CASE REPORT

Management of Trauma-Induced Multiple Sclerosis with Paleo Diet and Integrative Therapies: A Case Report

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Abstract

Introduction: Trauma continues to be noted in studies as a risk factor for autoimmune diseases such as multiple sclerosis (MS). Successful therapeutic interventions that support the reduction of numbing episodes associated with MS may include diet, stress reduction techniques, and biofield therapy.

Case Description: This case report highlights the successful reduction of numbing episodes, stress, and fatigue in an individual 38-year-old Caucasian female patient using nutrition and body-mind-spirit practices. This individual continued conventional interventions while starting medical nutrition therapy. Over the course of 120 days, her treatment was augmented with a Paleolithic-style diet, which eliminated dairy and ultra-processed foods. Other dietary recommendations suggested were the increase of polyunsaturated fatty acids (PUFAs) and monounsaturated fatty acids (MUFAs), decrease of saturated fatty acids (SFAs), and increase in protein and CO_2-promoting foods. Integrative recommendations were biofield therapy and for stress reduction were psychotherapy, reduced exercise intensity, lifestyle recovery from trauma, body-mind-spirit practices, and herbal supplementation.

Conclusion: Integrative therapies such as diet, stress reduction techniques, and biofield therapy may be used as therapeutic protocols for trauma-induced MS patients. Population-based clinical studies should be done to understand the role of these therapies in synchronization.

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Introduction

In patients with multiple sclerosis (MS), the immune system attacks the central nervous system (CNS) resulting in neurological symptoms including vision impairments, urinary system and intestinal incontinence, numbness and tingling, focal weakness, bouts of fatigue, and cognitive dysfunction.[1] Studies show risk factors include family history, immune system complications, and environmental factors1 such as diet, vitamin deficits, or psychological trauma, which play a major role in disease development.[2] MS-related neurological symptoms could be a function of the inability to cope with life stress.

