolenic fatty acid (ALA)</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;6&lt;/sub&gt; (pyridoxine)</td>
<td>Zeaxanthin</td>
<td>Eicosapentaenoic acid (EPA)</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;9&lt;/sub&gt; (folic acid)</td>
<td>Iron</td>
<td>Docosahexaenoic acid (DHA)</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;12&lt;/sub&gt; (cobalamin)</td>
<td>Copper</td>
<td>Arachidonic acid (AA)</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>Zinc</td>
<td>Gamma-linolenic fatty acid (GLA)</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>Iodine</td>
<td>Linoleic acid (LA)</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>Magnesium</td>
<td>N-Acetylcysteine</td>
</tr>
<tr>
<td>Vitamin K</td>
<td>Selenium</td>
<td>Taurine</td>
</tr>
</tbody>
</table>
Sulfur-Rich Foods

Cabbage  Onion  Mushroom
Why Brassica and Allium?

- Improve detoxification
- Increase glutathione production
- Increase GABA production
- Enhance neuroprotection
- Improve endothelial function
Brassica and Allium References

Why Emphasize Mushrooms?

- Increase nerve growth factors (NGF)
- *Hericium erinaceus* (Yamabushitake or Lion’s Mane) stimulate the production of NGF (in vitro)
- Activate natural killer cells
- Prime innate and adaptive immunity
Leafy Greens
Why Greens?

- Vitamin K1 metabolized to K2-MK7 in gut
- K2 important in:
  - Myelin production
  - Calcium influx into bones and teeth
- Carotenoids
- Magnesium
Greens References


Colored Foods
Why Deeply Pigmented?

- Pigments (especially blue/purple/black) are associated with improved cognitive performance and neuroprotection.
Blueberries and Mild Cognitive Impairment (MCI)

• N = 47 with MCI, 68 y/o +, Blueberry powder vs. placebo, 16 weeks, equivalent of 1 cup berries
  – "There was improvement in cognitive performance and brain function compared with placebo"

• N = 94, 62 to 80 y/o with memory complaints
• Fish oil + blueberries vs. fish oil + placebo, 24 weeks
• The blueberry-supplemented participants had a better sense of well-being, fewer memory mistakes and were less inefficient


Funding for the studies was provided by the US Highbush Blueberry Council, the National Institute on Aging, and Wild Blueberries of North America.

Dr. Krikorian has disclosed no relevant financial relationships.
Pigment & Blueberry References

• Berry antioxidants: small fruits providing large benefits. J Sci Food Agric. 2014 Mar 30;94(5):825-33
• Dietary and plant polyphenols exert neuroprotective effects and improve cognitive function in cerebral ischemia. Recent Pat Food Nutr Ag. 2013 Aug;5(2):128-43.
• Grape juice, berries, and walnuts affect brain aging and behavior. J Nutr. 2009 Sep;139(9):1813S-7S.
• Reversing the deleterious effects of aging on neuronal communication and behavior: beneficial properties of fruit polyphenolic compounds. Am J Clin Nutr. 2005 Jan;81(1 Suppl):313S-316S.
3 Greens

3 Colored

3 Sulfur
Why Organ Meat

• Pre-industrial: 30% of all meat consumed was organ meat
• Excellent source of ubiquinone, minerals, essential fatty acids, fat and water soluble vitamins, especially
  – Vitamin K2-MK4
  – Retinol, Vitamin A
## Organ Meat = Superfood

