



# **New Year, Still Me: Turning Simple and Realistic Resolutions into Habits**

Presented by:  
**Augusto Miravalle, MD, FAAN**

## **Yahaira Rivera:**

Hi. Good evening, everyone. Welcome and thank you for joining MSAA's live webinar New Year, Still Me: Turning Simple and Realistic Resolutions into Healthy Habits, presented by MS specialist Dr. Augusto Miravalle. My name is Yahaira Rivera and I'm the Director of Mission Delivery and Program Development for MSAA and your host for the program this evening. Before we get started, I would like to take this opportunity to give you some background information about MSAA and share some reminders.

As you may know, MSAA is a national nonprofit organization dedicated to improving lives today through vital services and support for the entire MS community. Our services include a national helpline providing English and Spanish services Monday through Friday, 8:30 a.m. to 8 p.m. Eastern Time. Equipment and cooling distribution programs with products designed to improve safety and mobility and to help with heat sensitivity. An MRI access fund for individuals with MS who qualify for assistance. We also have educational programs, online tools, publications and digital resources, and we offer support through community connection to help you stay connected with other members of the MS community. All of our programs are available to people living with MS nationwide. To learn more about MSAA's programs and services, please visit our website, [mysaa.org](http://mysaa.org) or give us a phone call. And don't forget to follow us on social media.

During tonight's program, you will have the opportunity to ask questions by typing them into the chat box or by using the Q&A tool. We are going to do our best to answer your questions during the Q&A portion of tonight's webinar. At the end of the program, we ask that you please complete a brief survey that will appear on your screen. Your feedback is extremely important and will help us in developing future programming and content. A link to the survey will also be available in the chat box. Also, please note that this program will be recorded and will be made available on demand on the MSAA MSi website in the upcoming weeks. As a friendly note, this program is for informational and educational purposes only and does not constitute any formal recommendations. Please speak with your doctor or healthcare provider if you have any questions or concerns.

Now, without further ado, I would like to introduce you to our speaker this evening. We are extremely grateful to have Dr. Miravalle with us tonight presenting on our topic of resolutions.

Dr. Miravalle is a board certified neurologist who specializes in MS and he is an Associate Professor of Clinical Neurology at the University of Colorado, Director of Advanced Science Course and Neuroscience at the Fort Collins Branch, Co-Director of Medicine Education at Alpine Trail and Co-Founder of The Brain Center of the Rockies. Dr. Miravalle received his medical degree from the University of La Plata in Argentina. He completed his Neurology Residency training at Loyola University in Chicago, where he served as Chief Resident of Education. He subsequently completed a Neuroimmunology Fellowship at Harvard University in Boston, Massachusetts, and a Fellowship in Medical Education at the University of Rochester, New York. Dr. Miravalle has published numerous scientific articles and has been involved in both clinical and science-based research in the field of MS. He is a recipient of multiple research and educational works, and he currently serves as a member of a patient-advocacy advisory board. Dr. Miravalle enjoys sharing his love for the outdoors and nature with his family and with his patients. Welcome, Dr. Miravalle. We are looking forward to your presentation and learning how people living with MS can manage their resolutions and turn them into healthy habits. Welcome and thank you for being here with us tonight.

### **Dr. Augusto Miravalle:**

Thank you very much, Yahaira. It is truly an honor and a pleasure being invited to present the first webinar, I believe, of MSAA for the year and what an important topic. I always believe that this is a time of year for reflection, a time of the year that we always try to create goals and motivate us to become better in some aspect of our lives. And what I would like to share with you are some tips and resources that I find to be very helpful, and particularly for those living with multiple sclerosis.

So before we start, let's go to the next slide, please. And I would like to share what I believe are the main pillars that constitute important aspects that will determine the likelihood of someone accomplishing brain health. And why brain health? Well, we all know that MS is a disease that affects the central nervous system and the brain and the spinal cord and the optic nerves are peripherally involved. And we've been, in a sense, advocating for brain health for multiple sclerosis for many years, but most recently, that is becoming an area that we finally start to learn more about and learn from scientific research that is allowing us to understand what else can we do to help someone with multiple sclerosis beyond the use of disease modifying therapies, which we all recognize are important as part of the algorithm of care. But there are many other aspects of care that always we try to emphasize that are equally important.

Among those, lifestyle is very important. We are what we eat, right? I mean, I think that concept is valuable for multiple sclerosis as well, we know that nutritional strategies can have a profound impact in clinical outcomes in someone with multiple sclerosis. But also there are other aspects of our lifestyle that perhaps have an important role, for example, the use of a certain medications, side effects from medications, smoking, are important aspects that will affect in a negative way, in this case, our brain health. We also know that certain co-morbidities that patients have may also impact their clinical outcomes in multiple sclerosis and ultimately brain health. The most common ones are, for example, hypertension, high cholesterol, diabetes, having obesity. Those are factors that will negatively impact multiple sclerosis and brain health if they are not properly controlled.

