

## HYPERBARIC CHAMBER THERAPY

by Ron Hunninghake, M.D.



One of two in Wichita, Kansas, our hyperbaric chamber is truly unique. Hyperbaric therapy was originally used to treat deep sea divers who were thought to be suffering from the formation of air embolisms due to a too rapid ascent from their deep sea dive. Dr. Riordan's son, Neil, was at one time a deep sea diver. Uncoincidentally, Neil was instrumental in the development of hyperbaric oxygen therapy here at the Riordan Clinic.

Neil was working as a Riordan Clinic physician's assistant in the early 90's. The story goes that Dr. Hugh Riordan had sent one of his patients for an evaluation of a non-healing wound on his foot, with the intent of proceeding on to hyperbaric oxygen treatment. Without checking back with Dr. Riordan, the consulting surgeon just amputated the patient's foot!

In deep frustration, Dr. Riordan decided that the Clinic needed its own chamber. Thanks to Neil's knowledge and experience in deep sea diving, he was able to procure the chamber we use today. Neil set up the chamber, the treatment protocol, and spearheaded the overall development of Hyperbaric Oxygen Therapy as a clinical service here.

Let's take a quick tour of the Hyperbaric Chamber room that is located on the lower level of the Riordan Clinic.

Many people have said that the hyperbaric chamber looks like a small submarine. It is a hard shelled pressure vessel made of steel and aluminum with view ports (windows) made of acrylic. The chamber has a human entry hatch, an airtight door to the hatch, and a gurney to lie on so that the patient can comfortably enter and exit the chamber. The patient is attended by a certified Hyperbaric Oxygen

Therapy (HBOT) technician who never leaves the patient during the whole treatment process.

What would a patient experience?

First, our technician would have the patient put on special cotton scrubs, because no metal objects are allowed for safety reasons. The technician would teach the patient how to "clear" their ears as the dive proceeds. This is no different than going up in a plane, where a person has to chew gum or swallow several times in order for the air pressure to equalize behind their ear drums.

Next, the patient lays on a gurney and the technician slides the patient into place inside the chamber. Once the hatch closes, the quiet is all encompassing. The technician is visible through the view port. Our two-way intercom allows the technician to stay in constant communication with the patient. The patient is then instructed to put on an oxygen mask and the technician will adjust it properly. One hundred percent pure O<sub>2</sub> is flowing in. The "dive" is just about to begin!

Now special valves are opened to let in pressured air. Normal room air is (at sea level) about 15 pounds per square inch. This is called "one atmosphere absolute." We abbreviate that as 1 ATA.

Most hyperbaric oxygen treatments take you down to 2 ATA or about 30 pounds per square inch. That's about the same amount of pressure as in the tires of a car. The patient is reminded to swallow. Once the patient does, the air pressure equalizes and they can hear better. (Some patients with chronic ear congestion require special coaching in order to comfort

continued on page 4

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## LETTER FROM THE EDITOR



Readers:  
School is in session and life has become a whirlwind.

In order to keep up with the hustle and bustle of life it is important to stay on top of your health.

This issue focuses on Hyperbaric Oxygen Therapy and not only how it helps chronic patients but how it can help everyone.

What is Hyperbaric Oxygen Therapy? Hyperbaric medicine, also known as hyperbaric oxygen therapy (HBOT), is the medical use of oxygen at a level higher than atmospheric pressure.

Although it has been around for hundreds of years, HBOT has only lately begun to gain recognition for treatment of a variety of disorders, including stroke and multiple sclerosis.

As Dr. Ron states, in his article, "wherever blood flow and oxygen delivery to vital organs is reduced, function and healing can potentially be aided with HBOT."

Hyperbaric Chamber therapy has been used at the Riordan Clinic since the early 1990's. In this issue you will learn more about this incredible therapy and its many benefits.

Also, take notice of some amazing offers that are coming up at the Riordan Clinic, like our Check Your Health lab testing event (formerly Beat the Odds).

This year we have incredible discounts on our lab tests and on our supplements. Don't wait until chronic illness develops. Act now while information about prevention can make a difference.

Enjoy! 

Amanda Hawkinson  
Editor

## HYPERBARIC SUCCESS STORY: MEMORY LOSS


**A** 78-year-old female came to the Riordan Clinic in August 2009. She presented symptoms of memory loss, transient ischemic attack, incontinence, congestive heart failure, cough, fatigue, heart arrhythmias, and macular degeneration.