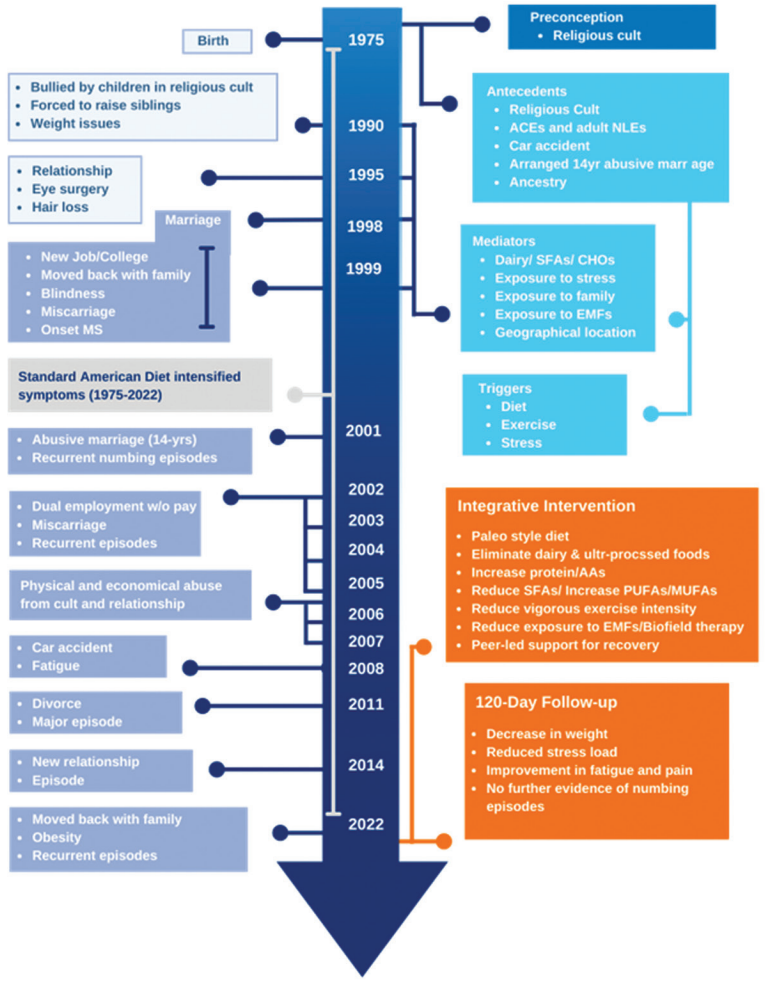
Patient Case

A 38-year-old Belgian, German, Scottish, and English Caucasian female presenting with a 22-year history of relapsing MS was readmitted to the hospital with numbing episodes resulting in progressive lower limb weakness, impaired walking, gait imbalance, and fatigue despite pharmaceutical interventions. The patient reported eye impairment, focal weakness and forgetfulness, and additional symptoms of hair loss and inability to lose weight. She also reported long-term exposure to traumatic events and clinical characteristics contributing to reduced quality of life and having a substantial impact on her physical and mental health.

History

During the initial evaluation, the client reported physical and psychological childhood abuse related to living in a religious cult with relatives, having to care for ten siblings, and being abused by other cult male children. She declared that her weight gain began during this time. Shortly after her first intimate relationship, at age 20, she described having corrective eye surgery and the start of hair loss. She then reported the onset of MS, blindness, and a miscarriage one year into marriage. After separation from the religious affiliation, she disclosed continued violent abuse during a 14-year marriage. Throughout this time, the client describes experiencing recurrent episodes of numbness and tingling, as well as ensuing miscarriages. Afterward, she reported that she and her spouse moved back with cult relatives and endured economic abuse

Figure 1. Timeline



related to financial hardship (i.e., restricted use of funds and earned income withholding) in addition to more domestic violence. Thereafter, once again separating from the religious affiliation, she reported a subsequent major car accident, which is when her fatigue began. She then detailed her continued MS episodes during a subsequent divorce. Finally, she revealed moving to a rural area away from relatives and declared that her MS flare-ups ceased. However, she reported experiencing MS flare-ups again after moving back in with relatives a third time.

Clinical Findings

The nutrition-focused physical exam determined the client was overweight from the following anthropometrics: *wt* = 264lbs, *ht* = 68in, *waistline* = 43.3in, and *hip* = 48.4 in, placing her in class 2 obese category and high risk for cardiovascular events. Initial protein intake was 37%, carbohydrates 35%, and fat 27%, however, the reported following meal analysis showed decreased protein and increased saturated fatty acids (SFAs). She further reported a diet with very low amounts of vegetables, void of red meat, daily intake of dairy, and disclosed eating similar meals daily.

Stress Load

On a 1-10 scale, with 10 being severe, the client disclosed a perceived stress level of eight. Initially, the client reported an active lifestyle with a physical activity level of 1.55 (sedentary = 1.2, lightly active = 1.375 moderately active, 5-day minimum 1.55, very Active, endurance = 1.725, and x- active, strength, athletic PA = 1.9) and vigorous high-intensity interval training (HIIT), 5 days a week at 45 minutes per session. However, the client also mentioned experiencing episodes of anxiety when trying to balance intimate and familial relationships, which contributed to her overall stress levels. In addition, she reported a high allostatic load with recurring memories of past traumatic events. She further disclosed being regularly exposed to dirty electricity - man-made electromagnetic fields (EMFs)), which may also be a contributing factor to allostatic load intensity.

Routine Blood Draws

Clinical summary notes revealed the client was previously prescribed vitamin D, vitamin B12, and folic acid during conventional consultation with her primary care provider. Recent hospitalization lab work revealed decreased anion gap, aspartate aminotransferase -white blood count - lymph count and percentage, phosphorus, and carbon dioxide (CO_2) with increased glucose. The client submitted laboratory health records from over the years, in which several low CO_2 levels were noted with regard to the reference range.

Timeline

An intriguing and increasingly recognized finding in clinical practice is the association between adverse childhood events (ACEs), negative life events (NLEs), and the manifestation of MS. This connection is gaining popularity as research highlights the impact of long-term exposure to traumatic events on health disparities. The timeline depicted in Figure 1 is of utmost importance as it illustrates the cumulative effect of these events on the client's health over time. It provides a visual representation of how the client's experiences with ACEs and NLEs have influenced her journey with MS.