Our genes will determine many things and whether it's our genetic ancestry, but also our race and ethnicity are factors that are going to directly affect brain health. As an example, we know that Hispanics and Latinos, for example, have a 1.5 higher chance of developing Alzheimer's and other neurodegenerative disorders when compared to Caucasians, for example. So there are clear differences among different races that will determine certain risk for brain health. In

MS, particularly, we know that the risk of developing MS is lower in Hispanics and Latinos. However, the clinical outcomes sometimes are worse, particularly the higher predisposition of having a spinal cord disease that leads to more, a higher accumulation of disability in that ethnic group.

Of course, access to health care, right? I mean, we can have wonderful resources, we can have state of the art facilities, but if patients can't access those facilities due to restrictions, of course they are going to have a profound negative impact in their abilities to accomplish brain health. Certain environmental factors. We also continue to learn whether these toxins in the environment, air pollution, will have also a negative impact. And last but not least, what we are doing today, improving education in our patients, bringing this information to our patients in ways that they can access, they can understand, is culturally appropriate and ultimately improving healthcare literacy so patients can truly be empowered through education to take action and be at the center of their care. Let's go to the next slide.

So I would like to focus today on areas of lifestyle that I believe patients can do and is accessible to anyone and there are common aspects that are usually included in the New Year's resolution. Let's go to the next slide. So the common pillars in the so-called lifestyle interventions in multiple sclerosis often include nutritional aspects, behavioral aspects, music and exercise. And perhaps you're surprised that I included music. Up until recently, music was not an aspect of our health care algorithm, but most recently we are starting to learn that actually music has a profound effect on brain health. And I will end today's presentation by giving you some practical tips in how you can actually help yourself to accomplish those goals that you have established perhaps in the last few weeks. Let's go to the next slide.

In terms of nutrition, there's a lot of information. We have been blessed to have so much information coming from well established scientific studies that are trying to understand that relationship between what we eat and how that will affect not only clinical outcomes in MS, but also secondary organs, that up until recently we have not paid attention. There's a lot of interest in the so-called gut microbiome and how certain colonies of bacteria may affect immune responses peripherally and how that may have a profound effect in central immune responses. We also learned recently that the Mediterranean diet has the strongest evidence that supports a positive effect on brain health. That diet is very common in certain parts of the world. Of course, in southern Europe, but also in certain countries in South America and Central America. It's primarily based on a high content of vegetables, fruits, grains and to a lesser degree, proteins coming from animals. And if you choose to eat animal based proteins, it's recommended that you stay away from trans fats and red meats and preferentially you try to increase the content of fish as well as white meats.

We also know that saturated fats promote innate immune system responses through the activation of pro-inflammatory toll-like receptors that have a profound effect in inflammation in the brain. And last but not least, we are recently learning that the content of salt or high sodium in diet is associated with pro-inflammatory responses for certain cells, including your T-helper 1 and T-helper 17, which are known to be pro-inflammatory multiple sclerosis. And these studies have suggested that levels of sodium that are higher than two grams per day have a profound effect on inflammation. So those are small things you can do, but has a very strong effect on your abilities to accomplish brain health. It's been well established now for a decade or more that Vitamin D levels have also a relationship with immune responses in multiple sclerosis, where lower levels of vitamin D have been associated with higher levels of inflammation as well as higher levels of vitamin D has direct anti-inflammatory responses and to some degree a positive effect of certain clinical outcomes.

As we know in medicine from many other fields, smoking is not good for your health and MS is not an exception. We know that the risk of MS is higher in smokers and could be as high as 50% when compared to non smokers. We also know that individuals who have multiple sclerosis, when they smoke, they are at a higher risk of developing clinical and MRI activity. We know that smoking has a direct effect on demyelination, on disruption of the blood brain barrier, as well as increased levels of nitric oxide and metabolites that has been linked to further inflammation as well as an impairability to remyelinate and protect the brain. So that's another practical way, if you're currently smoking, that could be a very nice, positive New Year's resolution that you can establish to set a goal and stop smoking before the end of the year. Let's go to the next slide.