<table>
<thead>
<tr>
<th>Minerals (mg/100g)</th>
<th>Kale</th>
<th>Turkey (roasted)</th>
<th>Beef Liver</th>
<th>Beef Heart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>72</td>
<td>26</td>
<td>6</td>
<td>94</td>
</tr>
<tr>
<td>Iron</td>
<td>0.9</td>
<td>1.79</td>
<td>6.54</td>
<td>1.17</td>
</tr>
<tr>
<td>Magnesium</td>
<td>18</td>
<td>25</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>28</td>
<td>203</td>
<td>497</td>
<td>36</td>
</tr>
<tr>
<td>Potassium</td>
<td>228</td>
<td>280</td>
<td>352</td>
<td>296</td>
</tr>
<tr>
<td>Sodium</td>
<td>23</td>
<td>68</td>
<td>79</td>
<td>30</td>
</tr>
<tr>
<td>Zinc</td>
<td>0.24</td>
<td>2.96</td>
<td>5.3</td>
<td>0.31</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vitamins (per 100g)</th>
<th>Kale</th>
<th>Turkey (roasted)</th>
<th>Beer Liver</th>
<th>Beef Heart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin C, mg</td>
<td>41</td>
<td>0</td>
<td>1.9</td>
<td>53.3</td>
</tr>
<tr>
<td>Thiamin mg</td>
<td>0.053</td>
<td>0.057</td>
<td>0.194</td>
<td>0.069</td>
</tr>
<tr>
<td>Riboflavin mg</td>
<td>0.07</td>
<td>0.177</td>
<td>3.425</td>
<td>0.091</td>
</tr>
<tr>
<td>Niacin mg</td>
<td>0.5</td>
<td>5.088</td>
<td>17.525</td>
<td>0.65</td>
</tr>
<tr>
<td>Vitamin mg B-6</td>
<td>0.138</td>
<td>0.41</td>
<td>1.017</td>
<td>0.179</td>
</tr>
<tr>
<td>Folate, mcgDFE</td>
<td>13</td>
<td>7</td>
<td>253</td>
<td>17</td>
</tr>
<tr>
<td>Vitamin B-12µg</td>
<td>0</td>
<td>0.35</td>
<td>70.58</td>
<td>0</td>
</tr>
<tr>
<td>Vitamin A, RAE</td>
<td>681 mcg</td>
<td>0</td>
<td>9442 mcg</td>
<td>885 mcg</td>
</tr>
<tr>
<td>Vitamin A, IU</td>
<td>13621 *</td>
<td>0.34</td>
<td>31714</td>
<td>17707</td>
</tr>
<tr>
<td>Vitamin E mg (alpha-tocopherol)</td>
<td>0.85</td>
<td>0</td>
<td>0.51</td>
<td>1.1</td>
</tr>
<tr>
<td>Vitamin K1 µg (phyloquinone)</td>
<td>817 (K1)</td>
<td>1.3</td>
<td>3.3 (K2)</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Grass-fed Meats, Organ Meats, and Wild Fish
Figure 1. The two routes by which diet can influence our health: (A) the metabolism of our cells and (B) the population of our gut microbiota.
Life Begins in the Ocean
Life Timeline Billions of Years

Going back in time billions of years

– 4.5 Water
– 4.0 Simple life
– 3.0 Photosynthesis
– 2.5 Oxygen crisis
– 1.5 Mitochondria Multi-cellular
– 0.5 (500 Million) Land plants/animals
– 0.2 (200 Million) Mammals
– 0.00025 (250 Thousand) Humans
– 0.00001 (10 Thousand) Grain, legumes and dairy
Our Human Ecosystem Began In The Ocean
• We have co-evolved with the organisms that were in the ocean
• Microbes divide every 20 minutes (1 billion years)
  – Billions of generations
• Humans every 25 years (250,000 years)
  – 10,000 generations
Guts Populated by Ocean Microbiome

- Co-operative mutualistic relationship
- We are all supra-organisms – as dependent on the microbes as our cells are upon our mitochondria to function
Gut Brain Immune Axis

• Gut microbiota influence the brain and immune system balance
• Diet influences the microbiome strongly
• Exercise, sleep, stress level also important
• Changes in the colon mucosa every early in the disease process
Gut–CNS-Axis
Possibility to Modulate Inflammatory Disease Activity—Implications for Multiple Sclerosis

Microbiome and MS

- 20 MS patients
- 40 Controls
- Depletion of *Clostridia* species related to priming the regulatory Th17 cells
- Loss of T regulatory cells / tolerance
Multiple Sclerosis Patients Have Gut Dysbiosis

Multiple sclerosis patients have a distinct gut microbiota compared to healthy controls

MS (n=31) More: Psuedomonas, Mycoplana, Haemophilus, Blautia, and Dorea

Control (n=36) More: Parabacteroides, Adlercreutzia and Prevotella
Fiber Grams / Day