Additionally, the timeline demonstrates the relevance of certain integrative therapies in reducing symptoms and numbing episodes. By incorporating these therapies at specific points along the timeline, it becomes evident how they have contributed to the management of the client's condition. This highlights the potential value of integrative

approaches in addressing the complex interplay between traumatic experiences, MS, and symptomatology.

Charting data is a crucial tool for visualizing the impact of integrative interventions. In Figure 2, it is evident that numbing episodes are positively correlated with fatigue levels, pain, and stress. Similarly, Figure 3 shows a positive correlation between perceived stress and weight. However, when considering exercise intensity, the results show contrasting patterns. Exercise intensity was measured on a scale of 0 to 10, where 10 represents vigorous activities such as high-intensity interval training (HIIT), resistance training (RT), or running for at least 45 minutes, five days a week. A score of 5 represents moderate exercises like walking, yoga, stretching, or Pilates for at least 30 minutes, three days a week. A score of 0 represents a sedentary lifestyle with no exercise. The data suggests that reducing exercise intensity is positively correlated with weight reduction and a decrease in perceived stress. However, it is important to note that weight and perceived stress develop a negative correlation when conditions become either too sedentary or too vigorous.

Figure 2. Clinical Data

Clinical Visits and Collected Data

Visit Dates	Type	PA Type	Wt (lbs)	NEs	F	P	S
9/19	MNT	10	264	1	10	9	8
9/30	MNT	10	261	1	9	8	8
10/8	MNT	5	---	0	2	1	2.5
10/15	R	5	254	1	7	4	10
10/22	MNT	5	256	0	1	2.5	1
10/31	R	5	253	0	---	---	---
11/4	R	5	251	0	---	---	---
11/12	MNT	5	254	0	---	---	---
11/18	R	5	253	0	---	---	---
11/25	R	0	247	0	---	---	---
12/2	R	0	249	0	---	---	---
12/9	MNT	0	252	0	3	2.5	5
12/16	MNT	0	256	0	2	3	4
1/7	MNT	---	---	---	---	---	---
2/10	R	2.5	260	0	2	2	3
3/10	R	2.5	264	0	2	2	2

Acronyms: PA, physical activity; Wt, weight; NEs, numbing episodes; FL, fatigue level; PS, pain scale; SL, stress load; MNT, reported during MNT visit; R, reported by client in client portal.

Exercise intensity is measured as 10 = vigorous (i.e. HIIT, RT, running at ≥ 45 min 5 d/wk), 5 = moderate (i.e. walking, yoga, stretching, pilates at = 30 min 3 d/wk), and 0 = sedentary (i.e. none).

Numbing Episodes Correlation

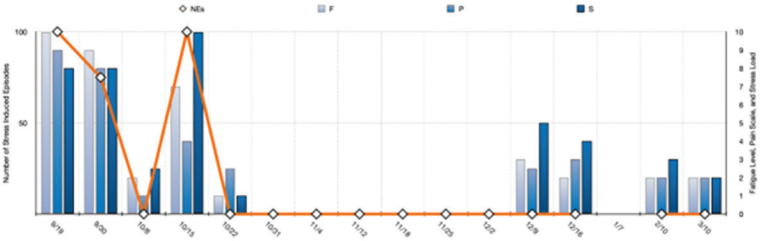
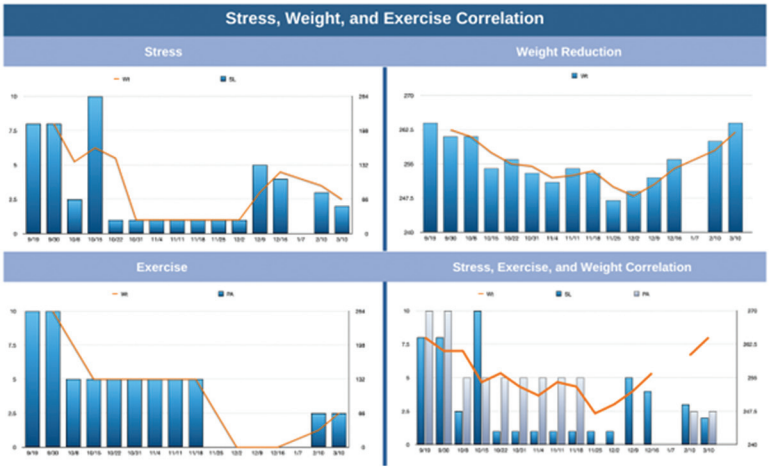