She came to the clinic because her husband had done research on hyperbaric treatments and wanted to see if she would benefit from the treatments.

She saw Dr. Rebecca Kirby for her initial office visit. Dr. Kirby recommended the following tests be done: a basic cytotoxic test to see if she had food sensitivities, c-reactive protein, essential fatty acids- due to limited diet intake, a blood chemistry, urinalysis, complete blood count, lipid profile, thyroid, and vitamin and mineral levels.

The urine test showed she had an infection and she was given an antibiotic. In addition she was given cranberry juice and probiotics. She also received several IVs with vitamins to boost her immune system.

To improve her memory and cough Dr. Kirby suggested the use of Hyperbaric treatments. After a short period of treatments her husband thought that she was doing a lot better. Her memory and cough had improved, and she was doing puzzles again. Her energy had greatly improved as well. She had been out of town for awhile but when she returned she continued to do Hyperbaric treatments.

At her last appointment in April 2010 she was still having some forgetfulness but continues to maintain her health by continuing HBOT, taking supplements and will see Dr. Kirby in September for a follow up appointment. 



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# HYPERBARIC SUCCESS TAKING A DIVE

## STORY: ALLERGIES

An 81-year-old female has been coming to the Riordan Clinic for many years. She was first seen in May 1995, her symptoms at the time were allergies, gastritis, headaches, hypertension, and chronic sinusitis.

She was seen by Dr. Riordan on her first visit and he recommended that her vitamin levels be checked. He also ordered the following tests: h-pylori, mineral levels, complete blood count, blood chemistry, and urinary analysis. He also did a diagnostic chelation.

Her results showed a large amount of heavy metals in her system. She was prescribed chelation treatments and she has continued treatments on an on-going schedule since then.

She has also taken a large number of vitamins, minerals, Co-enzyme Q10, compound hormones, and MSM.

In May of 2009, Dr. Ron Hunninghake suggested that she try hyperbaric treatments for her "brain fog." She also had trouble sleeping, fibromyalgia, and some skin problems due to stress. To date she has had a total of nine hyperbaric chamber treatments.

She has stated that she is sleeping much better and is actually having dreams now. Her blood pressure has lowered and her energy level has increased.

[H]



by Andrea Rogers, Research Scientist

Three hundred forty-eight years ago, Henshaw built the domicilium or what we today consider to be the hyperbaric chamber.<sup>1</sup> It is used for a variety of purposes including boosting immunity, improving circulation, encouraging stem cell growth, and fighting cancer.

### The Basics

Room air is comprised of about 20% oxygen. At sea level, with room air the oxygen transporter, hemoglobin, is 97% saturated with oxygen, meanwhile, the oxygen dissolved in the plasma is only 0.32 vol%.

Breathing 100% oxygen boosts dissolved oxygen levels to 2.09 vol% and at 3 atmospheric pressure absolute (ATA) it increases to 6.8 vol%.<sup>2</sup> One ATA is about 14.7 pounds per square inch.<sup>3</sup>



### Boosting the Body

The dead space of wounds tend to have low levels of oxygen.<sup>4</sup> Although dead space of wounds will stimulate blood vessel growth for healing, it can also impair leukocytes and neutrophils ability to fight bacterial infections since they require 10-15 times more oxygen.<sup>5</sup>

Adrenaline will promote infection in low oxygen areas.<sup>6</sup> Hyperbaric treatment has been shown to be as effective as the antibiotic cephalothin against *Staphylococcus aureus*,<sup>7</sup> a common cause of blood, lower respiratory tract, urinary tract, soft tissue, and skin infections (including pimples).<sup>8,9,10</sup>

Too little or too much induced nitric oxide synthases (iNOS) can impair wound healing by affecting fibroblast collagen synthesis, proliferation, and fibroblast-mediated matrix contraction.<sup>11</sup> Decreased amounts of nitric oxide have been observed with malnutrition, diabetes, and steroid (corticosteroid) use.<sup>12,13</sup>

In combination with other therapies, hyperbaric therapy doubled the average healing rate of chronic foot ulcers in nonischemic (with full blood flow) diabetic patients.<sup>14</sup>

In cases of severe ischemic foot ulcers, hyperbaric therapy effectively

decreased the number of major amputations.<sup>15</sup> Psychological stress slows wound healing by increasing iNOS beyond usable amounts. Hyperbaric treatments have been shown to correct this imbalance to allow wound healing.<sup>16</sup>

