



Hyperbaric Oxygen Therapy Heals Radionecrosis of the Mouth, Head and Neck

The FDA and Medicare approve the use of hyperbaric oxygen therapy to treat osteoradionecrosis, and the evidence shows that HBOT helps heal an overwhelming percentage of patients who have osteoradionecrosis.

How Hyperbarics Helps



Stimulates angiogenesis of the radiated bed



Salvages threatened breast soft tissue reconstruction



Reduces inflammation



Reduces fibrosis, softens connective fibrous tissue



Mobilizes and increases stem cells



Effective in wound closure and resolving contraction



Corrects ischemia



Resolves infection

What Research Says

Of course, radiation therapy is a common treatment for head and neck cancer, but as we know, it can sometimes lead to the development of radionecrosis, a condition in which the tissue in the irradiated area becomes damaged and non-functional. Fortunately, hyperbaric oxygen therapy (HBOT) can help heal radionecrosis. In fact,

the FDA and Medicare approve hyperbaric oxygen therapy to heal radionecrosis. It turns out there are several mechanisms by which HBOT can help heal radionecrosis. Radiation can damage tissues and blood vessels in and surrounding the irradiated area, which can lead to tissue hypoxia (low oxygen levels) and impaired healing.

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Hyperbaric oxygen therapy increases the amount of oxygen available to damaged tissues by over 1,200%, which can help stimulate angiogenesis (the growth of new blood vessels), which in turn promote healing.

Another mechanism by which hyperbarics heals osteoradionecrosis is the reduction of inflammation. Radiation therapy can cause inflammation in the irradiated tissue, which can exacerbate tissue damage and impair healing. HBOT can help reduce inflammation by promoting the release of anti-inflammatory cytokines and decreasing the production of pro-inflammatory cytokines.

Finally, HBOT can stimulate the production of collagen, a protein that is important for tissue healing. Collagen helps provide structural support to tissues and can help improve tissue strength and elasticity. HBOT can increase the production of collagen by stimulating the activity of fibroblasts, the cells responsible for producing collagen.

One concern that some oncologists have expressed about HBOT with their cancer patients is whether it can cause cancers to grow. While there is concern, there is no evidence to support this idea. In fact, there is evidence to suggest that HBOT may even be helpful in treating cancer. Still, some oncologists have concerns that because some types of cancer grow rapidly in an oxygen-rich environment, it exposes their patients to risk of their cancers spreading due to the oxygen-rich environment that HBOT promotes. However, hyperbaric oxygen therapy, which delivers oxygen under up to 3x pressure, seems to behave differently from oxygen alone. Specifically, it increases the growth of healthy new cells, but does not appear to stimulate the growth of cancerous cells.

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In fact, there is evidence to suggest that HBOT may even be helpful in the treatment of cancer. One study published in the Journal of Cancer Research and Therapeutics found that HBOT improved the efficacy of chemotherapy in patients with advanced ovarian cancer. Another study published in the Journal of Experimental & Clinical Cancer Research found that HBOT inhibited the growth of breast cancer cells in vitro.

While we need to see additional stage 3 trials, evidence to-date suggests that hyperbaric oxygen therapy is safe for cancer patients, and that it may help make some chemotherapy drugs more effective in treating cancers.

At Bay Area Hyperbarics, we have seen dozens of patients with osteoradionecrosis, as well as damage from radiation to soft tissues, including the breast, bladder, prostate and other sex organs. Each of these patients has seen significant improvement to the damaged tissue or bone, including a reduction in open sores, pain, and strengthening of bones for example in the mouth. Give our medical director or our nurse practitioners a call today to discuss the effect of hyperbaric oxygen therapy on radiation damage, as well as an adjuvant therapy for certain chemotherapy drugs.

Research Studies

Treasure Island (FL): StatPearls Publishing. Cooper, Jeffrey. Aug, 2022

Hyperbaric treatment of delayed radiation injury

Diffuse injury pattern related to the isodosing concept. The tumor is treated as a spheroidal mass with the most number of target cells at the center. A boost dose is given to the center of the tumor. At incremental distances from the center of the tumor, the mass is less; therefore, the delivered dose is less. However, the patient develops an additional diffuse area of injury from beam divergence. Radiation wounds demonstrate a progressive, proliferative endarteritis. This is an obliterative process that destroys the tissue blood supply. The tissue ends up chronically hypoxic, fibrotic, and with a dearth of blood vessels.[7] There is no satisfactory treatment of radiation necrosis using conventional therapy. It is difficult if not impossible to provide adequate nutrients and oxygen to the devascularized tissues. Surgical reconstruction of previously irradiated tissue has a very high failure rate due to poor healing. Hyperbaric oxygen therapy helps build new blood vessels in bone that typically has low blood flow in the first place. As such, it delivers oxygen, the key nutrient required for the bone to heal, and to help deliver the antibiotics required.

Treasure Island (FL): StatPearls Publishing. Buboltz, Jerome B. Jan, 2023.

