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Hyperbaric Oxygen Therapy (HBOT)

Hyperbaric Oxygen Therapy (HBOT) has a long history. The first chamber used to treat patients was constructed in 1662 by Henshaw. And yes, that date is correct, which makes hyperbaric therapy almost 350 years old. Needless to say, there have been a large number of studies done, and its effectiveness has been well established.

The Cole Center for Healing uses state of the art equipment manufactured by HyperTec. This is a physician owned, operated, and staffed facility. Dr. Cole works with each person to help maximize the benefits from their treatments at our center. Your comfort and well-being are our prime concern.

WHAT IS HBOT?

HBOT treatments involve placing you in a chamber, and then increasing the atmospheric pressure. During the treatment you breathe pure oxygen. This saturates the tissues with oxygen, and reverses any areas of hypoxia (low oxygen levels). As a comparison, the average person breathes in about 6 pounds of oxygen a day, which is about the same amount by weight of food and water intake. During a single hour of HBOT, a person will take in about 2.4 pounds of oxygen. This increases the oxygen content of the tissues by a factor of 10-15. Some of the effects this has are to promote the growth of new blood vessels, decreases swelling and inflammation, deactivates toxins, increase the body's ability to fight infections, clears out toxins and metabolic waste products, and improve the rate of healing.

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WHAT CONDITIONS CAN BE TREATED WITH HBOT?

Accepted problems for which HBOT is used include the following:

- Air or gas embolism
- Carbon Monoxide poisoning
- Acute traumatic ischemia
- Exceptional blood loss
- Cyanide poisoning
- Decompression sickness
- Some non-healing wounds
- Gas gangrene
- Necrotizing infections
- Some cases of osteomyelitis
- Radiation effects
- Compromised skin flaps
- Burns

The above conditions are the only ones that can be treated by a hospital-based center. However, we are a freestanding center, and are not restricted to treating only these problems. HBOT is beneficial in any condition that would improve with increased oxygen levels. Specifically, it has been found to be helpful in a vast number of conditions, including the following:

- Cerebral palsy
- Stroke
- Multiple Sclerosis

Head injuries and concussion
Infections of all types , including Lyme's
Heart attacks
Chronic fatigue
ADD/ADHD
Sports injuries
Autism
Migraine headaches
Cancer
HIV
Trigeminal neuralgia
Raynaud's phenomenon
Vascular disease
Crohn's disease
Fibromyalgia
Decreased immune function
Venomous bites
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WHAT ARE THE CHAMBERS LIKE?

We use two types of chambers, both of which are state of the art. Our chambers are manufactured by HyperTec, Inc. They meet every United States and international safety regulation currently in effect. They are extremely safe, comfortable, and reliable. To date, there has not been a single mechanical problem in any chamber in use.

The first chamber that we use is a monoplace unit, in which only one person is treated at a time. The second is a multiplace unit, which treats several people together. The monoplace unit has an atmosphere that is pure oxygen, and you lie on a comfortable mattress during the treatment. The multiplace has an atmosphere of regular air, and each person has a bib (a plastic hood), which is placed over the head and supplies oxygen. Each person has a chair that they sit on during the treatment. Both of the units are equipped with video and music, and you can choose whether or not to use this feature. The monoplace has a clear acrylic cover, while the multiplace has portholes that you can look out of. You have constant access to the technician during each treatment via intercom.

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WHAT IS IT LIKE TO GET AN HBOT TREATMENT?

Before starting your treatment, you change into scrub suits and remove your shoes. Upon entering the chamber, you pick a seat and get comfortable. As the treatment begins, you feel a pressure on your ears, much like that of being in an airplane. It is important to clear your ears constantly during this time. As the pressure increases it gets a little warmer, but is never uncomfortable. If the pressure is too uncomfortable or builds up too fast, simply notify the technician and it can be slowed down. When the treatment pressure is reached, you put on your bib, and then just sit back and relax. You can read, take a nap, or use our entertainment system. It's a good idea to drink some water during the pressurization and treatment, and this can help the young ones clear their ears. When the treatment ends, the air becomes cooler and mist forms in the air. It is important to clear the ears during this time as well. The overall experience is quite pleasant, and most children find it to be fun and exciting.

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WHAT CAN YOU TAKE INTO THE CHAMBERS?

In general, nothing can be taken into the monoplace unit. This uses a 100% oxygen environment, and is therefore strictly monitored. Take nothing into the chamber unless you clear it with the technician.

The multiplace chamber uses air, and so is less stringent. You can take water bottles and some books and magazines into the chamber.

In both chambers, items such as lighters, matches, cigarettes, nylons, wigs, ointments, hearing aids, petroleum jelly, watches, makeup, lipstick, lip balm, hairspray, hair dressings, synthetic fabrics, or hard contact lenses are not

allowed. Underwear items with metal, such as under wire bras, can be worn as long as they are covered by cotton clothing. If you have a wound dressing of any kind, the technician must exam it before you enter the chamber.

General Rule: don't take anything into either chamber unless you have been specifically told that it is safe to do so.