I would like to dive a little bit deeper into an area that is increasingly important in multiple sclerosis, and it's been recognized as perhaps one of the strongest non-pharmacological interventions that has a profound impact on brain health. We've always been interested in the relationship between exercise and the brain, but for those of you who are older, you may remember that back in the 80s and 90s, perhaps your neurologist, if you had MS, would have told you you should not exercise. And that concept came from the knowledge that when someone with multiple sclerosis exercised it increased their body temperature and they may feel worse. And that's a well-established phenomenon called the Uhthoff Phenomenon, that says that whenever there is presence of demyelination in the brain, increasing body temperature may lead to certain symptoms. That does not mean that a patient's multiple sclerosis will get worse. And what we learned in the last few decades is actually the contrary. We know that exercise is beneficial for MS, and not only directly linked to MRI and brain related outcomes, but also exercise is beneficial for other systems in your body. Among those, we know that exercise has a positive effect on immune responses, the endocrine system, of course the cardiovascular system, we have well established, now, evidence that exercise decreases the risk of heart disease and hypertension and also diabetes, which are comorbidities that often are linked to worse clinical outcomes in multiple sclerosis. But also exercise helps with your bones, with your connective tissue, with your muscles, which are secondary consequences of MS, often, patients present with joint pain, spasticity or muscle weakness. Exercise has a direct effect on immunoregulations as well as on neuroprotection, both in the central nervous system as well as the peripheral nervous system. Let's go to the next slide.

This is a group of studies that have looked into the direct effect of exercise in certain clinical outcomes in patients with multiple sclerosis. And as you can see in the graphs, all these dots that are represented here, are looking at the overall outcome. And those dots that are on the right side of the bar, of the vertical bar, favors exercise. Whereas those dots that actually cross the bar on the left side, on the top of this slide, favors control. When you go to the bottom of this slide, the graph is inverted. So those dots that actually are on the left side favor exercise, where those who are on the right side, favor control. And you can see that in all studies that are included in this meta-analysis, exercise had a profound positive effect in any outcomes that they looked at, including weakness, cognitive dysfunction, walking difficulty, pain, fatigue and depression. And these studies looked at different types of exercise. And I will explain that in a minute, that different types of exercise will give you different benefits depending on what you're looking to accomplish. Let's go to the next slide, please.

Perhaps you are familiar with a term NEDA, and that's an acronym that stands for No Evidence of Disease Activity. And that is a pretty helpful, kind of like, a goal to discuss with patients to establish a priority, what are the expectations of care. So I often use NEDA as a way to establish parameters saying how do we know that whatever intervention we establish for your

multiple sclerosis is going to lead to the expectations that you have? And NEDA has different iterations, different versions. The traditional NEDA was established almost a decade ago, which was the composite of no evidence of disease activity based on no relapses and no disability progression and no MRI activity. From then on, we have different versions of NEDA that added different outcomes, including blood based biomarkers, like NfL, MRI based biomarkers like lesion activity, but also brain volume loss. And the last versions, also known as NEDA 6, also include a cognitive impairment measure by neuropsychological testing. As you can see in this graph, all these studies looking at the exercise effect on different versions of NEDA showed, for the most part, either a benefit, as depicted here by those vertical green arrows, or perhaps no effect. But there was no study that showed a negative effect on any of these outcomes that were measured. Let's go to the next slide, please.

So the question is how much exercise and is there any dose effect? That means if exercise is good, if I do more, is that going to be better? And that is a very challenging question to answer, particularly when you look at a group of patients that perhaps may have different baseline training or endurance or exercise abilities. And this study tried to look at the efficacy of high intensity aerobic exercise and brain MRI measurements. And unfortunately, they did not find a lot of benefit or difference between doing regular exercise versus doing high intensity exercise, which for the purpose of this study was defined as reaching at least 70% of your maximal heart rate based on age. However, these studies show that those individuals who enroll into the high intensity aerobic exercise had a significantly lower rate of relapses. As you can see here, those who had exercise as high intensity had zero relapses versus an annualized relapse rate of 0.45, which when you look at these differences and you compare to, for example, what we see with certain pharmacological interventions in clinical research, is not that different, suggesting that actually a high intensity exercise may have a profound effect on analyzed relapse rate. Let's go to the next slide, please.

This is another group of studies that looked at the difference between resistance training, meaning weights, for example, versus a high intensity aerobic exercise in different measurements. And you can see that there was a trend that suggested that these resistance training or weights, lifting weights, for example, had a benefit on the brain volume change compared to those who actually did not engage into resistance training. The difference was not as clear when you look at the efficacy of high intensity aerobic exercise in MRI measurements. Let's go to the next slide, please.

This is another group of studies, and I included the references for those who want to learn more about this, that looked at other outcomes, not just MRI. Let's look at cognition, for example, and whether it is memory and learning, whether it's information processing speed, which is one of those domains of cognition that is often very early on affected with multiple sclerosis as well as attention and concentration. All of those domains of cognition had a benefit when a patient did either aerobic training or weightlifting. The area of executive function was not, at least in this study, seemed to have an effect depending on the type of exercise that patients actually engaged. But as you can see here, there are many domains of cognition that had a positive response in those patients who actually engage into any type of exercise. Let's go to the next slide, please.