Hyperbaric Treatment of Brain Radiation Necrosis

Many case studies demonstrate at least some benefit from hyperbaric oxygen therapy. HBOT promotes tissue healing by improved angiogenesis that results in better tissue perfusion. Hyperbaric oxygen therapy also can reduce tissue edema and enhance collagen synthesis by fibroblasts which activity is crucial for the healing of damaged tissue. HBOT helps to restore normal cellular functions to aid the repair of the ischemic damaged tissue. HBOT usually is delivered at a dose of 2 to 2.4 atmospheres absolute for 90 to 120 minutes daily and may take 20 to 30 treatments before significant angiogenesis occurs with the improvement of the neurologic symptoms. The major disadvantage of hyperbaric oxygen therapy is that it is time-consuming. More studies on the use of hyperbaric oxygen therapy alone and in conjunction with other therapies, such as concomitant steroids and surgery, are needed to determine the best treatment practices. An interesting study using bevacizumab (which inhibits VEGF) and HBOT (which enhances VEGF) in combination would be interesting to see conducted.

Target Oncol. Moen, Ingrid et al. 2012

Hyperbaric oxygen therapy and cancer—a review

Hypoxia is a critical hallmark of solid tumors and involves enhanced cell survival, angiogenesis, glycolytic metabolism, and metastasis. Hyperbaric oxygen (HBO) treatment has for centuries been used to improve or cure disorders involving hypoxia and ischemia, by enhancing the amount of dissolved oxygen in the plasma and thereby increasing O₂ delivery to the tissue. Studies on HBO and cancer have up to recently focused on whether enhanced oxygen acts as a cancer promoter or not. As oxygen is believed to be required for all the major processes of wound healing, one feared that the effects of HBO would be applicable to cancer tissue as well and promote cancer growth. Furthermore, one also feared that exposing

patients who had been treated for cancer, to HBO, would lead to recurrence. Nevertheless, two systematic reviews on HBO and cancer have concluded that the use of HBO in patients with malignancies is considered safe. To supplement the previous reviews, we have summarized the work performed on HBO and cancer in the period 2004–2012. Based on the present as well as previous reviews, there is no evidence indicating that HBO neither acts as a stimulator of tumor growth nor as an enhancer of recurrence. On the other hand, there is evidence that implies that HBO might have tumor-inhibitory effects in certain cancer subtypes. Thus, researchers believe we need to expand our knowledge on the effect and the mechanisms behind tumor oxygenation.

Patient Experiences

Bay Area Hyperbarics has healed hundreds of patients with stubborn and non-healing wounds over the last 20 years.



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Lorraine was about to lose several teeth, because the bones in her jaw were weakened by radiation from cancer treatments.

HBOT strengthened her bones and healed open sores in her mouth that her oral surgeon told her would otherwise not heal. At Bay Area Hyperbarics, we have treated patients for 20 years with radiation damage from treating oral cancers. HBOT has help them return to normal lives. Our patients tell us it also seems to heal their fatigue from “chemo brain” and radiation so they get their energy back. We can help you or your loved one too.

Lorraine, 46

Strengthened bones in her jaw and healed open sores



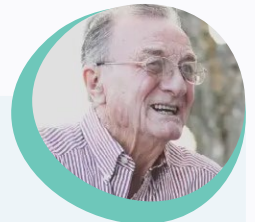
Fiona, a lively and proud mother of five grown children and an avid gardener, had received radiation many years earlier, which had damaged her bone.

It caused a severe infection in the bones in the roof of her mouth. In addition, Fiona was concerned about her low energy levels. She had tried everything, including antibiotics. When she received HBOT along with antibiotics, it cured the bone infection in her mouth. It healed and regrew her bones and gums. Fiona also said that her energy levels had also returned sufficiently that she could again garden, which she said was fundamental to her sense of well-being. On some school holidays, she brings one of her children in to the shop. Angelina had a lumpectomy and radiation to her right breast. The difficulty started slowly over the next several years when she had pain on lifting up her right arm.

Cancer was ruled out. She was sent to physical therapy. She did her physical therapy exercises daily as they requested but the weakness and pain continued to make working difficult as she repaired items on the machines. I gave her information about hyperbaric medicine and what it had done for my mother. She took it to her physician who approved her for HBOT. The mild swelling and some pain reduced within the first week of treatments. It took 30 treatments to repair the tissues to dispel the pain. A year later she was still working in the shop without pain or range of motion issues.

Fiona, 62

Cured her bone infection, regrew bones and gums, and she regained her previous energy



Howard had very painful open sores in his mouth resulting from his cancer treatment. He had already lost a few teeth. What worried his son is that he had lost too much weight. HBOT stabilized two loose teeth and healed his mouth sores, allowing him to return to a healthy weight.

Howard, 74

Stabilized teeth, healed his mouth sores and increased weight to a healthy level.

Refer a Patient

Refer a patient in three easy steps.

1 You submit patient's information

As a provider, your office fills out and faxes back the Patient Referral Form. Have questions? Call us!

2 We get authorizations

We make sure the patient understands treatment and then follow the prescribed protocol to get the patient on the road to recovery!

3 Patient starts HBOT

Our medical staff meets with the patient to ensure that HBOT is appropriate, and contacts Medicare or private insurance to receive authorization.



Scan for Patient Referral Form

 **Call Us: (408) 356-7438**