

EPOCH HEALTH

Hyperbaric Oxygen Therapy's Promising Potential in Cancer Treatment

HBOT has the potential to enhance radiation therapy, halt tumor growth, and reduce the debilitating side effects of chemotherapy and radiation.



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By [Christy Prais](#)

In the quest to find innovative cancer treatments, a remarkable contender has emerged—hyperbaric oxygen therapy.

Recent studies are uncovering its potential to not only enhance radiation therapy and halt tumor growth but also reduce the debilitating side effects of cancer treatments such as chemotherapy and radiation when used as part of treatment or as an adjuvant.

What's Hyperbaric Oxygen Therapy?

Hyperbaric medical therapy began in 1662 by placing patients in a pressurized chamber with regular air, but it would be another 100-plus years before pure oxygen was routinely used.

Since then, it has been studied extensively and is currently approved by the U.S. Food and Drug Administration (FDA) for several specific conditions, including wound care, radiation injury, and more. Research and clinical trials are ongoing, exploring its potential applications for many other conditions such as COVID-19 and long COVID.

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Hyperbaric oxygen therapy (HBOT) places patients in a pressurized chamber that's then filled with pure oxygen (95 percent or more) to an atmospheric pressure that's 1.4 to three times higher than normal. The air we breathe contains about 21 percent oxygen.

The elevated atmospheric pressure results in the absorption of significantly higher amounts of oxygen into the blood and tissues, facilitating oxygen transfer to damaged organs and tissues.

Why It's Beneficial

Every cell in our body relies on oxygen for survival and well-being, particularly when illness or injury hinders tissue from getting enough oxygen.

Interestingly, a [2019 article published](#) in *Frontiers in Nutrition* offers the controversial opinion that oxygen is conclusively a nutrient and “should be included within the landscape of nutritional science.”

Hyperbaric Oxygen Therapy for Long COVID and Vaccine Injury

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When our tissues don't get enough oxygen, we suffer [hypoxia](#).

A [2021 overview](#) of HBOT published in Medicina references 215 studies. It explains that hypoxia can happen because of low oxygen in the blood, which can result from issues such as poor blood flow to the lungs, problems with airflow to the tiny air sacs in the lungs, or difficulties in oxygen exchange within the lungs. It can also occur because of low blood supply or trouble delivering oxygen to the tissues.

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The article also notes that while a little bit of hypoxia can be good for our health during early development or when we're occasionally exposed to it, most of the time, it's bad for our cells and can lead to many diseases. That's why oxygen is considered a potential treatment for people with various short- or long-term health issues.

A [2020 research review article](#) published in the Journal of Biomedical Science states, "A growing body of evidence implicates that hypoxia plays critical roles in the pathogenesis of major causes of mortality including cancer, myocardial ischemia, metabolic diseases, chronic heart and kidney diseases, and in reproductive diseases such as preeclampsia and endometriosis."

HBOT offers a solution by providing higher oxygen concentrations to affected areas, ultimately benefiting all cells in the body. It's essential to administer HBOT properly, as excessive oxygen intake can injure the body.

HBOT and Cancer

Currently, using HBOT as a part of cancer therapy isn't FDA-approved, but there have been some hopeful findings in recent studies on different types of cancer, including leukemia, breast cancer, brain tumors, prostate cancer, head and neck cancer, colorectal cancer, cervical cancer, and bladder cancer, according to the Medicina review.

HBOT was a way to support other treatments, it found, and could be used as a way to enhance chemotherapy, radiation therapy, and other treatments.

Treatment

[A 2007 study](#) published in Leukemia Research looked at how HBOT at 2.5 to 3.5 atmospheric pressure with 100 percent oxygen for six hours affected different types of cancer cells in terms of apoptosis, a process of programmed cell death. The researchers used different cell lines, including blood-related cells and nonblood cells.

Researchers found that the hematopoietic cells underwent a significant amount of programmed cell death (apoptosis) because of the treatment.

The results suggest that hematopoietic cancer cells are more sensitive to oxidative stress induced by high-pressure oxygen treatment than nonhematopoietic cancer cells. Also, the study notes that the amount of oxygen and the pressure seem to be important factors in causing apoptosis in the cancer cells.

[A 2005 study](#) published in Anticancer Research tested the effect of HBOT on four specific types of breast cells: normal mammary cells, cells from a primary tumor, MCF7 human mammary adenocarcinoma cell lines, and cells from a tumor that had spread to other parts of the body (metastatic tumor cells). The goal was to see how HBOT influenced the growth of these different types of breast cells.

The study found that HBOT inhibited the growth of all four types of breast cells studied and that the effect was more pronounced the longer the cells were exposed to HBOT.

Other conditions such as high oxygen levels alone or increased atmospheric pressure also slowed down cell growth, but HBOT had the most significant effect.