And this is another NEDA analysis looking at different dimensions. And you can see that for the most part, there are benefits or at least a trend towards benefit of exercise in patients with multiple sclerosis who had cognitive decline. And I believe I have one more slide coming on exercise, which is this theoretical model of what... do we need to wait until we are in trouble to exercise? Do we need to wait to do physical therapy until, let's say I have a relapse or I have a

problem to fix, or can I proactively engage into exercise activities before I get into trouble? And the answer, of course, as you can imagine, is no, you don't need to wait. The earlier you start your physical activity, the earlier you start your routine of exercises, the better the benefit. And here in these curves, you can see a theoretical model, such as that in the black line at the bottom, there will be a patient with multiple sclerosis that decides not to intervene with any type of exercise. And you anticipate that that patient is going to accumulate disability and have a significant drop in the functional and neurological reserve as time progresses and disease progresses. However, that individual on the top, on the dotted red line, that decides to have medical treatment for multiple sclerosis, plus a proactive early exercise routine is expected to have a significant lower accumulation of disability over time. At times, that curve is similar to what we anticipate and expect by just simply normal aging. Let's go to the next slide, please.

Very often patients want to know what type of exercise, how much should I do? And is aerobic better than weightlifting? As I mentioned before in the slides, well, we are still trying to learn that, and the recommendation is of course, talk to your doctor and most likely your doctor is going to recommend that you discuss this with a physical therapist, someone that is actually trained and understands the importance of exercise, but also can do a formal assessment of your functional capacity, of any potential disability that you may have from your multiple sclerosis. And that person can tailor your exercise routine to your needs and your expectations. Having said that, there are publications now that this group of experts in exercise in multiple sclerosis came together and developed these guidelines, and those serve as, as the name implies, as general guides that actually are important to keep in mind. But as I said before, we always advocate for patient-centric activities. So ideally you should have that tailored to your needs. When you look at these guidelines, they are grouped into three tiers and those are based on disability. So on the top you have patients with minimal accumulation of disability and the recommendation is that those individuals should follow some degree of routine that includes aerobic exercise 2 to 3 times per week, at least 20 to 30 minutes at a time, as well as some degree of resistance training with weightlifting a couple of times a week, as well as what is called neuromotor training, which is any type of activity that includes multiple modalities of exercise, usually it's yoga, or Pilates, or Tai chi, or whatever you enjoy. And you can see that depending on the level of disability, the recommendations may vary and may be different. So let's go to the next slide now.

So now we are going to shift gears and we are going to go from a pure motor activity, which is exercise, to a mixed or hybrid activity, as I like to call it, which is music. Music is not only a cognitive science, but also music includes movement, particularly if you perform or if you choose to dance to music. So this is an area of personal interest and something that every time I read a new article, I learn something new. And I'm glad to see that the field of neurology and brain health is moving towards a model in which it's incorporating music as one of the non-pharmacological strategies that has a profound effect on the ability of the brain to regenerate and become healthier. So let's go to the next slide.

So what are the health benefits of music? Is it something new? Well, no, it is not. And you can see one of the quotes, my favorite quotes, from Plato that said "I would teach children music, physics and philosophy; but most importantly music, for the patterns in music and all the arts are the key to learning." And he understood very early on that music is more than just something to listen in the background. Music is a language. Music is a way of communicating, and music, most importantly, will activate every part of your brain. Let's go to the next slide, please.

There is a process in the brain, a phenomenon called neuronal plasticity, and neuronal plasticity is the ability of the brain to adapt and adjust to different circumstances, it could be triggered by intrinsic factors or could be triggered by extrinsic factors. The brain is an extremely plastic organ, what that means is that the brain is going to adapt to different circumstances, that's how we can learn things. Every time we are learning something new, what we are doing is training different parts of the brain to become more specialized in whatever skill we are actually incorporating. When you're learning a new language, you are training those cells, those neurons in the language areas to become more proficient in the new language that you are trying to do. And when you are trying to remember, you're making those connections a little faster and more efficient. So every time we learn something, we do something new, we are training our brain to become super specialized. And music is one of those activities that actually has been shown to enhance the ability of the brain to adapt, enhance neuronal plasticity, and most importantly, create functional and structural changes in the brain. We also know that music is an activity that can activate, modulate, signaling certain areas of the brain, the neurotransmitters, those chemicals that are involved in the brain that has a profound impact in our emotional processing, cognitive flexibility, attention, reward, and motivation. Let's go to the next slide.

