

Hyperbaric Oxygen Therapy as an Adjunct Healing Modality

Analysis by [Dr. Joseph Mercola](#)

November 26, 2023

STORY AT-A-GLANCE

- › Hyperbaric oxygen therapy (HBOT) involves breathing air or oxygen in a pressurized chamber. The pressure allows your body to absorb a higher percentage of oxygen
- › There's a wide range of conditions for which HBOT can be beneficial, including autoimmune conditions, neurological conditions, musculoskeletal injuries, mitochondrial dysfunction-driven conditions, ailments involving damaged microcirculation, chronic infections, subacute infections and cancer co-management
- › Hyperbaric oxygen improves mitochondrial function, helps with detoxification, inhibits and controls inflammation and optimizes your body's energy production and healing capacity
- › HBOT also activates stem cell production, and can help optimize results when doing stem cell therapy
- › While HBOT can speed healing of any inflammatory condition, in the U.S., there are only 14 conditions for which insurance will pay, one of which is diabetic neuropathy, and typically only after other conventional treatments have failed. There are over 100 internationally recognized indications for hyperbaric use

Editor's Note: This article is a reprint. It was originally published November 24, 2019.

In this interview, Dr. Jason Sonners discusses hyperbaric oxygen therapy (HBOT), which is a tremendously beneficial and widely underutilized therapy. Sonners, a chiropractor, also has a degree in applied kinesiology,¹ and has worked with HBOT for over 12 years.

Even if you're not trying to treat a specific condition and are generally healthy, HBOT can have significant benefits for longevity.

"On its most basic premise, hyperbaric oxygen [therapy] is literally the breathing of either air or oxygen under pressure. You're inside some type of pressurized device or hyperbaric chamber. Due to the pressure, you're exposing the body to a higher percentage of oxygen.

You could also increase that oxygen by piping oxygen into the chambers. As a result of that environment, you're increasing the body's capacity to absorb more oxygen than what you and I can get here at 1 atmosphere (atm)," Sonners explains.

Hyperbaric Oxygen Therapy Basics

Most healthy individuals have somewhere between 96% and 98% oxygen in their hemoglobin, which means your capacity to increase your oxygen level is between 2% and 4%, were you to breathe medical-grade oxygen, for example. That's it; there's no way to raise your oxygen level beyond that. The exception is if your body is under pressure.

"Two main laws govern how that works," Sonners says. "Boyle's Law and Henry's Law. Basically, as you take a gas and exert pressure on it, you make the size of that gas take up less space. As a result of that pressure, you can then dissolve that gas into a liquid.

An easy example is a can of seltzer. They're using carbon dioxide and water. But basically, you can pressurize that can, so you can put carbon dioxide into that can. As a result of that pressurization, you can dissolve molecules of carbon dioxide into the water.

In the hyperbaric version of that, we're using oxygen, and the can is the chamber. But as a result of dumping excess oxygen inside that chamber, you can dissolve that into the liquid of your body ... directly into the tissue and the plasma of your blood.

The oxygen in your blood is carried by hemoglobin. The plasma that carries your red blood cells that holds the hemoglobin normally does not carry oxygen. We rely wholly on red blood cell oxygen-carrying capacity. But inside the chamber, you could literally bypass the red blood cell oxygen-carrying capacity altogether, and you can absorb oxygen directly into the plasma and tissue of the body."

Your Body Needs All the Oxygen It Can Get

Sonnens, who has a lot of experience with functional medicine and nutrition, views oxygen primarily as a nutrient.

"We need about 100% of the oxygen that we're capable of carrying every minute of every day just to perform normal functions," he says, "so there's very little room for creating an excess of oxygen for the sake of healing or helping some of the conditions that we'll talk about later on ...

In nutrition, there's deficiency, which has consequences. There's optimum range, which is allowing us to do what we need to do every day. And then there are periods where we need a surplus of that nutrient to help us deal with some issue that we're having in our health or in our life.