Figure 3. Charted Correlations



Therapeutic Intervention

The clinical findings have identified the primary cause of the disease manifestation as the client's unreadiness for a lifestyle change. This is supported by contributing factors such as continued exposure to NLEs that induce high allostatic load, intake of dairy food components, obesity, and excessive vigorous physical activity. The medical nutrition therapy diagnostic codes associated with these findings include NB 1.3 (not ready for lifestyle change), NI 4.2 (excessive intake of bioactive substances), NC 3.3 (overweight/obesity), and NB 2.2 (excessive physical activity). Based on the nutrition diagnoses, the client was placed on the following recommendations: adoption of the Paleo-style diet, which eliminates dairy, is low in SFAs, and is high in protein, polyunsaturated fatty acids (PUFAs), and monounsaturated fatty acids (MUFAs). Integrative therapies were to seek emotional support by finding a psychologist, reduce exposure to dirty electricity and engage in biofield therapy, minimize exposure to NLEs that induce high allostatic load, and reduce vigorous physical activity to moderate-to-low intensity to balance the benefits of exercise without overexertion. Boswellia herbal supplement was further recommended for its anti-inflammatory properties.

Follow-up and Outcomes

The follow-up with the client began approximately two weeks after the initial consultation. During this follow-up, the client reported experiencing an initial decrease in weight after eliminating dairy from her diet. However, the client also disclosed a recurring numbing

Figure 4. Recommendations and Integrative Treatment Pillars

Recommendation	Number of Times Intervention was Delivered						
	9/19	9/30	10/8	10/22	11/12	12/16	1/7
Eliminate Dairy	✓					✓	
Paleo style diet	✓		✓	✓			
Reduce stress load	✓	✓	✓	✓	✓	✓	✓
Reduce vigorous Exercise	✓		✓			✓	
Increase protein/ amino acids	✓		✓		✓	✓	
Decrease SFAs/Increase PUFAs/MUFAs	✓	✓				✓	
Decrease exposure to dirty electricity and Engage in Biofield therapies	✓				✓	✓	
Compliance		✓				✓	
Intervention Re- Recommended						✓	

Integrative Treatment Pillars

Stress

During acute times of stress, consuming CO2 producing foods such as protein (beef, pork, lamb, coffee, shrimp, crabs, soy beans, rice) and avoiding foods high in SFAs is beneficial.

Exercise

Exercising 3 d/wk performing flexibility and balance movements. For cardio only pursue walking to improve walking gait and reduce fall risk in case episodes occur. Practice exercising large muscle groups prior to small muscle groups.

Biofield Therapy

Engaging in Reiki or use of magnetic pads and avoiding environments with excessive exposure to dirty electricity (i.e. man-made EMFs or modern electrical devices that induce high levels of EMF radiation waves).

episode. To address these issues, the strategies of stress reduction, incorporation of Boswellia (an herbal supplement known for its anti-inflammatory properties), reduction of SFAs, and maintaining compliance with the recommended interventions were continued.

At the second follow-up, the client provided positive updates. The client reported a significant reduction in stress levels, fatigue, and pain scores. Additionally, there were no further occurrences of numbing episodes. These improvements could be attributed to various factors, including the reduction of vigorous exercise and the adoption of moderate exercise intensity. The client was also advised to monitor stressful life events closely, incorporate meat broths (simmered meat) into their diet, and continue following the Paleo dietary approach.

At the third follow-up, the client reported a weight reduction of ten pounds and mentioned avoiding red meat. The client also experienced an increase in stressful events and had another numbing episode before the visit. The client expressed feeling anxious when exposed to family events. As a result, a referral to a psychologist was proposed. During the visit, the client's lab reports were reviewed, and assessments were conducted regarding the current diet, fatigue, stress, pain, and numbing episodes. The client reported low scores in these areas. Further recommendations were made to decrease the number of meals to a normal three meals per day and increase the consumption of colorful fruits and vegetables.