- Westernized society: 15 grams
- Target: 30 grams
- Wahls Diet: 80 grams
- Hunter Gatherer: 100 to 150 grams
- Feed your bacterial friends more fiber
<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Separate hard lumps</td>
<td>Very constipated</td>
</tr>
<tr>
<td>2</td>
<td>Lumpy and sausage like</td>
<td>Slightly constipated</td>
</tr>
<tr>
<td>3</td>
<td>A sausage shape with cracks in the surface</td>
<td>Normal</td>
</tr>
<tr>
<td>4</td>
<td>Like a smooth, soft sausage or snake</td>
<td>Normal</td>
</tr>
<tr>
<td>5</td>
<td>Soft blobs with clear-cut edges</td>
<td>Lacking fibre</td>
</tr>
<tr>
<td>6</td>
<td>Mushy consistency with ragged edges</td>
<td>Inflammation</td>
</tr>
<tr>
<td>7</td>
<td>Liquid consistency with no solid pieces</td>
<td>Inflammation</td>
</tr>
</tbody>
</table>
More Vegetables

3
Greens

3
Colored

3
Sulfur
### Study Diet

<table>
<thead>
<tr>
<th>Food</th>
<th>Instruction</th>
<th>Servings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green leafy vegetables</td>
<td>Recommended*</td>
<td>3 cups cooked/6 cups raw=3svrg</td>
</tr>
<tr>
<td>Sulfur-rich vegetables</td>
<td>Recommended*</td>
<td>3 cups raw or cooked= 3svrg</td>
</tr>
<tr>
<td>Intensely colored fruits or</td>
<td>Recommended*</td>
<td>3 cups raw or cooked =3 svrg</td>
</tr>
<tr>
<td>vegetables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Omega-3 oils</td>
<td>Encouraged</td>
<td>2 tablespoons</td>
</tr>
<tr>
<td>Animal protein</td>
<td>Encouraged</td>
<td>4 ounces or more</td>
</tr>
<tr>
<td>Gluten-containing grain</td>
<td>Excluded</td>
<td></td>
</tr>
<tr>
<td>Dairy</td>
<td>Excluded</td>
<td></td>
</tr>
<tr>
<td>Eggs</td>
<td>Excluded</td>
<td></td>
</tr>
</tbody>
</table>
Nutritional Adequacy (%RDA)
US Diet vs. Study Diet

- Vitamin D
- Calcium
- Vitamin E
- Magnesium
- Zinc
- Folate
- Iron
- Vitamin A
- Vitamin C
- Niacin
- Vitamin B6
- Vitamin B12
- Thiamin
- Riboflavin

- US Diet
- Wahls*

Graph showing the comparison of nutritional adequacy between the US Diet and the Wahls Study Diet across various nutrients.
Stop Processed Foods, Gluten, Dairy, Eggs
Methyl B12, Methyl Folate, Vitamin D, Fish Oil

Meditation
## Stretching Exercises

<table>
<thead>
<tr>
<th>Muscles</th>
<th>Image</th>
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</thead>
<tbody>
<tr>
<td>Gastro-soleus</td>
<td><img src="image1" alt="Image" /></td>
</tr>
<tr>
<td>Hamstring</td>
<td><img src="image2" alt="Image" /></td>
</tr>
<tr>
<td>Quadriceps</td>
<td><img src="image3" alt="Image" /></td>
</tr>
<tr>
<td>Erector spinae</td>
<td><img src="image4" alt="Image" /></td>
</tr>
</tbody>
</table>
Electrical Stimulation of Muscles Builds Muscle Mass
Multimodal intervention improves fatigue and quality of life in subjects with progressive multiple sclerosis: a pilot study

Background: Fatigue is a disabling symptom of multiple sclerosis (MS) and reduces quality of life. The aim of this study was to investigate the effects of a multimodal intervention, including a modified Paleolithic diet, nutritional supplements, stretching, strengthening exercises with electrical stimulation of trunk and lower limb muscles, and stress management on perceived fatigue and quality of life of persons with progressive MS.

Methods: Twenty subjects with progressive MS and average Expanded Disability Status Scale (EDSS) score of 6.2 (range: 3.5–8.0) participated in the 12-month phase of the study. Assessments were completed at baseline and at 3 months, 6 months, 9 months, and 12 months. Safety analyses were based on monthly side effect questionnaires and blood analyses at 1 month, 3 months, 6 months, 9 months, and 12 months.