Let's dive a little bit deeper in this concept of the chemicals in the brain and music. It's been shown that listening and playing music reduces a chronic stress hormone called cortisol. And I think we all can get our head around that, I mean, when you had a bad day and you're stressed and you need to decompress, one of the things we do is just put music and that has an immediate effect in how you're dealing with your stress. This effect has been studied in the ICU, or the critical care units, in patients that are in coma or intubated. When you play music, you can see that their levels of blood pressure significantly go down. I used to run the Spinal Tap Clinic, I should say, when I worked in the University of Colorado, and one of the things that we did is play music and you will be amazed that patients that were undergoing spinal taps, they had a profound effect by distracting themselves with music. That was a typical question that we'll ask our patients - "Would you like some music with your Spinal tap?" I can tell you that nine out of ten patients will say, Yes, please. We know that listening to music increases a neurotransmitter called dopamine. Dopamine is a molecule in the brain known as the motivation molecule. And when you need more energy or reward systems, your brain is going to boost dopamine to help you accomplish what you want to do. And of course, playing music with others or sharing the experience of music by listening to music with others or going to a concert together, it's going to stimulate another chemical called oxytocin. This is also known as the love drug, and I think we all experience that situation in which going to a concert with friends is ten times better than going to a concert alone. Let's go to the next slide.

But how do we know this? Is this just some sort of magical science that we are trying to put in people's brain? No, this is far from it. And we are now starting to actually quantify this area in medicine that finally is giving us ways to actually understand the effect of music on the brain. And there is a type of imaging study called PET or positron emission tomography that is a wonderful technique that allows us to measure these chemical changes in the brain. And when you do PET scans looking at dopamine, for example, you can see that there is an immediate response when listening to whether it is familiar music or some sort of novel music, and the type of music that you have, whether you knew that music from before or it's new, may activate different areas. But the music, whether it is new or not, it's going to increase the levels of dopamine in almost a dose effect that is immediate in the brain. Let's go to the next slide, please.

So a question that I often get from patients when I talk about music is does the type of music matter? Because I like classical music, but my kids are now listening to pop music, rap, or

whatever it is. Well, I used to think that the music, the type of music, mattered, because I'm biased and I think that the music I like is the best music, but science is telling us otherwise. The type of music does not matter, whether you come from a different country or have a different cultural background, you may like different types of music and you don't have to change that. If you want to include music in your life, just do that and listen to the music you like. You have to enjoy what you're listening to and in order to get all the benefits of music and the brain, it has to be the type of music that you're more familiar with and you like. Let's go to the next slide, please.

So as I mentioned before, we are starting to learn more about this, and I'm glad to see that in the last decade we had a significant increase in the number of publications that looked at musical interventions in multiple sclerosis. And you can see that music has been used in not only to improve, for example, depression or improve mood in patients with MS, but also improved dexterity by using keyboard instruments. So music therapy is usually, what they do is work with patients to improve motor and non-motor functions by using different strategies that are linked to music. Let's go to the next slide, please.

There were multiple randomized controlled trials looking at music and the brain, and for the most part, those studies supported the effectiveness of musical interventions in improving mood, depression, quality of life, functional recovery from a relapse, as well as neuromotor performance. And it's been well established in, for example, Parkinson's disease, that patients, when they walk to music, they can actually walk better, faster and have less balance issues. Let's go to the next slide, please.

And another question about dose effect. More is better. And in this case, the answer is yes. So when you look at, for example, musicians, those individuals that proficiently play music and they're listening to and performing music for many hours a day, studies have shown that musicians have bigger brains, they are better connected and they're more sensitive. Their brains are more symmetrical, in particular in those who actually use both hands to perform. Areas of the brain responsible for motor control, auditory processing and spatial coordination are larger. This is fascinating and interesting, particularly for those with MS. Musicians have a larger corpus callosum. The corpus callosum is that structure in the brain that connects the right side to the left side. It's a key component of the brain. All the fibers going from the right hemisphere to the left and vice versa, most of those go through the corpus callosum, and MS likes to affect the corpus callosum, one of the most popular areas of lesions in MS is the corpus callosum. And it's fascinating to see that musicians, by doing this constant training have larger and healthier corpus callosum. We also know that you don't have to be a musician to benefit from music. On average, we are exposed to 32 hours per week and that's kind of like the number that has been studied in clinical trials. Looking at how many hours of intervention. Well, even though it's very variable among trials, you can look at the number of hours usually included, it's around 30 hours per week. Let's go to the next slide.

And just to wrap things up with music and the brain, and I can talk for hours if you let me, but I will try to be brief today, we know that music also protects against the effects of memory problems and cognitive decline in individuals with different neurological disorders. MS and dementia, perhaps, are the ones that have been studied the most. We know that seniors that have a musical background score higher on cognitive tests and is now one of those cognitive pre-morbid activities that have been linked to a lower risk of developing dementia. And also we know that listening to music has been shown to significantly improve working memory in older adults.