Lack of oxygen due to a heart attack or stroke can lead to tissue death (infarction). In cardiac blockage, hyperbaric oxygen therapy has been able to reduce the infarct size by 62%. Nitric oxide also was able to double in amount.<sup>17</sup>

In cerebral blockage, the infarct volume was decreased 38% and less neurological loss was observed when hyperbaric treatments were applied within hours of the occurrence.<sup>18</sup>

Hyperbaric treatment may also be able to reduce delayed tissue death in severe injuries to the arms and legs such as crush injury or early compartment syndrome.<sup>19</sup>

### Headache Treatment

There is debate over the usefulness of hyperbaric treatment and headaches. One study concluded that it was no more effective for cluster headaches than placebo treatments. However, during the treatment none of the patients receiving hyperbaric reported any cluster headache attacks while 62% receiving the placebo did.

Two patients from the placebo group had no cluster headaches for at least one year following treatment, possibly due to just the atmospheric pressure change.<sup>20</sup>

Hyperbaric therapy used during cluster headaches interrupted 6 out of 7 patients' attacks within 5 – 13 minutes. Of the 6 patients, 3 had complete interruption and 3 had interruption for 4 – 6 days.<sup>21</sup>

In a study for migraines, 24 of 26 patients had complete relief in less than 30 minutes, with nausea relief within 5 minutes.<sup>22</sup>

### Stimulating Stem Cell Growth

Hyperbaric oxygen stimulates growth, differentiation, and migration of stem cells to the wounded area.<sup>23,24</sup>

Circulating stem cells can double in response to one treatment and increase eight times over the course of twenty.

The oxidative stress from hyperbaric  
continued on next page



also increases blood vessel formation.<sup>2</sup>

**Fighting Cancer**

Studies show hyperbaric oxygen to inhibit primary and metastatic breast cancer,<sup>25</sup> lymphoma, sarcoma, prostate,<sup>26</sup> and lung cancer.<sup>27</sup> Hyperbaric treatments have also been shown to enhance chemotherapy drugs gemcitabine, paclitaxel, melphalan, and doxorubicin.<sup>22, 23, 24</sup>

Radiation causes skin thickening and reduced tensile / breaking strength. Hyperbaric therapy reduces the skin thickening and scarring with slight improvement of the strength.<sup>28</sup>

It was also shown to be efficient in formation of collagen matrix, the structural component of skin, and forming new blood vessels.<sup>29</sup> Radiotherapy reduces the migration of stem cells, however stem cell numbers greatly increased between 1-10 hyperbaric treatments.<sup>4</sup>

The combination of 100% oxygen and greater than 1 ATA, as found in HBOT, has many benefits. Call the Riordan Clinic today to make an appointment.



**Taking a Dive Sources**

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ably reach a depth of 2 ATA.)

In addition to watching the technician, there's another port that will allow him/her to watch a movie. Or the patient can always take a nap to allow time to pass quickly.

Once the patient's time is up, the "ascent" to the surface pressure of 1 ATA begins. It takes about 10 minutes to slowly and safely return to 1 ATA, all the while the patient continues to swallow to clear their ears!

What benefits can a patient expect to gain from a HBOT experience?

The increased air pressure, combined with an increase in oxygen to 100 percent, forces oxygen to dissolve in the liquid part of a person's blood.

This "hyper-oxygenated" blood is delivered to all of the body's cells, tissues, and fluids at up to 10 times over the normal concentration! This is high enough to sustain life with no blood at all!

Let's do the calculation: Room air is 20% oxygen. So 100% oxygen is an increase of 5 times. Then if this is done in 2 ATA (which is double the air pressure) this **DOUBLES** the effect of the 100% oxygen. The net result is that the body experiences a 10-fold increase in oxygen to the cells! Wow!



Here are just some of the many amazing benefits that Hyperbaric Oxygen Chamber Therapy has

been shown to provide:

- Greatly increased oxygen concentration in all body tissues, even with reduced or blocked blood flow.
- Stimulation of the growth of new blood vessels to locations with reduced circulation, improving blood flow to areas with arterial blockage (such as after a stroke or a head injury.)
- Rebound arterial dilation, resulting in an increased blood vessel diameter greater than when therapy began, improving blood flow to compromised organs.
- An adaptive increase in superoxide dismutase (SOD), one of the body's prin-

cipal, internally produced antioxidants and free radical scavengers.