I look at oxygen the same way. If you're not getting enough oxygen, whether that's globally because of a lung or heart issue or if that's locally because of a trauma ... or some type of injury or inflammation, you could have an area of your body that has oxygen deficiency. We call that hypoxia.

There's an optimum range of oxygen, which for us is virtually almost 100% of our oxygen-carrying capacity, every minute of every day. And then periodically, we might choose that we want to create a surplus of oxygen because oxygen ... helps us detoxify, it controls inflammation, it runs our energy production and helps us to heal ...

Once you expose the body to increased levels of oxygen ... the whole oxidative phosphorylation [process], the whole ATP and energy production system of our

body increases its capacity to produce ATP and to produce energy ...

Sometimes, we might need more than the optimum range to help us get over some sort of health issue, or ... from a quality of life, longevity, regenerative medicine-type standpoint ..."

Conditions That Can Benefit From HBOT

Considering the importance of oxygen, there's a long list of conditions for which HBOT is recommended. Insurance will pay for some, but not anywhere near all of them.

While HBOT can be used to help speed healing of any inflammatory condition, in the U.S., there are only 14 conditions for which insurance will pay, whereas there are up to 100 approved indications for HBOT internationally.

"In the States, we reserve it for pretty tough cases: really bad infections like gangrene, osteomyelitis, radiation burns ... diabetic neuropathy ... chronic wounds that are not healing with traditional attempts at antibiotics and things like that," Sonners says.

From my perspective, it's medically reprehensible and inexcusable for a doctor to not treat patients with diabetic neuropathy, infections in the distal extremities or peripheral vascular disease with HBOT, as it will in most cases prevent the need for amputation.

That the U.S. limits the use of HBOT to a last resort for only a few hard-to-treat conditions is truly unfortunate, as there's a wide range of other conditions for which HBOT can be beneficial. This includes:

All autoimmune conditions

Neurological conditions, including concussion, [traumatic brain injury](#), dementia and post-stroke

Musculoskeletal injuries, including broken bones, disk herniations, and torn muscles and tendons

Any condition involving **mitochondrial dysfunction** (which includes most chronic and degenerative diseases)

Any condition involving damaged microcirculation or that can benefit from capillary growth

Chronic infections such as Lyme disease, and subacute infections that cause damage over time – As noted by Sonners, "When you go into these pressurized hyperbaric chambers and you're breathing and absorbing these higher levels of oxygen, they literally act as a natural antibiotic."

The hyperbaric oxygen kills anaerobic bacteria and helps break down the biofilm that many anaerobic bacteria produce to protect themselves. At the same time, it's boosting your immune system through increased neutrophil-macrophage stimulation and by feeding healthy bacteria.

Hyperbaric oxygen also combats viral and fungal infections, in part by stimulating neutrophil and macrophage activation. "You literally stimulate an increased production of white blood cells," Sonners says, "and that's what your body uses to fight infections"

Cancer co-management – As noted by Sonners, researchers are looking at HBOT in cancer treatments in a number of different ways. For example, doing it may allow you to use less radiation or chemo and still get the same outcome. Or, it may allow the patient to tolerate higher amounts of radiation by speeding the healing between sessions. A third avenue of investigation is the use of HBOT in isolation.

"Some of them are using it as a method to help with or augment the cancer treatment itself. Some are using it as a way to heal," Sonners says. "There are consequences of chemotherapy. There are consequences of radiation."

The idea with most cancer treatments is we're trying to kill cells. Hopefully, the person survives that process. If you're augmenting with hyperbaric oxygen simultaneously, the idea is that you're also helping to heal the tissue so that the healthy tissue can still survive or even thrive ..."

HBOT Improves Mitochondrial Function

"If the idea is that we need to control inflammation, if we need to improve the rate of healing, if we need to improve mitochondrial function – all of these are going to be very solid indications of people who would respond very positively to hyperbaric treatment," Sonners says.