NICOTINE AND HBOT

Nicotine causes vasoconstriction, or narrowing of the blood vessels. This reduces blood flow to the tissues, and interferes with the growth of new blood vessels. These are two problems that we are trying to counteract with HBOT, and so nicotine works against the therapy. Therefore, it is **STRONGLY** recommended that you stop all nicotine use before starting HBOT. If you continue to use nicotine, you will not receive the full benefit of HBOT. Your treatment might take longer, or it might not work at all.

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HYPERBARIC SIDE EFFECTS

As with any treatment, side effects are possible. They are, however, minimal. HBOT has been proven to be extremely safe, and the actual number of side effects is very small.

The most common problem is trauma to the ears and sinuses caused by pressure changes. We will teach you auto inflationary techniques to promote adequate clearing of the ears during treatment. Decongestants may be helpful. This problem is temporary and resolves when HBO treatment is completed. If you have ear pain or are unable to clear your ears, the insertion of myringotomy tubes or placing a small hole in the eardrum may be necessary before the treatment continues. We also have special earplugs that can help with this problem without having surgery.

OTHER SIDE EFFECTS ARE MORE RARE:

Oxygen toxicity can cause CNS and pulmonary effects. Seizures occur rarely during treatment and are self-limiting. Seizures will cease when the patient is removed from breathing the pure oxygen. Factors such as history of seizures, high temperature, acidosis and low blood sugar are taken into account before treatment is begun

- Pulmonary oxygen toxicity may occur in patients who require supplemental oxygen between treatments. This is very rarely seen with the limited number of treatments currently used
- Some patients may suffer claustrophobia. This is managed by maintaining communication, use of relaxation techniques and mild sedation, if necessary. If you have a problem with this condition, please let us know. Dr. Cole has some fast and easy techniques to help deal with it.
- Rarely, patients develop temporary changes in eyesight; these are minor and occur only in those individuals who have large numbers of treatments. Vision usually returns to normal within eight weeks following the end of treatments.
- Patients with cataracts may experience accelerated maturation of the cataract, but the treatments do not cause cataract formation.

OTHER AREAS OF CONCERN INCLUDE:

Asthma - Small airway hyper-reactivity may result in air trapping and damage to the lungs on ascent. Dr. Cole will evaluate each person carefully before making a decision about HBOT. There is some evidence that the administration of some bronchodilators may increase the incidence of gas embolism to the brain through pulmonary vasodilation.

Congenital spherocytosis - This is a condition in which the person has fragile red blood cells. Treatment may result in massive hemolysis

Cisplatinum - There is some evidence that this drug retards wound healing when combined with HBO.

Disulphiram (Antabuse) - There is evidence to suggest that this drug blocks the production of superoxide dismutase. This may severely affect the body's ability to neutralize oxygen free radicals. Experimental evidence suggests that a single exposure to HBO is safe but that subsequent treatments may be unwise.

Doxorubicin (Adriamycin) - This chemotherapeutic agent becomes increasingly toxic under pressure. Animal studies suggest at least a one-week break between last dose and first treatment of HBOT.

Emphysema with CO₂ retention - We must exercise caution in giving high pressures + concentrations of oxygen to patients who may be existing on the hypoxic drive in order to continue breathing. Patients with emphysema may become apnoeic (have difficulty breathing) in the chamber and require emergency care. In addition, gas trapping and subsequent lung rupture can occur. This is also true for any condition that is associated with bullous formation in the lungs.

High Fevers - High fevers (>38.5degC) tend to lower the seizure threshold due to O₂ toxicity and may result in the delay of relatively routine therapy. If we decide to proceed with treatment, then we would attempt to lower your temperature with antipyretics and physical measures

History of middle ear surgery or disorders - Please notify us of any ear problems, current or past. You should be able to clear your ears, or there is a risk of further injury.

History of seizures - HBO therapy may lower the seizure threshold and some workers advocate increasing the baseline medication for such patients

Optic Neuritis - There have been reports in patients with a history of optic neuritis of failing sight and even blindness after HBO therapy. This complaint would seem to be extremely rare but of tragic consequence.

Pneumothorax - A pocket of trapped gas in the pleura will decrease in volume on compression and re-expand on surfacing during a cycle of HBO therapy. These changes may result in further lung damage and or arterial gas embolization. If there is a communication between lung and pneumothorax with a tension component, then a potentially dangerous situation exists as the pressure is lowered. As Boyle's Law predicts, a 1.8 liter pneumothorax at 20 msw is potentially a 6 liter pneumothorax at sea level - certainly a life-threatening situation. For this reason it is mandatory to have a chest tube in place to relieve a pneumothorax before contemplating HBO therapy. Please let us know if you have a history of chest trauma or thoracic surgery.

Pregnancy - The fears that either retrolental fibroplasia or closure of the ductus arteriosus may result in the fetus whose mother undergoes HBO appear to be groundless from considerable Russian experience. However, we continue to exercise caution in the treatment of pregnant women, and HBOT will be done only on a case-by-case basis.

Upper Respiratory Tract Infections - These are relative contra-indications due to the difficulty such patients may have in clearing their ears and sinuses. Elective treatment may be best postponed for a few days in such cases.

Viral Infections - Many workers in the past have expressed concern that viral infections may be considerably worsened after HBOT. There have been no studies to give convincing evidence of this and no reported activation of herpetic lesions associated with HBOT. Others believe that HBOT can be helpful in eliminating viral infections.

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