So to finish today's presentation, I want to introduce you to a program, and MSAA has wonderful programs, but this is one of those, the MS Brain Health Program is organized by the Brain Health Center of the Rockies, an organization that my wife Cathy and I founded a couple of years ago. And this is something that is available to any patient at no cost. It's currently being offered on Zoom and it's three weeks in duration, two days per week. And through this program, we are hoping to offer patients the exposure to education but also present different speakers that have different expertise in different areas related to brain health, including exercise, occupational therapy, physical therapy music therapy, nutrition, neuropsychology and of course, any aspects related to neurology and brain health. Let's go to the next slide. The strategy is being designed around a well established principle in medical education that it's, kind of, targeting old, sort of, learners, whether you're an auditory learner, a visual learner, or kinesthetic learner, the one that you need to do things in order to learn. This program tries to target all of those. Our outcomes have been recently presented at ECTRIMS and show that 97% and 94% of patients feel more educated, more confident and have improved health care literacy at the end of this program. Let's go to the next slide.

And as I mentioned before, the design is innovative in the way that allows patients to have different ways and approaches to learn. And we use a model called the flipped classroom model, in which patients are exposed to videos that they can watch prior to the sessions. After those videos, patients are enrolled into live sessions, and those live sessions allow them to debrief, ask questions and, kind of like, compare notes with our patients. And we also offer longitudinal programs called the Research Club and like programs called the Brain Health Fair. Let's go to the next slide. And this is an example of the curriculum in which every day has different topics. And actually patients can choose the different modules that they're going to watch prior to the live sessions and then bring the questions. Let's go to the next slide. These are examples of the online modules and let's go to the next slide, please. And these are the outcomes. And as I mentioned before, most patients actually score higher at the end of the program when compared to things like, for example, understanding brain research, overall knowledge in multiple sclerosis and being educated to make decisions. Let's go to the next slide and we can skip this one and go to the next one in the interest of time.

So where do we start? So I hopefully by the end of today, I gave you some summary of the data and the research data that came out related to the benefits of exercise, music, and some nutritional strategies. I presented to you an example of a program, the Brain Health Program organized by the Brain Health Center of the Rockies that you can enroll and you can get educated and get more tools, but you don't need to do that. Anyone can do this today. You can start today with a plan. So where do we start? Let's go to the next slide. So I always remind patients and students that whenever you set goals, it's always good to have some degree of framework to make sure that those goals are realistic. And one of my favorite frameworks is called the SMART goals. And that gives you a sense of, you know, how do we set those goals? Well, first of all, the goals have to be specific. You need to be clear to yourself what is it you want to accomplish? And I always recommend to write it down and you will be surprised that whenever you write down your goals, your likelihood of accomplishing those goals are going to be significantly higher than if you just simply think about them.

Your goals have to be measurable. You have to have the ability to use metrics or data to measure whether you are accomplishing that goal or not. For example, I'm going to give you an example, a goal will be I'm going to lose 10 pounds by the end of June. So that way you have something that you can measure, it's your weight, and it's specific. And you have some degree of timeline. It has to be achievable. You have to be able to do that. Try to make goals that are realistic. It also has to be relevant. It has to be important to you. If that goal is not important to

you, perhaps you will not accomplish that. As an example, If you have multiple sclerosis and you want to create goals, well, try to make them linked to areas that are being known to improve brain health. So it's something that you feel that has some purpose or meaning to you. And last but not least, as I mentioned before, it has to be time-bound, and create some degree of timeline that will allow you to check periodically on whether you're accomplishing the goals and have a goal, have something to look forward to that will allow you to know if you are on the right track or you need some help. Let's go to the next slide.

A model that actually I find to be helpful and perhaps relevant to today's talk has been a model established by Dave Brailsford. He was a professional biker, and he was hired to become the national lead coach for the biking team in England. And he brought something called the Marginal Gains. And the whole principle came from the idea that if you broke down every component that is included in biking and you improve every component by 1%, you will have significantly better results than if you tried to accomplish 100% improvement in one area. So how do we translate that to MS? Let's click the next slide. So if we break down everything that we can think goes into improving MS outcomes, for example, your diet, your sleep, your exercise, access to health care, your medication for multiple sclerosis, and then you set goals that will lead to improvement in at least 1% in every area that is linked to MS, the odds are that you're going to improve significantly more than if you just focus in one area. So, sometimes it's tempting to think, well, I'm going to eat healthier. And you go from eating burgers and fries and bacon, the things that are delicious but are not good for you, and you try to radically change that and go from there to eating salad every day and fish. Well, yeah, you may do it for one week, but the odds are that maybe two, three weeks you are going to start missing that burger.