During the fourth follow-up, the client reviewed her lab reports and mentioned a past period of three years when numbing episodes had ceased. The discussion focused on the potential impact of exposure to dirty electricity and the magnetic polarity of the client's geographic location on corticospinal stimulation, as well as the biochemical mechanisms involving CO_2 in relation to numbing episodes. It was recommended that the client maintain an intake of essential proteins and not avoid red meat during acute stress episodes.

At the fifth follow-up, although the client reported engaging in sedentary physical activity and experiencing weight gain, they reported zero episodes of numbness. This noteworthy finding suggests that perceived stress plays a pivotal role in the measured outcomes of MS-related episodes. Moderate exercise, biofield therapy, and ongoing psychology visits were further recommended. The components of the client's diet were revisited, and the importance of compliance was emphasized once again.

Patient Perspective

I have multiple sclerosis and was having relapses. I also was struggling with my weight and was looking for help with nutritional eating. When I met with the nutrition doctor, she went through not only my medical issues but also included my mental and emotional issues. She started with dietary changes. One of my biggest issues was stress and she helped me work through stress reducing exercises, finding ways to reduce stressful situations and practicing meditation to relax. When we met, she would have us do body mind and spirit practices before our visits. These really helped me to get into the mental place I needed to be in. She was able to walk with me through my trauma and helped set me up for success with eventually finding a full-time therapist to work alongside us, something I had put off before. She walked me through how to eat better, nutritional plans, and budgetary ideas in order to help make staying on course possible, walked through stressors that can influence and cause my MS relapses. Things like dirty electricity, where I lived in the country, and lifestyle changes that were causing stress. I have a huge family which is a blessing but being the oldest and around them all the time was extremely stressful. I have since moved away but come back to visit on the regular. Her idea…put the visits into the family budget so that I can see my family ever 3 months to maintain the thing I love so much but I am far enough away to eliminate the large amount of stress. She helped me implement breathing exercises, food planning, stress reduction techniques and these have stayed with me and have created a new successful lifestyle for me. I am extremely grateful.

Discussion

Ancestry, Heredity, and Genetic Factors

The client's antecedents were of Belgian, German, Scottish, and English ancestry. In a European systematic review, the highest population estimates of MS were reported to be in Scotland, Ireland, Scandinavia, and Italy

at an average occurrence of ≥200/100 000, Belgium at 80-90/100 000, and Germany at 128/100 000.[3] Of 123 studies, the British Isles was the most studied area and MS was found to be more prevalent in German women than men.[3] It is hypothesized that this client may have an increased genetic susceptibility as a result of ethnic ancestry.

Traumatic Stress

This case report highlights a client with long-term exposure to traumatic experiences and a 22-year history of MS looking for an integrative approach to assist with the reduction of numbing episodes and allostatic load. Previous research has indicated that psychological trauma often precedes the onset of MS, as these patients are documented to experience higher levels of life stress.[2] It is believed that this association may be due to the perception that psychological trauma is viewed as an NLE, with the frequency of relapses increasing in response to heightened exposure to stressful events.[2] A recent systematic review has highlighted that children exposed to ACEs face an increased risk of developing MS, and risk continues to rise with prolonged exposure.[4] In this particular case, the client disclosed a lengthy history of complex NLEs, originating during childhood. During the initial 30-day treatment, the client reported experiencing three numbing episodes, each following a perceived stress level of 7 to 10. It is well-documented that stress reduction plays a beneficial role in MS interventions.[5,6] By adopting lifestyle techniques, developing emotional coping skills, and reducing exposure to environmental stressors, the client reported a reduction in numbing episodes and a lower perceived stress score.

Carbon Dioxide

The client submitted several laboratory results obtained during numbing episodes, which showed low levels of CO_2 and anion gap reference ranges. It is known that during episodes of MS, neuromuscular malfunctions can occur, and low CO_2 levels have been associated with such malfunctions.[7] Additionally, decreased CO_2 levels have been linked to hyperventilation,[8] which can be triggered by anxiety, stress, or panic disorders.[8] Controlled studies have documented that hyperventilation-induced low CO_2 level not only impairs neuromuscular function but also induce fatigue, reduces cerebral blood flow, and lowers cardiac end-tidal carbon dioxide levels, ultimately increasing corticospinal excitability.[7] Furthermore, research has indicated that prolonged exercise inhibits arterial partial CO_2.[7] The client reported anxiety, high levels of perceived stress during acute numbing episodes, and engaging in excessive physical activity. Therefore, implementing dietary changes and practicing proper breathing exercises to replenish CO_2 levels may prove beneficial. As part of the current intervention for the client, the inclusion of CO_2-producing foods such as protein-rich sources (e.g., meats and legumes) during episodes of acute stress was recommended, along with the reduction of vigorous physical activity to moderate intensity levels.

