

# Hyperbaric Wellness Center



## Indications, Contraindications, and Possible Complications of Hyperbaric Oxygen Therapy

Hyperbaric Oxygen Therapy, also known as HBOT, is a medical treatment involving the use of oxygen under increased atmospheric pressure. The therapeutic principle of HBOT lies in a drastically increased partial pressure of oxygen in the tissues of the body. The oxygen partial pressures achievable under HBOT are much higher than those under breathing pure oxygen at normobaric conditions (i.e. at normal atmospheric pressure). This increase in atmospheric pressure relates to an increased oxygen transport capacity of the blood. Under normal atmospheric pressure, oxygen transport is limited by the oxygen binding capacity of hemoglobin in red blood cells while very little oxygen is transported by blood plasma. With HBOT, oxygen transport by plasma is significantly increased, suppling the body with an increased oxygenization, promoting healing on a cellular level.

### Indications

Currently the indications for hyperbaric oxygen therapy are expanding. Throughout the world, there are over 100 diagnoses that are improved by use of this therapy. However, we at the Hyperbaric Wellness Center have decided to focus on neuro-developmental disorders found in children. It has been shown that children with these disorders show tremendous improvement in healing, function, and cognitive processes. The following list shows these and other diagnoses for which we have the ability to treat:

Autism / Autistic Spectrum Disorders	ALS (Amyotrophic Lateral Sclerosis)
ADD (Attention Deficit Disorder)	Brain Injury
Cerebral Palsy	CFS / CFIDS (Chronic Fatigue Immune Dysfunction)
Crohn's Disease	Fibromyalgia
Interstitial Cystitis	Lupus
Lyme Disease	Memory Loss
Migraine	Multiple Sclerosis
Neuropathy	RSD (Reflex Symapthetic Dystrophy)
Rheumatic Diseases	Sports Injury
Stroke	Traumatic Brain Injury

### Contraindications

**con-tra'-in-di-ca'-tion** - a symptom or condition that makes a particular treatment inadvisable.

There are few contraindications for hyperbaric oxygen therapy. In fact, the medical textbook *Hyperbaric Medicine Practice* states, "Of all the medical treatments carried out in hospitals,

hyperbaric oxygen therapy is one of the most benign (non-threatening) when it comes to side effects. The contraindications are relatively few." Nevertheless, the use of oxygen under hyperbaric conditions is a medical therapy, and as such, does have some conditions which make this treatment inadvisable for some patients. The following is a list of relative contraindications:

- Upper respiratory infections: These conditions can make it difficult for the patient to clear their ears, which can result in what may be termed "sinus squeeze".
- High fevers: In most cases the fever should be lowered before hyperbaric oxygen treatment begins.
- History of thoracic (chest) surgery: This is rarely a problem and usually not considered a contraindication. However, there is concern that air may be trapped in lesions that were created by surgical scarring. These conditions need to be evaluated prior to considering HBO therapy.
- Malignant disease: Since cancers both thrive in blood rich environments and may be suppressed in high oxygen environments, cancer and HBO poses a dilemma since HBO both increases blood flow via angiogenesis and also raises oxygen levels.
- History of spontaneous pneumothorax
- Severe chronic obstructive pulmonary disease (COPD) with CO<sub>2</sub> retention or bullous emphysema. This condition can lead to pneumothorax during HBO treatment.
- Severe cardiomyopathy or decompensated congestive heart failure (CHF)
- Poorly controlled seizure disorders.
- History of optic neuritis.
- History of reconstructive ear surgery.

Also, patients should not undergo hyperbaric oxygen therapy if they are taking or have recently taken the following medications:

- Doxorubicin (Adriamycin) - A chemotherapeutic drug.
- Disulfiram (Antabuse) - Used in the treatment of alcoholism.
- Cis-Platinum - A cancer drug.
- Mafenide Acetate (Sulfamylon) - Suppresses bacterial infections in burn wounds.

## **Possible Complications**

Ear barotrauma: This is the most common side effect of HBOT. Ear barotrauma is a condition of discomfort in the ear caused by pressure differences between the inside and the outside of the eardrum. This may be caused by an upper respiratory infection, nasal congestion, or immature or deformed eustation tubes. Usually, the discomfort is temporary and can be resolved by equalizing the pressure in the ears. Children can be taught to clear (pop) their ears by drinking water, chewing gum, yawning, or simply by blowing pressure into the nose while pinching it shut. Decongestants or nasal sprays may be used, if necessary. If a patient is unable to equalize their ear pressure, the chamber pressure will be reduced until their ear discomfort subsides. Rarely, some patients may have to stop treatment and get evaluated by an ENT specialist for possible ear tube placement. Also, we have a device, called the Ear Popper, that helps in relieving the discomfort of sinus pressure.

**Sinus pain:** This is the second most common HBOT complication and usually occurs in patients with upper respiratory track infections or allergic rhinitis. Usually a program of decongestant nasal spray (Afrin), antihistamines, and/or steroid spray just prior to compression allows therapy to continue.

**Ocular changes:** Rarely myopia and vision changes can be caused or worsened by hyperbaric therapy. It is always temporary and resolves after discontinuing treatment. Do not get new prescription glasses while receiving treatment. Acceleration of growth in existing cataracts is seen rarely in the elderly.

**Oxygen toxicity:** Pulmonary and Neuralgic manifestations of excessive oxygen are often cited as major concerns. Oxygen tolerance limits that avoid these manifestations are well defined for continuous exposures in normal people. Toxicity is not produced by daily exposures to oxygen at below 2.0 ATA for up to 2 hours per day. The protocol for most of the diagnoses we address is 1.5 ATA for 1 hour a day.

**Oxygen seizures:** Incidence of seizures is very rare and occurs only about once in over 200,000 treatments. Seizures have never been reported in treatments at less than 2.0 ATA for 1 hour or less. These are usually seen in persons with a known seizure disorder. Please advise us if you or your child have a known history of seizures.

**Fire:** Theoretically there is an increased risk of fire due to the enriched oxygen atmosphere inside of a tank. Since this chamber used by this clinic delivers oxygen through a mask system, the risk of fire is greatly reduced. Further, these risks are minimized by eliminating fire causing materials from the tank during treatment. No pocket warmers, lighters, or cell phones should ever be carried inside the chambers. Under certain conditions, battery operated devices may or may not be allowed.

**Claustrophobia:** Due to the confining nature of this treatment, confinement anxiety may occur. If signs of this are seen, therapy may be discontinued until this problem is resolved. If this is an issue, please keep in mind that in an emergency it takes two minutes to decompress the chamber. The chamber door can not be opened until it is totally decompressed.

**Pulmonary barotrauma:** Pulmonary barotrauma is a condition that rarely happens at the end of a therapy session, during decompression. This can be caused by the patient holding their breath during decompression or by certain lung diseases. Lung diseases that can cause an increased risk of pulmonary barotrauma include those in which there is obstruction to gas flow, such as asthma that has not responded fully to treatment, and lung scarring or inflammation (such as sarcoidosis, eosinophilic granuloma, or interstitial fibrosis). More rarely, a patient might experience a spontaneous pneumothorax. This occurs when an existing abnormality of the lung ruptures and allows air to leak between the lung tissue and the chest wall making it difficult to expand the lung and breathe. These are very dangerous and require emergency care. Fortunately this complication has never been seen in mild hyperbaric treatments.