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You May Need a Vagus Nerve Reset. Here's How to Do It

Written by Dr. Michael Ruscio, DC on July 31, 2023 — Reviewed by Dr. Hannah Hamlin

Understanding the Role of the Vagus Nerve in a Number of Organ Systems and How It Impacts Your Health and Well-Being

The Nuts and Bolts: What Is the Vagus Nerve?
The Parasympathetic Nervous System
What is a Vagus Nerve Reset?
Improve Vagal Tone and Whole-Body Health
Heart Rate Variability
Electrical Vagus Nerve Stimulation
Reset Your Vagus Nerve with Self-Care First

Key Takeaways:

- The vagus nerve is the longest nerve in the body and connects nearly every organ system to the brain stem and cortex.
- Vagus nerve dysfunction can lead to a number of mental and physical health problems, like lightheadedness, anxiety, digestive distress, and sleep issues.
- Healthy lifestyle choices like gentle exercise, meditation, and a nutrient-dense diet act as non-invasive forms of vagus nerve reset.
- Other holistic interventions include multiple types of massage, breathwork, and laughter.
- Heart rate variability (HRV) is the best way to indirectly measure vagal activity, also called vagal tone.
- Electrical vagus nerve stimulation (VNS) is the conventional approach to vagus nerve stimulation but is only FDA-approved for a small number of conditions, is invasive, and has a higher potential for side effects.

Your vagus nerve connects from the bottom of your brain stem to many of your internal organs (including your gut), and a growing body of research suggests that through vagus nerve stimulation (VNS), you may be able to improve a number of ailments and diseases. If you've been struggling with anxiety, low mood, migraines, elevated heart rate, or slow digestion, it's possibly time for a vagus nerve reset.

Boosting low vagal tone can also help a number of medical conditions such as epilepsy, high blood pressure, Parkinson's disease, rheumatoid arthritis, atherosclerosis, inflammatory bowel disease, diabetes, and cardiovascular disease, and prevent early mortality [1].

A vagus nerve reset involves a set of interventions (diet, self-care, and even laughter) that can alter brain activity and address autonomic nervous system dysfunction. While there's still a lot of exploration to be done in the scientific and medical communities to more thoroughly understand vagus nerve dysfunction and how to treat it from a practical and clinical standpoint, we have enough information to create an educated approach.

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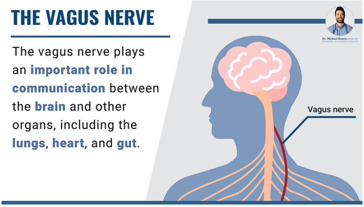
There are several low-cost, low-barrier-to-entry treatments for a vagus nerve reset that are safe and effective for many conditions that are tied to vagus nerve dysfunction. Lifestyle interventions like gentle exercise, a nutrient-dense diet, and a meditation practice can go a long way in helping reset the vagus nerve.

Since electrical vagus nerve stimulation isn't realistic for most people, due to its limited use and higher potential for side effects, the natural, safe, and research-backed treatments I discuss here are probably a better place to start when healing your nervous system. They also take a more holistic approach as they can help heal many other body systems, not just the vagus nerve.

Let's explore the existing research and dive into the possibilities of how a vagus nerve reset might lead to relief of various health challenges from gut, cardiovascular, metabolic, and mental health, and improve your overall well-being.

The Nuts and Bolts: What Is the Vagus Nerve?



THE VAGUS NERVE

The vagus nerve plays an **important role in communication** between the **brain** and other organs, including the **lungs**, **heart**, and **gut**.

Dr. Michael Ruscio, DNM, DC
Get Healthy - and Get Back to Your Life
Vagus nerve

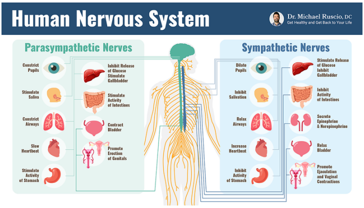
The vagus nerve (there are technically two — on the left side and right side of the body) is the 10th cranial nerve that originates from the lowest part of the brainstem (called the medulla oblongata). It runs deep in the neck and into the chest and abdominal cavities, connecting various organ systems — including the gastrointestinal system, heart, lungs, tongue, and pharynx — to the brainstem and cortex. It's the longest cranial nerve in the human body [2, 3].

The literal translation of the word "vagus" means "wanderer," which reflects how wide and far-reaching this nerve is in the human body. It contains motor and sensory fibers, which send nerve impulses both to and from the brain. The sensory fibers can detect pressure, pain, stretch, temperature, chemical, osmotic pressure, and inflammation in the organs. The motor fibers supply muscles of the pharynx and larynx that we use for swallowing and speech [2, 3].