Electromagnetic Fields

This client, who originally resided in Wisconsin, has ancestral heritage from England, Scotland, Belgium, and Germany. Interestingly, these regions are geographically close to the zero agonic line of magnetic declination. It has been reported that the highest risk of MS diagnosis is associated with these specific geographical areas.[3] Furthermore, it is worth noting that dirty electricity has been indirectly linked to MS susceptibility.[9] Studies have shown that local applications of magnetic field stimulation (MFS) to the human cortex can modulate cortical excitability.[10,11] When MSF is applied over the cervical spinal cord, it has been found to decrease excitation,[10] and alleviate synaptic alterations associated with MS, such as demyelination and neuronal loss.[11] Additionally, stress hormones synthesized as a result of psychological trauma or habitual high-intensity physical activity have the potential to induce corticospinal excitability.[12] Therefore, the combination of factors including exposure to trauma, excess physical activity, dirty electricity, and residing in geographical areas near the zero agonic line may create an environment that is conducive to developing MS. Interestingly, the client reported a period of three years during which her MS episodes ceased after moving to a rural area near the 10 agonic line. This observation suggests that seeking biofield therapy and residing in areas with lower perceived stress levels, which may exhibit different earth magnetic fields, could potentially decrease corticospinal excitability and lead to a reduction in numbing episodes.

Dairy

Research has shown a positive correlation between the consumption of dairy products and MS.[13] In the case of this client, she reported frequent consumption of dairy before the start of the nutritional intervention. However, bivariate analysis suggests removal of dairy from the diet can improve quality of life and a reduction of levels of disability.[14] Interestingly, implementation of Paleo dietary methods has been positively associated with metabolic changes in patients with MS.[6] Considering this, the client was advised to adhere to a Paleo-style diet as a part of the intervention. By eliminating dairy products and adopting a Paleo-style diet, the client may experience potential benefits such as improved quality of life and a reduction in disability levels associated with MS.

Macronutrients

In patients with MS, higher intakes of SFA and carbohydrates have been associated with increased relapse rates.[5,6] Researchers have suggested that decreasing the

consumption of high SFAs and carbohydrates while increasing the intake of omega-3 FAs and protein, can positively impact neuronal health and reduce fatigue.[5,6] The nutritional changes can also have implications for neuronal functions related to psychological trauma. Specifically, they can improve functioning in the prefrontal cortex and amygdala, which are involved in the processing of emotional memories and the reduction of fear responses.[15] Additionally, specific amino acids (i.e., glutamate, γ-aminobutyric acid [GABA], and beta-alanine) can help preserve functioning and improve the regulation of memory related to sequences of events within the dentate gyrus–CA3 region of the hippocampus.[16] Based on these findings, the client was recommended to adhere to a dietary approach that emphasizes high protein, low SFA, and high PUFA/MUFA intake. This dietary pattern aims to provide the necessary nutrients for promoting neuronal health, reducing fatigue, and improving memory regulation.

Availability of Data Materials
Data materials are available upon request.

Ethics Approval and Patient Consent
IRB approval is not required for case reports. Signed informed consent was obtained and is on file.

Author Disclosure Statement
The author serves as a board member of True Paleo Inc., an organization that offers free consumer resources on Paleolithic dieting methods, derived from peer-reviewed sources and the organization's extensive research. True Paleo Inc. also owns EatitUP™ Research League, a subsidiary focused on investigating the impact of the Paleolithic diet on populations with specific diseases. It should be noted that while some case reports published by True Paleo Inc. may have utilized the Paleo diet as a personalized prescription for supportive interventions, not all case reports followed this approach.

The author approved the final case report as submitted and signed informed consent for publication was obtained and is on file.

