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In the News:

The Terri (Theresa Marie Schindler) Schiavo Case
The Ethical Divide of Saving the Chronically Brain-Injured

An interview with Dr. William Hammesfahr, which appeared on the Hannity & Combs segment of Fox News on March 22, 2005 prompted the IHA to contact Dr. Hammesfahr, who is familiar—first-hand—with the case.

Dr. Hammesfahr has been working with disabled and chronically brain-injured patients for many years, seeking the best therapy options for their rehabilitation. Many of these therapies include medication and prescription devices, such as hyperbaric chambers that increase the oxygen flow to the impaired brain and which affect the patient with positive physical and mental gains.

According to Dr. Hammesfahr, who has examined Terri Schiavo on many occasions (for a total of 10 hours), her brain injury can be rehabilitated to allow Terri to speak and gain new movement.* (see end note)

from Terri regarding her medical care in life and death circumstances, Terri's husband has the right to decide on life support measures.

The state of Florida has recently deemed "feeding tubes" to be a life supporting measure, such as ventilators and resuscitative measures. And now, judges have upheld the husband's wishes to suspend the delivery of food and water based on these laws.

One item of contention is the fact that Terri is not in an immediate medical danger of dying—except now from starvation and dehydration.

Dr. Hammesfahr asserts that he indeed has testified on Terri's behalf, but has unsuccessfully been able to sway her husband or the courts toward Terri's rehabilitation, which could take years. In his testimony, he noted that Terri responded to familiar piano music and especially to the sound of her mother's voice.

Indeed, the *ethical divide* lies in Terri's husband's determination that even some small gains in speech and movement do not constitute an adequate quality of life. The long-term care of such a disabled person is often a grueling and demanding task.

That Terri Schiavo's parents are willing to care for their daughter is the crux of the legal battles. Monies received for her initial medical injuries have been disbursed to her husband, the legal guardian. If guardianship is surrendered to Terri's parents, the money to care for Terri Schiavo would accompany her.

Yet, according to most news reports, Mr. Schiavo, who has in the last 15 years moved on with his life, contends that he

"Terri is completely aware and conscious and responsive. She is like a child with cerebral palsy. We have kids in the Pinellas County school system every day that are much worse than her, that we're educating."

**What is Legal,
What is Ethical**

As promising as this all sounds, there is always the quality of life issue that is at the forefront of this entire case. This is where the legal field is in ethical turmoil.

Legally, in lieu of a will or statement

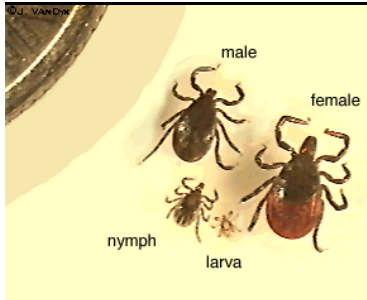


Terri's Family: the Schindlers

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A Trip Through Inner Spaces

Hyperbaric Oxygen Treatment for Lyme Disease

by Tracy Stout, Lymes Times

Hyperbaric Oxygen:

- Kids aerobic and anaerobic bacteria
- Stimulates immune response
- Anti-inflammatory
- Improves brain blood flow
- Neuroprotective

We looked like astronauts ready to conquer and do battle in a new world, with our color matched uniforms, plastic collars hooked to large conical helmets, tubes leading in and out of the helmets and gauges and dials everywhere in our module. We were in fact getting ready to do our first hyperbaric “dive: to conquer an ancient problem in our own world, that of bacterial invasion. The battleground would be the inner spaces of our own bodies.

I first heard of hyperbaric treatments (HBOT) for Lyme Disease at a California Lyme Disease Association (CALDA) board meeting in San Francisco. I met a fellow Lyme patient, who had been initially misdiagnosed with multiple sclerosis and had improved significantly after extensive antibiotics and a series of hyperbaric chamber treatments. My symptoms were arthritic, cardiac neurological and musculoskeletal. She suggested that I talk to Mitch Hoggard, a pharmacist who owns the Chico Hyperbaric Center. Mitch, who is a board member of CALDA and ILADS, was at the meeting so I took some time to learn more about the effects of pressure on bacteria.