One of the reasons I'm fascinated by HBOT is because of its ability to improve mitochondrial function. As noted by Sonners, longer term hyperbaric exposures will result in larger mitochondria and a greater density of mitochondria.

"Just to give you an idea, [after] 20 or 40 hours of exposure, what you're going to end up getting [are] more efficient, bigger mitochondria, and you're going to get a lot more of them," he says.

"Even if you're stuck at like 80% efficiency, if you had twice as many mitochondria, producing 80% efficiency, you're still going to get a much better output for the patient. I think the capacity there for improving these chronic illnesses is really tremendous."

HBOT Boosts Stem Cell Production

HBOT also activates stem cell production. Conventional stem cell therapy can cost \$10,000 to \$20,000 and isn't covered by insurance. HBOT costs far less, may be covered by insurance (depending on your condition), is completely safe and has a whole host of other beneficial effects as well.

Even if you decide to get stem cell therapy, using HBOT before and after can significantly improve your end results, as the hyperbaric oxygen will help optimize your internal environment to make it more conducive to the newly injected stem cells.

Sonnars suggests 10 to 20 hours of HBOT before your stem cell treatment, as that's when your body will start upregulating its own stem cells. If you're extracting the stem cells from your own body, you will now also have much higher amounts. After the stem cell injection, Sonners suggests doing 20 to 40 hours of HBOT to make sure the new stem cells will thrive.

Difference Between HBOT and EWOT

On a side note, there's a similar therapy that many people confuse with HBOT. EWOT is an acronym for "exercise with oxygen therapy," which usually involves using an oxygen concentrator and a large oxygen-filled bag that you then breathe from while exercising.

While EWOT certainly has its benefits, it's not interchangeable with HBOT. They're really very distinct therapies and accomplish different things. For starters, while EWOT is an active process, hyperbaric oxygen is a passive process.

With hyperbaric oxygen, you're typically sitting or lying down and simply breathing normally. "Especially in some patient populations, you can't even express the level of exercise you would need to in order to gain some of those benefits. That's one difference," Sonners says.

The primary difference, however, is that with EWOT, you're basically increasing demand through exercise, and then you're increasing supply through the oxygen concentrator. However, you're still relying on your red blood cell oxygen-carrying capacity.

"If you have an issue that is trauma-related – chronic inflammation, damage to the microcirculation – there's nothing about that excess oxygen that you're creating through supply and demand that's ultimately ever going to change that. So long as you are relying on red blood cells carrying, you will not get oxygen to the damaged site.

The only way you're going to change that environmental issue, and especially the microcirculation ... [and stem cells, is through] exposures to oxygen [under] pressure. This is where oxygen will be absorbed directly into the plasma and tissues along the hypoxic tissue gain access to the oxygen.

What we're finding is that it's not just the level of oxygen absorption. Some of our epigenome is pressure-sensitive. Pressure alone increases the response to oxygen and stimulates some of these healing responses.

The biggest difference is that one is active and one is passive. One is still relying on red blood cell oxygen-carrying capacity; one is basically bypassing red blood cell oxygen-carrying capacity.

To some degree, they're both increasing oxygen, but I don't think you could really compare it. I mean hyperbaric is definitely increasing oxygen capacity to a degree that is significantly higher than anything else that exists."

So, to recap, your red blood cells (if you are healthy) are typically already saturated with oxygen at 98% to 99%, and breathing pure oxygen at normal pressures will not significantly change that. But if you breathe oxygen under pressure, it will diffuse into your cellular fluids and provide a greater delivery of oxygen to your tissues, especially if they have compromised microcirculation.

Soft Versus Hard Shell Chambers

There are two primary types of HBOT chambers: hard shell and soft shell. Hard-shell versions are available in two types — the kind you find in hospitals and the kind you typically find in private clinics or can purchase for home use.