So if you follow this principle, what you should be doing is increments by 1%, try to improve your diet. The first month, try to eliminate salt, or decrease, radically decrease, the amount of salt you put in your diet. The second month you incorporate more greens and vegetables in your diet. The third month you try to eliminate trans fats, and that way you keep incorporating or eliminating things as you move toward your ultimate goal, which is in 6 to 12 months to try to have at least 80% of your meals following a well-established Mediterranean diet. So let's go to the next slide. So does this model help? Well, this is an example of how the marginal gains was applied to the cycling team in England. And you can see that if you click one more, the animation is going to show the time where this model was applied. And you can see that before David Brailsford, England was not that good at getting Olympic medals in cycling. And you can see that significantly improved after they applied this method. So I will love everyone to think about this and perhaps start incorporating some of these models, whatever works for you, into your life, so hopefully you can significantly improve your clinical outcomes. So let's go to the last slide, please.

So the take home messages, identify one or two areas of brain health you want to target. Try to set SMART goals. And important, too, that we didn't talk much today, is have a partner, have a support group, have someone that is going to be there for you, but also hold you accountable and, in a sense, check with that person periodically and see if you are on the right track. Develop a plan and write it down. As I mentioned before, anything that you write down, very likely you will have higher chances of accomplishing that than if you just seem to think about it. Remember the Marginal Gains and perhaps it's something you may want to incorporate. And last but not least, have fun. Whatever you do, you have to enjoy. If you are suffering through the process, perhaps you will not sustain your efforts into something that will meaningfully improve your brain health. And with that, I would like to end and perhaps open the floor for any questions you may have.

**Yahaira Rivera:**

Thank you, Dr. Miravalle, for such a wonderful and informative presentation. We do have a little bit of time, so I know that we received questions during the registration process, but the majority of them you already answered during your presentation, but one that caught our attention was about: "I often find that I don't complete things in my life, especially after finding out that I have MS. What is the best way to keep New Year's resolutions and goals throughout the year?" So usually we only think about resolutions in January, but as the year progresses, we forget about it or it gets interrupted. So any advice about that?

**Dr. Augusto Miravalle:**

Yeah, that's a great question. And, you know, we touched a little bit on some of that, but something else that we can do is try to do it in pieces, small parts. Right? An example, and you can translate it to everything, let's say that I set a goal for this weekend, I want to clean the house. Well, if I tried to do all of that in one day, I probably will not accomplish that. Whereas if you break it down in small pieces, in small increments, probably you will. So you translate that to the whole year and say, Well, I want to eat healthy. That's your goal. I'll start with one thing at a time and try to incorporate those things in a sequential way, that also not only allows you to break it down in small pieces, but gives you that sense of positive reinforcement. When you accomplish something, you feel better about it and very likely you want to keep doing that. So breaking it down perhaps is the most efficient way to make sure that you stay engaged.

**Yahaira Rivera:**

Thank you. Great advice. And another question is about habits. How can we get rid of bad habits?

**Dr. Augusto Miravalle:**

That's a great question, too. Well, I'm a big believer that whenever we understand something, we are probably going to adhere to a meaningful change. Right? So there is a lot of literature about change and how to make sure that we go about changing habits. So the first step will be understanding whether that habit is good or bad for you. The odds are that if that habit is bad, for example, smoking, creating a sense of urgency, and that's where your team can help. Right? So sometimes I play more of the role, a paternalistic role in medicine, saying, Hey, you need to stop smoking. I'm not going to give you a chance there. This is nothing that you can choose. I mean, smoking is not good for you. And sometimes you have to create that burning platform, saying, Well, if you continue to smoke, the odds are that you will continue to do worse and your overall health will be worse. And, you know, your MRI outcomes are worse. And sometimes you have to create that sense of urgency to break these habits.

Most of the time, habits are not necessarily that bad, but it's something that we don't recognize and that's when others can bring a lot of value. Right? So have your safety nets, have your team, your friends, your family members, and once in a while say, hey, by the way, what do you think of my eating habits? And you will learn a lot when you pay attention to what they have to say about it. So I will say, just find your team, find a good doctor and pay attention. Be reflective of about your life and you probably will learn a lot.

**Yahaira Rivera:**

That's great. Thank you Dr. Miravalle. Having that communication, having support, and also thinking about what is best for us. People living with MS, one of the symptoms that they frequently feel and suffer is fatigue. So a lot of the questions for tonight were regarding fatigue. I

know that I have to exercise. I know I want to, but I'm exhausted. I have fatigue. What can they do about that?