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JBH conducted the initial proposal of the case report, acquired data, performed data analysis and literature reviews, authored the manuscript, created case intervention, prepared materials, and created figures and tables.

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References

1. Tafti D, Ehsan M, Xixis KL. *Multiple Sclerosis*. StatPearls Publishing; 2022. https://www.ncbi.nlm.nih.gov/books/NBK499849/
2. Martinelli V. Trauma, stress and multiple sclerosis. *Neurol Sci*. 2000;21(4)(suppl 2):S849-S852. doi:10.1007/s100720070024
3. Kingwell E, Marriott JJ, Jetté N, et al. Incidence and prevalence of multiple sclerosis in Europe: a systematic review. *BMC Neurol*. 2013;13(1):128. doi:10.1186/1471-2377-13-128
4. Polick CS, Polick SR, Stoddard SA. Relationships between childhood trauma and multiple sclerosis: A systematic review. *J Psychosom Res*. 2022;160:110981. doi:10.1016/j.jpsychores.2022.110981
5. Fellows Maxwell K, Wahls T, Browne RW, et al. Lipid profile is associated with decreased fatigue in individuals with progressive multiple sclerosis following a diet-based intervention: results from a pilot study. *PLoS One*. 2019;14(6):e0218075. doi:10.1371/journal.pone.0218075
6. Titcomb TJ, Bisht B, Moore DD III, et al. Eating Pattern and Nutritional Risks among People with Multiple Sclerosis Following a Modified Paleolithic Diet. *Nutrients*. 2020;12(6):1844. doi:10.3390/nu12061844
7. Hartley GL, Watson CL, Ainslie PN, et al. Corticospinal excitability is associated with hypocapnia but not changes in cerebral blood flow. *J Physiol*. 2016;594(12):3423-3437. doi:10.1113/JP271914
8. Sharma S, Hashmi MF. *Hypocarbia*. StatPearls Publishing; 2022. https://www.ncbi.nlm.nih.gov/books/NBK493167/
9. Khaki-Khatibi F, Nourazarian A, Ahmadi F, et al. Relationship between the use of electronic devices and susceptibility to multiple sclerosis. *Cogn Neurodyn*. 2019;13(3):287-292. doi:10.1007/s11571-019-09524-1
10. Nakagawa K, Nakazawa K. Static magnetic field stimulation applied over the cervical spinal cord can decrease corticospinal excitability in finger muscle. *Clin Neurophysiol Pract*. 2018;3:49-53. doi:10.1016/j.cnp.2018.02.001
11. Stampanoni Bassi M, Buttari F, Gilio L, et al. Inflammation and Corticospinal Functioning in Multiple Sclerosis: A TMS Perspective. *Front Neurol*. 2020;11:566. doi:10.3389/fneur.2020.00566
12. Centonze D, Palmieri MG, Boffa L, et al. Cortical hyperexcitability in post-traumatic stress disorder secondary to minor accidental head trauma: a neurophysiologic study. *J Psychiatry Neurosci*. 2005;30(2):127-132.
13. Malosse D, Perron H, Sasco A, Seigneurin JM. Correlation between milk and dairy product consumption and multiple sclerosis prevalence: a worldwide study. *Neuroepidemiology*. 1992;11(4-6):304-312. doi:10.1159/000110946
14. Hadgkiss EJ, Jelinek GA, Weiland TJ, Pereira NG, Marck CH, van der Meer DM. The association of diet with quality of life, disability, and relapse rate in an international sample of people with multiple sclerosis. *Nutr Neurosci*. 2015;18(3):125-136. doi:10.1179/1476830514Y.0000000117
15. Kalyan-Masih P, Vega-Torres JD, Miles C, et al. Western High-Fat Diet Consumption during Adolescence Increases Susceptibility to Traumatic Stress while Selectively Disrupting Hippocampal and Ventricular Volumes. *eNeuro*. 2016;3(5):ENEURO.0125-16.2016. doi:10.1523/ENEURO.0125-16.2016
16. Knox D, Perrine SA, George SA, Galloway MP, Liberzon I. Single prolonged stress decreases glutamate, glutamine, and creatine concentrations in the rat medial prefrontal cortex. *Neurosci Lett*. 2010;480(1):16-20. doi:10.1016/j.neulet.2010.05.052