- Hard shell 100% oxygen hospital chambers are capable of the highest pressures, which in some cases can be important, especially in cases of nonhealing wounds. In this kind of chamber, the pressurization is done with 100% oxygen. While oxygen is not really flammable, it's an accelerant, so you have to be very careful not to

create sparks. You're wearing cotton scrubs and you can't bring anything inside the chamber.

- Hard chambers are the next step down. Instead of filling the whole hard chamber with oxygen, air is used to create pressure, and then oxygen is being piped in separately for you to breathe.

In this type of chamber, you can wear whatever clothing you want as you don't have the same safety concerns. You can even bring certain electronics into the chamber. In many situations, this is an ideal choice, as the safety is higher while the effectiveness of the treatment is identical, especially for most internal issues. These types of chambers are often found in private clinics.

- Soft chambers are limited in terms of the pressure you can achieve. "In the U.S., you're only allowed to go to 1.3 atmospheres (ATA), which is about a relative 9 feet under water. It's considered mild HBOT. It's about 4 to 4.25 pounds of force per square inch (psi)," Sonners says.

Still, it will allow you to absorb quite a bit more oxygen than you could normally, so it still offers very meaningful benefits. You may need to use it more frequently, and for longer duration though.

While treatments involving hard shell chambers with 100% oxygen are quite costly, typically running around \$2,000 per treatment (which may or may not be covered by insurance), hard and soft chambers found in private clinics are much more affordable, typically ranging between \$90 to \$180 per session. While this may still sound like a lot, it could well turn out to be one of your less expensive options in the long run.

"Clinically, we used to do our typical protocols. When people weren't responding the way we expected them to, we would introduce hyperbaric oxygen.

At this point, it's become literally one of the first things that we do, because if we do [HBOT] early on, so many of the other therapies that we used to have to do, we don't need to do anymore," Sonners says.

HBOT Treatment Suggestions

Typically, you'd want to start out getting about 10 hours of treatment at a local facility to see if and how your condition responds. If you're trying to address trauma, an injury or a condition that has a beginning and end, then whatever benefits you get from the therapy, you will keep as you heal.

Progressive and degenerative conditions, on the other hand, and/or if you're using it for longevity purposes, treatment will need to be ongoing for long periods of time. This is a case in which you may want to consider buying your own chamber.

"Somewhere between 10 and 20 hours, you kind of know if it's a good fit for you. From that point, with guidance of the practitioner, you should be able to figure out a baseline of what your protocol should look like," Sonners says. "Ultimately, if you're going to be using this thing for years and years, then you're better off, in most cases, just to have your own."

Unfortunately, it can be tricky finding a local HBOT facility. Usually, online search results tend to focus on hospitals, and hospitals will not provide you with HBOT unless you have one of the 14 approved indications.

"To find a center, you're just going to be looking up hyperbaric oxygen [centers]. You're going to be looking in the private sector, because those are the only people outside the hospital who are going to treat these other indications," Sonners says.

One alternative is to contact either the International Hyperbaric Association² (IHA) or Hyperbaric Medical International³ (HMI). These are the two organizations focused on educating the public on the use of HBOT in the U.S., especially for indications that aren't FDA-approved.

"They have a tremendous amount of resources," Sonners says. "They also probably help direct people ... to centers that might be more local ... That's

probably the best. Otherwise, you'd be looking at different manufacturers that produce chambers and how to get those into your home."

If you're in New Jersey or Pennsylvania, you can visit one of Sonner's clinics – [New Jersey HBOT Center](#), or [HBOT PA](#). You can also learn more on [HBOTusa.com](#), which is Sonner's primary education website. There you can find a list of treated conditions, research, the benefits of HBOT in athletics, testimonials and much more.

He also has written a book on the topic, "Oxygen Under Pressure: Using Hyperbaric Oxygen to Restore Health, Reduce Inflammation, Reverse Aging and Revolutionize Health Care."⁴

Sources and References

- ¹ [Dr. Jason Sonners](#)
- ² [International Hyperbaric Association](#)
- ³ [Hyperbaric Medical International](#)
- ⁴ [Amazon](#)