- Greatly enhanced white blood cell action, thus allowing your immune system to eliminate stubborn chronic infections.
- Stimulation of the release of adult stem cells that promote tissue regeneration and healing.

The use of increased atmospheric pressure for medical therapy has intrigued many physicians and scientists for hundreds of years.

Though not new, HBOT has recently gained importance for treatment of chronic degenerative health problems related to atherosclerosis, stroke, peripheral vascular disease, diabetic ulcers, wound healing, cerebral palsy, brain injury, multiple sclerosis, macular degeneration, and many other disorders.



Wherever blood flow and oxygen delivery to vital organs is reduced, their functioning can be improved with HBOT.

When the brain is injured by stroke, cerebral palsy, or trauma, then HBOT may re-activate the stunned parts of the brain to restore function. Results can be dramatic. Patients with cerebral vascular disease commonly recover from complications of stroke more readily after HBOT.

This is also true for potentially gangrenous legs and feet caused by blocked circulation, and for slow-healing diabetic ulcers. HBOT relieves pain, helps fight infection, and keeps threatened tissues alive.

These benefits do not happen in just one treatment. A series of treatments are required. The number depends upon the severity and duration of your condition. Insurance coverage is limited depending upon the diagnosis. Not all diagnoses are covered. Check with your doctor.

Take advantage of the benefits of HBOT today. Call for an appointment with a Riordan Clinic doctor today.

# INFORMATION WORTH KNOWING HYPERBARIC CHAMBER

Find the words in the grid. Words can go horizontally, vertically, and diagonally in all eight directions.

BLOOD  
CHAMBER  
CIRCULATION  
DIABETIC  
HEADACHE  
HYPERBARIC  
IMBALANCE  
IMPAIRED  
INFECTON  
OXYGEN  
PLASMA  
PRESSURE  
STEMCELL  
THERAPY  
ULCER

C	H	A	M	B	E	R	U	R	L	D	Z	N	I
L	P	K	Q	Q	L	L	E	C	M	E	T	S	M
N	P	L	C	M	C	C	Z	K	M	C	P	N	P
Q	O	C	A	E	C	T	M	J	R	I	E	C	A
T	X	I	R	S	X	J	Y	C	N	G	I	I	I
X	D	B	T	B	M	P	Q	F	Y	M	D	R	R
N	I	H	Z	A	A	A	E	X	B	X	O	A	E
G	A	P	E	R	L	C	O	A	T	X	O	B	D
P	B	X	E	A	T	U	L	R	T	R	L	R	T
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P	T	L	O	J	N	A	L	R	K	R	W	P	C
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Y	C	F	E	N	F	T	M	H	G	C	P	H	V
M	V	P	R	E	S	S	U	R	E	M	T	C	W

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**SPECIAL EVENT**  
**Healing WALKS for Hard Times**  
 with  
 Carolyn Scott Kortge



Thursday, September 16, 2010  
 12:00 noon – 1:00 pm

**C**arolyn Scott Kortge has been a long time friend of the Riordan Clinic, and spoke here in 1998 after the release of her first book, *The Spirited Walker*.

Carolyn began years ago as a fitness walker; and later discovered that by focusing on breath and cadence, she immediately comfort, and out of control situations could become more manageable.

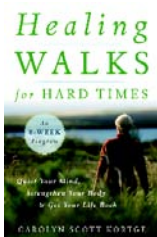
Carolyn is back! Back in Wichita, from Oregon, with the release of her second book, *Healing Walks for Hard Times*, Carolyn demonstrates the power of a regular walking regimen to heal the mind, body, and spirit.

Even if you have never tried fitness walking, you can still take advantage of the program by moving at your own pace.

Healthy walking can reduce the risk of heart disease and other chronic illnesses, can ease depression, and improve immune function.

Come join us and learn how to restore balance, wholeness, improve your health, and enjoy walking!

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 Cost: \$15 - Lunch is included.



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 Thursday, September 23, 2010  
 6:00p.m. – 7:30p.m.



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## NEXT MONTH'S ISSUE



In honor of Breast Cancer Awareness Month, October's issue of the *Health Hunters Newsletter* will focus on treatments offered at the Riordan Clinic.

Featuring Articles by:  
 Ron Hunninghake, M.D.  
 Andrea Rogers, Research Scientist  
 Mavis Schultz, A.R.N.P

Answers to  
 Information Worth Knowing  
 on pg 5