If you’ve ever fainted or gotten woozy at the sight of blood, an intense injury or sudden pain, or other stressful stimuli, it was likely a vasovagal malfunction called vasovagal syncope. This is the most well-known type of vagal disturbance where blood pressure drops, temporarily reducing blood flow to the brain and resulting in a brief loss of consciousness (usually a minute or less) [4].

However, there are many other ways in which long-term vagus nerve dysfunction can impact your health and well-being, often causing non-specific health symptoms to unexpectedly appear.

Vagus Nerve and The Parasympathetic Nervous System


Human Nervous System
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Parasympathetic Nerves
Constrict Pupils
Stimulate Saliva
Constrict Airways
Slow Heartbeat
Stimulate Activity of Stomach
Inhibit Release of Glucose Stimulate Gallbladder
Stimulate Activity of Intestines
Contract Bladder
Promote Erection of Genitals
Sympathetic Nerves
Dilate Pupils
Inhibit Salivation
Relax Airways
Increase Heartbeat
Inhibit Activity of Stomach
Stimulate Release of Glucose Inhibit Gallbladder
Inhibit Activity of Intestines
Secrete Epinephrine & Norepinephrine
Relax Bladder
Promote Ejaculation and Vaginal Contractions

The vagus nerve carries 75% of all parasympathetic nerve fibers in the body, making it the primary component of the parasympathetic nervous system (PNS), which is part of the autonomic nervous system (ANS). The other part of the ANS is the sympathetic nervous system (SNS), which governs fight or flight, as well as most voluntary actions.

The PNS is responsible for maintaining the body systems that you aren’t consciously deciding to operate. This includes [5, 6]:

- Organ systems: cardiovascular, respiratory, gastrointestinal, immune, and endocrine (hormone)
  - Heart rate
  - Respiratory rate
  - Dilation/constriction of vessels
  - Digestion
  - Urination
  - Involuntary muscle movements
  - Reflex actions such as coughing, sneezing, swallowing, and vomiting

Because of its widespread influence throughout the body, when the vagus nerve is disrupted (often due to chronic stress) you can begin to develop a number of non-specific health systems. Low vagal tone doesn’t necessarily mean that all of your body systems will go haywire, but there are some signs and symptoms to look out for:

- Insomnia
- Migraines
- Anxiety
- Chronic pain
- Gas and bloating
- Gastroparesis
- Constipation
- High or low blood pressure

- Elevated and/or fluctuating heart rate

The primary neurotransmitter of the PNS is acetylcholine, which activates muscarinic receptors located throughout the body. The binding of acetylcholine to muscarinic receptors helps the vagus nerve/PNS carry out its primary functions [2, 3, 7]. I bring up this level of physiological detail because choline (a B vitamin) is a really important part of your diet and is also a precursor to acetylcholine.

When you eat foods rich in choline (like eggs, meat, and nutritional yeast), you are helping give your body the raw materials it needs to support your nervous system [8]. It's especially important for vegetarians and vegans to make sure that they are getting enough choline (among other important nutrients) in their diet to support brain neural health.

This is why diet is a fundamental component of a vagus nerve reset, and why I prioritize nutrition in my practice — especially when the above symptoms of vagus nerve dysfunction are present.

What is a Vagus Nerve Reset?

Many studies have linked various gastrointestinal, neurologic, and cardiovascular/metabolic diseases to reduced vagal tone, and this has led to exploration into how stimulation of the vagus nerve can improve health. Vagus nerve stimulation is also referred to as vagus nerve therapy or, more loosely, a vagus nerve reset.*

The goal of a vagus nerve reset is to get the two parts of the autonomic nervous system (parasympathetic and sympathetic) back into balance, thereby helping to heal symptoms of nervous system dysfunction.

Any technique that stimulates the vagus nerve, including manual or electrical stimulation, constitutes a form of vagus nerve stimulation (VNS). However, there are other ways to reset the nerve that doesn't involve direct stimulation and are likely a much more effective place to start.

**Slight disclaimer: I'm about to dive into a discussion on the various therapies that could be employed for a vagus nerve reset. I want to highlight that in general, it appears that behaviors and holistic modalities that are known to be good for overall health also seem to be good for improving vagal tone. Being overly focused on stimulating the vagus nerve may be unnecessary.*

This exploration is intended to focus on the vagus nerve in order to better equip you with information about how you might explore these therapies if you've been experiencing symptoms or issues specific to a vasovagal malfunction or weakness.

Holistic Forms of Vagus Nerve Stimulation

This is the list of interventions that include healthy lifestyle habits that we know are good for your overall health generally. However, there are also additional interventions in this category that are geared specifically toward improving vagal tone.

