

## Mild Hyperbaric Therapy As An Immune Modulator

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The following is a summary of the work done by Heuser et al.

Mild Hyperbaric Oxygen treatment (mHBOT) in a portable chamber, at 1.3 ATA and 24% oxygen, administered daily for ten consecutive sessions (1 hour each) improves brain function as measured by SPECT brain scan and a test for attention and reaction time.

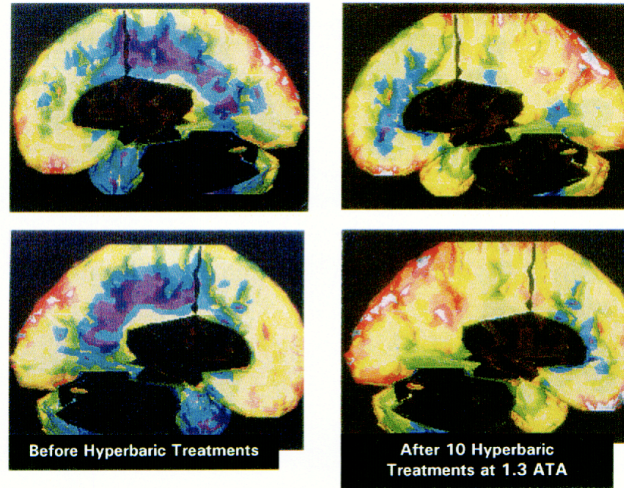
Patients often report a sense of well-being and youthfulness after mHBOT therapy. We wondered whether immune function is positively affected by mHBOT. We chose apoptosis (a function of programmed cell death) and natural killer cell activity (a function of immune surveillance) as parameters in nine patients.

Our preliminary data show that 10 mHBOT sessions can positively affect immune function: natural killer cell function increases and apoptosis values decrease. More sessions may be needed to affect positive results in an even higher percentage of patients.

We conclude that mHBOT can improve immune function. Since apoptosis numbers increase with age the reversal of that process may have significance with regard to aging.

**Disclaimer:** Although mild hyperbaric therapy has been reported to be beneficial for a wide range of conditions, this treatment is not meant as a cure for any condition or disease, and no therapeutic outcomes can be guaranteed

## S.P.E.C.T. Scans



These SPECT scans were taken from a person with impaired brain function before and after 10 hyperbaric treatments at 1.3 ATA. The treatments were administered for one hour per day for five consecutive days for two weeks. The darker blue and purple areas indicate low activity. The lighter red and yellow areas indicate high activity.

## Are There Side Effects?

Ear and sinus discomfort from the change of pressure can occur, similar to flying in an airplane. This can be minimized by ventilating or “popping” the ears well during pressurization, or by slowing your dive speed. Our staff will work closely with you to help you and your child learn what works best.

To avoid trauma to the ears, treatment will be held if your child has a cold, congestion or fever.

A parent always accompanies the child into the chamber and keeps them occupied for the hour, so the accompanying adult must also be well.

# Mild Hyperbaric Therapy Helps Many Chronic Diseases and Conditions



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## What Is Mild Hyperbaric Therapy ?

Mild Hyperbaric Therapy (mHBOT) is a medical treatment in which a person is exposed to increased atmospheric pressure inside an inflatable chamber. The typical pressure reaches 1.3 atmospheres, which can also be expressed as 4 pounds per square inch. The increase in pressure allows more oxygen to reach the cells of the body which has many healing and therapeutic benefits.

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### How Does Mild Hyperbaric Therapy Work ?

According to Henry's Law of Physics, an increase in atmospheric pressure allows more gas to be dissolved into any given liquid. Henry's law is displayed in every can of soda. When soda is canned at the factory, it is put under pressure so that more carbon dioxide can be dissolved into the soda causing it to be carbonated. When the can is opened, the pressure is released. Without the pressure to keep the gas dissolved, the soda will become flat in a few hours. This same principle applies to oxygen and plasma, the liquid part of the blood. When the body is under pressure, the fluids of the body such as the plasma and cerebrospinal fluid, will dissolve more oxygen than they would if they were not under pressure. Not only does this increase the amount of available oxygen to the tissues, it allows oxygen to reach areas of the body that would normally be difficult to reach. This increased oxygenation allows for many health benefits, such as cell growth and regeneration, detoxification, immune support, new capillary growth, and improved neurological functioning.

“When the oxygenated plasma circulates near dormant or injured tissue such as an encephalopathic brain, a bruised muscle, a sprained tendon, or a surgical wound, the oxygen in the plasma can and does dissolve further into the damaged area than the oxygen that's attached to the red blood cell in the “traditional” delivery system.” (Buckley, 2005)

## What Are the Different Types of Hyperbaric Oxygen Therapy?

Hyperbaric medicine is separated into two types- High pressure and mild. High pressure is found in hospital settings or specialized hyperbaric centers and delivers pressures above 2 atmospheres. The Medicare approved indications for hyperbaric oxygen therapy such as wound healing, crush injuries and carbon monoxide poisoning involve the use of high pressures greater than 2.0 atm. and 100% oxygen. However, in several neurological conditions, research has shown lower hyperbaric pressures (1.3-1.5 atm.) to be preferable. For example, one study of 111 children with cerebral palsy and a history of hypoxia in the perinatal period had statistically significant clinical improvements in gross motor function, memory, attention, and language production after hyperbaric therapy. One group received lower pressure hyperbaric therapy at 1.3 atm. and room air while the other group was given higher pressure at 1.75 atm. and 100% oxygen. The improvements in symptoms were statistically equivalent in the two groups. (*Lancet* 2001;357 (9256):582-6). The increase in the oxygen carrying capacity of the blood is due to dissolved oxygen which is achieved by the increase in atmospheric pressure (Henry's Law of Physics). Each type of hyperbaric therapy has its advantages and disadvantages. The higher pressures are very useful in acute illnesses, and the lower pressures are safer, generally without major side-effects, and better for chronic illnesses.

## Hyperbaric Oxygen and Autism

The use of mild hyperbaric therapy in children with cerebral palsy has shown benefit and, based on these studies, the methodology for using mild hyperbaric therapy to help with the symptoms of autism is emerging. Increasing research shows that in autism and other neurological disorders there are areas of the brain lacking in blood flow and oxygen, and that when these areas of the brain are exposed to hyperbaric oxygen the blood flow and level of activity in these portions of the brain returns to normal. The improvements seen in these early studies are very encouraging with improvements noted in irritability, social withdrawal, hyperactivity, motivation, speech, and sensory/cognitive awareness (Rossignol et al., *BMC Pediatrics* 2007;7:36 and *Med Hypotheses* 2006;67(2):216-28). Dr. Rossignol has also recently published a randomized, multicenter trial indicating that hyperbaric therapy at 1.3 atm. and 24% oxygen is safe and effective in children with autism when compared to a control group.

SPECT scans are colorful pictures of the blood flow to your brain. Studies utilizing SPECT scans have shown an improvement in cerebral hypoperfusion in children with autism after mild hyperbaric therapy.

“In addition to impacting cerebral brain flow in injured brains, lower pressure hyperbaric therapy has been shown to positively impact natural killer cell function and thus, immune function. It has also been found to be of benefit in inflammatory conditions and has facilitated improvement in gut disease such as Crohn's and ulcerative colitis. mHBOT has been shown to increase glutathione levels by 15% for at least 24 hours after therapy in previous studies. These areas are all of interest for parents of children with Autism Spectrum Disorders as they are often impaired in their children.” (Buckley, 2005)