Results: Subjects showed good adherence (assessed from subjects’ daily logs) with this intervention and did not report any serious side effects. Fatigue Severity Scale (FSS) and Performance Scales-fatigue subscale scores decreased in 12 months (P<0.0005). Average FSS scores of eleven subjects showed clinically significant reduction (more than two points, high response) at 3 months, and this improvement was sustained until 12 months. Remaining subjects (n=9, low responders) either showed inconsistent or less than one point decrease in average FSS scores in the 12 months. Energy and general health scores of RAND 36-item Health Survey (Short Form-36) increased during the study (P<0.05). Decrease in FSS scores during the 12 months was associated with shorter disease duration (r=0.511, P=0.01), and lower baseline Patient Determined Disease Steps score (r=0.563, P<0.005) and EDSS scores (r=0.501, P=0.012). Compared to low responders, high responders had lower level of physical disability (P<0.05) and lower intake of gluten, dairy products, and eggs (P=0.036) at baseline. High responders undertook longer duration of massage and stretches per muscle (P<0.05) in 12 months.

Conclusion: A multimodal intervention may reduce fatigue and improve quality of life of subjects with progressive MS. Larger randomized controlled trials with blinded raters are needed to prove efficacy of this intervention on MS-related fatigue.

Keywords: modified Paleolithic diet, exercise, neuromuscular electrical stimulation, stress management, lifestyle changes, vitamins, supplements
Subject Demographics

- 20 individuals (18 SPMS, 2 PPMS)
- Age: 51.7 (+ 6.4) years
- Baseline EDSS: 6.2 (+1)
- Fatigue Severity Scale Score: 5.5 (+ 1.2)
Average daily servings of the study diet recommended (vegetables/fruits) and excluded (gluten/dairy/eggs) foods p < 0.01 difference from baseline to 12 months
Side effect – Overweight and obese subjects lost weight and got to a healthy weight.
Multimodal Intervention Improves Quality of Life
5 point change is clinically meaningful

**p<0.0005
*p< 0.05
Factors Associated With Success

- Less disability
- Shorter disease duration
- Larger intervention Dose
- Family intervention / support (Diet)
- Exercise Dose (Gait)
A Multimodal, Nonpharmacologic Intervention Improves Mood and Cognitive Function in People with Multiple Sclerosis

Jennifer E. Lee, PhD, MA<sup>a,b</sup>, Babita Bisht, PhD, BPT<sup>c</sup>, Michael J. Hall, PhD<sup>a,c</sup>, Linda M. Rubenstein, PhD, MS<sup>f</sup>, Rebecca Louison, BS<sup>c</sup>, Danielle T. Klein, BS<sup>c</sup>, and Terry L. Wahls, MD<sup>a,b</sup>

<sup>a</sup>Department of Psychology, Mount Mercy University, Cedar Rapids, Iowa; <sup>b</sup>College of Nursing, The University of Iowa, Iowa City, Iowa; <sup>c</sup>Department of Internal Medicine, Carver College of Medicine, The University of Iowa, Iowa City, Iowa; <sup>d</sup>Department of Psychiatry, Iowa City VA Health Care System, Iowa City, Iowa; <sup>e</sup>Department of Psychology, Carver College of Medicine, University of Iowa, Iowa City, Iowa; <sup>f</sup>College of Public Health, The University of Iowa, Iowa City, Iowa; <sup>g</sup>Extended Care and Rehabilitation Service Line, Iowa City VA Health Care System, Iowa City, Iowa

**ABSTRACT**

Objective: The objective of this study was to examine whether participation in a 12-month multimodal intervention would improve mood and cognitive function in adults with progressive multiple sclerosis (MS).

Methods: In this one-arm, open-label feasibility trial, participants were prescribed a home-based multimodal intervention, including (1) a modified Paleolithic diet; (2) an exercise program (stretching and strengthening of the trunk and lower limb muscles); (3) neuromuscular electrical stimulation (EStim) of trunk and lower limb muscles; and (4) stress management (meditation and self-massage). Individuals completed measures of mood (Beck Anxiety and Depression Inventories) and cognitive (Cognitive Stability Index, Cognitive Screening Test, Delis–Kaplan Executive Function System) and executive function (Wechsler Adult Intelligence Scale) at baseline and 3, 6, 9, and 12 months after the start of the intervention. Dosage of the multimodal intervention was assessed at 3, 6, 9, and 12 months.