It also found that HBOT worked even better when combined with certain cancer drugs, making them more effective at inhibiting cell growth. The authors also noted that the inhibitory effects of HBOT were still noticeable two weeks after exposure.

[Another study](#) conducted in 2010 and published in the journal Cancer Biology & Therapy found that applying HBOT to mice with ovarian tumors over 21 days led to a notable reduction in tumor growth.

In an additional experiment, the researchers took it a step further by combining HBOT therapy with a chemotherapy agent in a separate group of mice. The outcome demonstrated a reduction in tumor volume within two weeks with the combined approach.

Another study outlined in the 2021 review in *Medicina* found that when used in combination with specific chemotherapy drugs—paclitaxel, carboplatin, and hyperthermia—HBOT showed promising results in treating patients with non-small cell lung cancer and multiple metastases.

Mitigating Damage Caused by Radiation and Chemotherapy

Radiation therapy is a common treatment for cancer, but it can cause damage to healthy tissues and organs.

Almost all tissues affected by these delayed radiation injuries show a specific type of tissue damage that includes low oxygen, poor blood supply, and reduced cell presence, according to the *Medicina* review.

The review also notes that HBOT has consistently proven to be an effective treatment for these radiation-induced injuries and is supported by medical organizations such as the [Undersea and Hyperbaric Medical Society](#) and the [European Committee for Hyperbaric Medicine](#).

Below are documented ways HBOT can help with damage caused by radiation therapy:

[Endothelial Injury](#) and Vascular Damage

HBOT has been shown to repair damage and promote the growth of [new blood vessels](#), as well as endothelial cells that line blood vessels, [according to](#) Johns Hopkins Medicine literature on HBOT.

[Vascular Disease](#)

HBOT can help reduce the risk of vascular disease by improving blood flow and oxygen delivery to the tissues.

[A 2021 study](#) in the *Impact Journal on Aging* found that HBOT had a positive effect on blood vessels in mice with Alzheimer's disease. The study shows that the diameter of blood vessels in the brain was slightly reduced in these mice, resulting in less blood flow. HBOT helped to widen the narrowed blood vessels, increasing blood flow and reducing hypoxia.

This improvement continued for at least two weeks after the HBOT treatment was completed, having a lasting positive effect on blood vessels and oxygen levels in the brains of these mice with Alzheimer's disease, according to the study.

Hypoxia

HBOT can help mitigate the effects of hypoxia by increasing the amount of oxygen delivered to the tissues, as noted in the study mentioned above.

HBOT is also shown to help mitigate damage from chemotherapy. Some of the documented benefits covered in the *Medicina* review include the following:

Preventing Chemotherapy-Induced Neuropathy

HBOT has been shown to be effective in preventing chemotherapy-induced neuropathy, which is a common side effect of chemotherapy.

Reducing Mortality in Cancer Animals

The combination of chemotherapy with HBOT has been found to significantly reduce mortality in animal cancer models, such as osteosarcoma and lung cancer.

However, the article stresses that the combined use of HBOT and certain chemotherapy drugs, such as doxorubicin, bleomycin, or cisplatin, may lead to adverse effects, such as cardiotoxicity, pulmonary toxicity, or impaired wound healing.

Approved Uses of HBOT

The [FDA provides the following list](#) of conditions that HBOT can be marketed for:

- Air and gas bubbles in blood vessels
- Anemia (severe anemia when blood transfusions can't be used)
- Burns (severe and large burns treated at a specialized burn center)
- Carbon monoxide poisoning
- Crush injury
- Decompression sickness (diving risk)
- Gas gangrene
- Hearing loss (complete hearing loss that occurs suddenly and without any known cause)
- Infection of the skin and bone (severe)
- Radiation injury
- Skin graft flap at risk of tissue death
- Vision loss (when sudden and painless in one eye due to blockage of blood flow)
- Wounds (nonhealing, diabetic foot ulcers)

Unapproved Uses of HBOT

The [Cleveland Clinic overview](#) on HBOT provides the following list of conditions that alternative medicine centers claim HBOT helps treat:

- Age-related symptoms or conditions (anti-aging)
- Autism spectrum disorder
- COVID-19
- Cerebral palsy
- HIV and AIDS

- Depression
- Strokes
- Hair loss (alopecia)
- Migraine headaches
- Sports injuries

The Cleveland Clinic overview warns that there's currently insufficient research and testing to definitively establish the safety and efficacy of hyperbaric oxygen therapy for these conditions and that one should only go for approved medical conditions preferably with a health care provider certified with the Undersea and Hyperbaric Medical Society.

Possible Side Effects

Possible side effects as documented by the Cleveland Clinic include the following:

- Sinus congestion
- Middle ear injuries
- Temporary nearsightedness
- Oxygen poisoning
- Claustrophobia
- Seizures (rare cases)

A Johns Hopkins Medicine overview on HBOT also states that HBOT “shouldn't be used by people who have had a recent ear surgery or injury, a cold or fever, or certain types of lung disease.”