While these interventions do have some scientific support, more research is needed in this area to further understand the use of these therapies from a practical, clinical standpoint. They include [1]:

- Slow breathing exercises
- Chanting
- Music therapy (singing, listening, learning, and performing music)
- Practicing loving-kindness meditation
- Mindfulness meditation
- Practicing forgiveness
- Laughter
- Aerobic exercise
- Stretching
- Resistance training
- Yoga
- Increased consumption of omega-3 fatty acids
- Fasting
- Massage
- Cold water facial immersion
- Sleeping on the right side

Thankfully, we don't always need to wait for the research to catch up with clinical practice, as these therapies are extremely safe and low cost. These can be easily integrated into your everyday routine to bring maximum benefit to your vagus nerve reset.

Improve Vagal Tone and Whole-Body Health

The known healthy behaviors that have been shown to improve vagal tone include:

- Physical activity/exercise like walking, yoga, and stretching [9, 10]
- Good nutrition and supplementation with choline, omega-3 fatty acids, B12, and probiotics [9]
- Stress management and meditation [10]

Adjacent to these because of their known mental health benefits are laughter, practicing forgiveness massage, chanting, and strong social connections [1]. The idea behind these self-care interventions is that **each of these increases relaxation, heart rate variability (HRV), and resilience (ability to recover after a stressful event) [11, 12]**.

Oddly enough, this seems to include simulated (fake or forced) laughter. A very small 2012 study looked at the effects of laughter on HRV and mood in patients awaiting an organ transplant (high stress!). It compared the effects of simulated laughter, stretching exercises, clapping, and meditation for 20 minutes to a control group that only had discussions about their health [13].

The results showed that the laughter group had immediate improvement in mood and HRV — the best measure for vagal tone, which I discuss below. Both groups had improved long-term anxiety [13].

Another study showed that laughter may reduce the risk of heart disease and stroke (which are linked to poor vagal tone), even after controlling for other risk factors like high cholesterol, blood pressure, and body mass index [14].

Nutrition

As discussed above, proper nutrition is vital for healing the vagus nerve. Reducing your consumption of inflammatory foods like sugar, trans fats, processed foods, and alcohol can go a long way in reducing inflammation and nervous system hyperreactivity.

A Mediterranean diet is pretty non-restrictive, and research shows that it is linked to better vagal tone [9]. It emphasizes the consumption of fatty fish, moderate amounts of polyphenol-rich red wine (no spirits or beer), yogurt, and nuts like pistachio, which are all shown to be good for improving heart rate variability (a measure of vagus nerve health).

However, I tend to start my patients with a Paleo-style diet, as it eliminates even more common inflammatory foods, like dairy, eggs, and corn. If a Mediterranean diet doesn't seem to resolve your symptoms, a Paleo elimination diet can often help.

Exercise

An effective vagus verve reset is likely going to include some sort of physical activity, as research consistently shows that this is one of the best ways to normalize heart rate variability and boost vagal tone [15]. While this might look different for everyone, the key here is just to get moving.

There really is no best exercise for healing your vagal nerve though research suggests that yoga, aerobic exercise, and resistance training are particularly beneficial [1]. If you are new to exercise or intimidated by starting a new regimen, I have articles on this topic that can give you some direction.

Massage

Vagus nerve massages work by applying pressure with stroking and twisting motions to the area between the trapezius and sternocleidomastoid muscles in the neck/shoulder area and to muscles below the base of the skull. Massaging of these areas is thought to stimulate the vagus nerve (due to its close proximity), and to increase parasympathetic activity and vagal tone [16].

Another type of massage, known as a **carotid sinus massage**, involves exerting light pressure with the fingers on one side of the neck where the pulse from the carotid artery can be felt the strongest. However, carotid sinus massages are typically used in emergency medicine situations to slow rapid heart rate and improve abnormal heart rhythms. It can cause adverse effects, especially in people with underlying heart conditions and carotid artery disease [17].

For this reason, I never recommend using this at home, and it should only be done under the direct guidance of a qualified healthcare provider.

Ice massage applied to the head and spine may also improve HRV when compared to tap water massage or massage using no water or ice. A study done on 30 healthy male subjects had the participants lie face down while receiving an ice massage over their heads and spine. Compared to the no-treatment and water massage control groups, those who received ice massage had significantly reduced heart rates and improved HRV [18].

Cold water facial immersion also seems to be effective in improving vagal tone [1]. Cold exposure (with ice packs, cold air, or cold water) has a number of other known benefits as well. This makes it one of the top vagus reset therapies that comes with little-to-no risk and is easy to implement. It would be interesting to look more deeply into cold exposure and vagus nerve reset, but for now, it appears to be effective for reducing symptoms of nervous system dysfunction.