Results: The more individuals participated in the intervention activities, the greater improvements they had from baseline to 12 months on self-report measures of anxiety (Beck Anxiety Inventory [BAI]; \(p_s = 0.001\) to \(0.02\)), depression (Beck Depression Inventory [BDI]; \(p_s = -0.0001\) to \(0.09\)), cognitive function (Cognitive Stability Index [CSI/T]; Delis–Kaplan Executive Function System [D2FES]; \(p_s = 0.001\) to \(0.06\)), and executive function (Wechsler Adult Intelligence Scale [WAIS]; \(p_s = 0.0001\) to \(0.09\)).

**ARTICLE HISTORY**

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Multiple sclerosis; Wahl's Protocol; diet; exercise; nonpharmacologic; mood; cognitive function; depression; anxiety; electrical stimulation

Average Scores on the Mood Measures at Each Study Visit
Average Scores on the DKEFS and WAIS Subscales at Each Study Visit
Effects of a multimodal intervention on gait and balance of subjects with progressive multiple sclerosis: a prospective longitudinal pilot study

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In the Setting of Relapsing-remitting MS
Reduction of Fatigue and Improved Motor Function

Randomized control trial evaluation of a modified Paleolithic dietary intervention in the treatment of relapsing-remitting multiple sclerosis: a pilot study

Background/objective: A Paleolithic diet may improve fatigue and quality of life in progressive multiple sclerosis (MS) patients, but past research has evaluated the effects of this dietary intervention in combination with other treatments such as exercise. Thus, the purpose of this pilot study was to evaluate a modified Paleolithic dietary intervention (MPDI) in the treatment of fatigue and other symptoms in relapsing-remitting MS (RRMS).

Methods: We measured the effects of a MPDI in 17 individuals with RRMS. Of 34 subjects randomly assigned to control (maintain usual diet) and intervention (MPDI) groups, nine subjects (one man) completed the control group and eight subjects (one man) completed the MPDI.

Results: Significant improvements were seen in Fatigue Severity Scale score and also in Mul-
Reduced Fatigue

**Figure A**: FSS score comparison between Control and MPDI groups at baseline and postprotocol. The MPDI group shows a significant reduction in FSS score postprotocol (indicated by the star symbol).

**Figure B**: Change in FSS score from baseline to postprotocol for each participant (C1 to C8) across the control and MPDI groups.
Improved Mental and Physical QoL
Improved Motor Function

A. 9-HPT (dominant)

B. 9-HPT (nondominant)

C. 25-FW

D. 6-MV
Family Time
- Therapeutic lifestyle classes
- Group classes
- Introduction to concepts
- Intake ½ day
- 2 Hr MD – timeline and matrix
- 2 HR RD – healthy kitchen
• Support groups every other month
• Skills classes every month
Reasons for Referral

• Chronic pain (55%)
• Metabolic Issues (25%)
• Autoimmune (15%)
• TBI
• Fibromyalgia
• Mood disorders
# Interventions

<table>
<thead>
<tr>
<th>Primary Care Labs</th>
<th>Supplements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin D, B12, folate</td>
<td>Vitamin D</td>
</tr>
<tr>
<td>Homocysteine</td>
<td>Cod liver oil</td>
</tr>
<tr>
<td>Lipids (Trig/ HDL ratio)</td>
<td></td>
</tr>
<tr>
<td>HbA1c</td>
<td>Methyl B12, methyl folate</td>
</tr>
<tr>
<td>ESR</td>
<td></td>
</tr>
<tr>
<td>h.s. CRP</td>
<td>Algae, NAC</td>
</tr>
</tbody>
</table>
Outcomes Biometric

- Comparing those with 1 visit to 3+ visits
- BMI ↓
- HbA1c ↓
- Trig/HDL ratio ↓
- Vitamin D ↑
- Homocysteine ↓
Dietary Approaches to Treating MS Related Fatigue

• Recruiting for clinical trial
• Relapsing Remitting MS + fatigue
• Compare Swank and Wahls Diet
• MSDietStudy@healthcare.uiowa.edu
• Live within 500 miles of Iowa City, Iowa
www.terrywahls.com

RRMS & Fatigue Study funded by NMSS
MSDietStudy@healthcare.uiowa.edu

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MY GDX – Order materials and get results

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Additional Questions?

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- How Genova’s profiles might support patients in your clinical practice
- Review a profile that has already been completed on one of your patients

We look forward to hearing from you!
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Deanna Minich, PhD

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Dietary Approaches to Reducing MS Related Symptoms

Terry Wahls, MD, IFMCP
Author The Wahls Protocol How I Beat Progressive MS
Using Functional Medicine and Paleo Principles

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