**Dr. Augusto Miravalle:**

Yeah, that's a great question. You're right. 80% to 90% of patients with MS have fatigue. And fatigue is very complex. It's usually a consequence of many factors. But perhaps my favorite analogy for fatigue has to do with the spoons and the jar. I don't know if you know that, Yahaira, but I heard that from an occupational therapist and what she proposes saying, Well, look at the day that you have the most energy, and that is equivalent to ten spoons in one jar. So when you wake up, you do a check, say, okay, how tired I am or how energized I feel? And if you feel that you have a lot of energy that will be, Okay, I have ten spoons in my jar today. And then you have to reflect: What do I want to do? What do I want to accomplish today? Well, let's say that perhaps you need to clean the house and perhaps you want to go to the bank and perhaps you want to go for a walk with your dog. Well, then you will look at your spoons and say, I'm going to dedicate three spoons to cleaning the house. I'm going to do two spoons to go to the bank and one to walk the dog. And that way you can kind of like quantify the amount of energy you have in a very practical way. And then you can establish how you go into your formula. Right? So how are you going to allocate that energy to whatever activities you want to do?

I always recommend overestimate the amount of energy that any activity will require. So then you are pleasantly surprised that at the end of the day you have more energy than the one that you thought you were going to have. But that's a pretty practical way to go about goals during the day. Pay attention to how much energy you have. Sometimes you realize at 2 p.m. you're out of spoons - well, take a nap. Right? And that's a very practical way to bring one more spoon to your jar. And then sometimes I tell, Well, share these with your spouses. Right? So we know that caregivers want to help and they need to know how tired you are. So you can say, Well, today I only have five spoons, so you may want to leave me alone. And so that way is a practical way that you can actually go about your life, your day, and also you can help your caregivers help you.

**Yahaira Rivera:**

I love that analogy. Definitely. Thank you for sharing with us. And also, I think that it's important that we know that maybe one day, and they don't have the energy, and they can't do their physical activity, it's okay. That is not going to define the whole year. Right?

**Dr. Augusto Miravalle:**

Absolutely.

**Yahaira Rivera:**

Find that motivation, and I love that analogy. Thank you for sharing with us. We have another question about stress. "Managing stress is an important part of staying healthy while living with MS. How can I do, or what can I do to manage stress?"

**Dr. Augusto Miravalle:**

Right. Great question, too. And so the way I look at stress is, you know, there are certain factors that we have control on, but most of the time we don't have control. Right? So if you're if you have to work and you're in a work environment that is stressful, there is so much you can do about it. But the first step is try to understand the sources of stress. Right? So, what type of

things are bringing stress to my life? And then group them into categories: modifiable and non modifiable. Right? The ones I actually can do something about it and the ones I can't. And look at the ones that you can modify and try to create a plan, say, well, you know what, every time that I come home from work, I feel like my head is exploding. I mean, I come home and my kids are there. And that can be like an effect of multiplication and amplifies the stress. And sometimes all you need to do is before you enter the house, take 5 minutes, 10 minutes, stay in the car by yourself, listen to music and decompress. Don't bring more stress to another source of stress. Right? So having those breaks, and plan those breaks during the day sometimes help. Some patients respond well to exercise. Right? Some patients respond better to mindfulness, yoga, meditation, music. So there are different interventions you can do. I think the first step is understand and quantify the sources of stress and try to look at those in which you have some control of, and try to modify that.

**Yahaira Rivera:**

Great advice. Thank you so much. And also some of the questions were related to finding motivation and not losing the hope. Living with MS, we know that is hard, that it's unique for each individual. So, where can they find that hope, if they're lacking hope and motivation, to start planning for the smart goals and for the new year?

**Dr. Augusto Miravalle:**

One of my favorite words in our language, in our vocabulary, is hope. For anything you look for, I think the moment we lose hope, we are losing a big part of our existence, so you should never lose hope. There's always something we can do to be better. And sometimes that looks like physical improvement. Sometimes it looks like mental health improvement. But there's something always we can do. And so if you find that you're losing hope, perhaps you need help. And again, go back to having a team. Right? Talking to your health care provider, sometimes you need a counselor, sometimes you need a friend. Right? So there are certain things you can do, but hope is the last thing we lose.

**Yahaira Rivera:**

Thank you so much, Dr. Miravalle. I know that we have participants asking about if they're going to receive a copy of this presentation, know that this program is being recorded, so it's going to be made available on our MSAi website. So once there, you're going to be able to access the presentation and share with loved ones, family care partners, and watch it as many times as you would like.

Our time together has come to an end. Thank you once again, on behalf of MSA, thank you Dr. Miravalle for such a powerful presentation, for sharing the data, the research, but also SMART goals. I think that's going to be our takeaway tonight. Let's plan and work with those SMART goals. Let's be proactive, loving ourselves and making those healthy habits throughout the year to add quality of life. Thank you, everyone, being here with us tonight, learning alongside our staff and Dr. Augusto Miravalle. And we wish you and your families the best. I hope that this presentation brought some light and wisdom and hope to you as you plan goals for the new year, and have a wonderful night, and may you and your family members have a very blessed and happy New Year. Thank you so much and have a good night.