Slow Breathing Exercises

Deep breathing activates the PNS and tells your body that it can calm down and relax. In contrast, in fight or flight response (when the sympathetic nervous system is active), short, shallow breaths are more common. By taking deep breaths, you can tell your brain to calm down and slow down the stress response in the body.

Research shows that slow, diaphragmatic breaths can improve HRT/vagal tone and feelings of relaxation [19]. There are a number of different breathwork techniques out there that have been shown to improve mental and physical health, including improving cognition. If you are new to therapeutic breathing, you can start with the box breathing technique:

1. Breath in through your nose for 4 seconds
2. Hold at the top of your inhale for 4 seconds
3. Exhale through your mouth for 4 seconds
4. Hold the bottom of the exhale for 4 seconds
5. Repeat as many times as desired or until you feel relaxed

When first starting, it may feel difficult to hold your breath for too long. Don't force it, and inhale when you need to — with practice, you will perfect this technique over time.

Using Heart Rate Variability to Measure the Vagus Nerve Activity

So how do you know if you need to work on your vagal tone anyway?

Activity of the vagus nerve, also referred to as vagal tone, is measured indirectly through heart rate variability (HRV), which is the fluctuation in time intervals between heartbeats. High HRV is associated with higher vagal tone and better health, and represents the ability of the nervous system to be adaptable and resilient during stressful situations and to return to baseline afterward [20].

Even though higher/optimal levels of HRV appear to be associated with health and lower HRV is associated with lower vagal tone and worse health, there are no definitive reference ranges constituting normal or healthy HRV [21, 22].

What's more important is looking at your HRV trend over time (which can be done with a smartwatch or fitness tracker) to see if it is consistently low or has frequent and/or drastic dips. This is a sign your nervous system is taxed and can benefit from a vagus nerve reset.

Electrical Vagus Nerve Stimulation

Electrical VNS is a more invasive method where a small implanted device is surgically placed just under the surface of the skin (usually on the left side of the chest) to stimulate the vagus nerve. It's FDA-approved in the treatment of epilepsy and treatment-resistant depression and is also being explored for the treatment of obesity, stroke rehabilitation, male infertility, autism spectrum disorders, migraines, tinnitus, autoimmunity, and inflammatory disorders [2, 3].

This treatment is reserved for the above conditions, and its invasive nature and high cost make it a less preferred method for vagus stimulation in the general population (best stick to cold water and targeted breathing techniques).

However, if you do think you qualify for eVNS there are also a few potential side effects that you should know about before seeking this type of intervention. They include [3]:

- Voice alteration
- Hoarseness
- Cough
- Tingling
- Difficulty breathing
- Vocal cord paralysis
- Implant site infection
- Left facial nerve paralysis
- Horner syndrome: Nervous dysfunction of the face that leads to a smaller pupil, drooping eyelid, and little or no sweating on the affected side [23].

The two forms of non-invasive electrical VNS are transcutaneous auricular vagus nerve stimulation (taVNS) and cervical transcutaneous vagus nerve stimulation (ctVNS). In taVNS, a transcutaneous electrical nerve stimulation (TENS) unit is placed on the ear to deliver electrical stimulation through the skin directly to a branch of the vagus nerve located in the ear known as the auricular nerve.

In ctVNS, the electrode is the same, but the placement is different. It's placed on the neck area over the sternocleidomastoid muscle near a branch of the vagus nerve [24]. We don't quite understand why or how providing direct electrical impulses to the vagus nerve helps, but it provides a positive result for a number of patients.

There is no standardized protocol or set of parameters that are proven to yield the greatest therapeutic benefit for specific conditions in these treatments. While these may have a more predominant place in improving vagal tone in the future, trying low-cost, at-home methods that benefit your overall health is probably where your resources will be best spent.

If you don't find relief with the fundamentals, seek out a provider who is educated in this modality — such as a physiotherapist, physical therapist, chiropractor, neurologist, or alternative healthcare provider — who can help guide you on how to best use this less invasive form of eVNS [24].

Reset Your Vagus Nerve with Self-Care First

Knowing that your vagus nerve is connected to so many systems of the body should help you understand how a disruption there could affect your sense of well-being.

Let it be a comfort that so many established self-care and healthy lifestyle habits like exercise, mindfulness, and nutrition already have a positive impact on vagal tone and heart rate variability. There are also a number of other holistic, complementary interventions like music therapy and targeted breathwork that can improve vagal tone.

If you suspect your health challenges are vagus nerve-related, we're here to help. Reach out to schedule a consultation at our clinic so that we can begin exploring with you.

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