Mitch’s son, Ted, was 14 years old when he took part in a study on the effect of HBOT on Lyme disease conducted by William Fife, Ph.D. at Texas A & M. The treatment had a dramatic effect on his son, who no longer needed a wheelchair after a series of HBO treatments. This study showed improvement in 85% of the patients treated. Mitch warned me though that it doesn’t work for everyone and that some people respond initially, only to relapse. However, Mitch has seen dramatic response in some patients that have failed to respond to antibiotic therapy alone, significantly shortening their time to wellness.

These stories had me hooked, but why did it work? I visited the website www.hbotoday.com to get some more information. HBO therapy is a medical treatment that

uses the administration of 100% oxygen at controlled pressure (greater than sea level) for a prescribed amount of time, usually 60 to 90 minutes. No one knows exactly how it works or why it works in some people, but is ineffective for others. There are a lot of theories, though, including 1) HBOT may adversely affect Lyme bacteria, 2) HBO facilitates development of blood vessels in the body (which may be important because it is believed that Lyme Bacteria effectively evade antibiotics by moving away from normal blood flow into tissue, organs and bone, and 3) the positive effects of simply getting oxygen into the compromised immune system.

The first thing I did was meet with Mitch and the LLMD that works closely with the chamber. He checks to make sure you have no physical problems that would keep you out of the chamber. He is a great contact to have in case you need to change your prescription, have medical questions and need blood work or to check on medical issues that come up.

Later that day I went to the chamber to meet my fellow explorers on this new route to health. There would be 6 of us. They try to treat everyone with the same diagnosis together because pressure is related to diagnosis.*

We wore clue cotton scrubs and went without jewelry, scents, or vitamins (you want free radicals during treatment). The chamber itself looked like a big tube, maybe ten feet high, maybe 16 feet long, 6 chairs with blankets folded neatly over them, room for a gurney if needed.

First thought was, gosh, it looks confining, but it turned out to be like one of those cartoon tents that gets much larger on the inside. A technician sits on the outside “driving” us to the level we need to be, in our case 45 feet below sea level pressure. We also had a tech-

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The author lives in Oregon

*With hyperbaric oxygenation, Lymes disease initially responds with the release of mycotoxins into the body

HBOT Course of Treatment & Potential Side Effects

Treatment:

- Usually two 1 hour sessions per day, 5 days per week
- 40 to 60 treatments are usually required
- Usually reserved for patients who are failing to respond or are very slow responders to antibiotic therapy

Side Effects:

- Middle ear barotraumas incidence 2%
- Sinus squeeze less common. Decongestant nasal spray or antihistamines before therapy may be a remedy.
- Myopia usually occurs in patients over 40 years of age.* This effect reverses to pre-treatment level within 3 weeks to 3 months
- Oxygen toxicity can occur. Neurological manifestation occurrence is about 1 per 10,000 patient therapies.

*Note, vision problem become likelier at higher pressure treatments

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nician inside with us.

It felt just like flying. We learned to clear our ears early and often to prevent pressure from building up. Once we got to the right “depth” we put on clear plastic helmets attached to a collar around the neck, and oxygen was pumped in for 60 minutes.

Then we took off our helmets and returned to the “surface.” We dove twice a day, once at 10 a.m. and once at 6 p.m. Each day our vital signs were taken, and we kept track of our symptoms in a log.

My fellow divers had an array of symptoms ranging from drop foot, to neuropathy, to joint pains, to shooting neurological pains, massive cognitive symptoms, paralyzed vocal cords, to a woman who had been strapped in a wheel chair that now came bouncing in looking to be in perfect health. She told us she had been through HBO treatments before, had done well for a couple of years and was starting to relapse.

A real sense of community develops with people sharing the chamber and the staff at Chico Hyperbaric Center. Many of us stayed at the same bed and breakfast because the center was not within easy commute. Everyone was dealing with their own physical issues, yet each person reached out to share and help the others.

The hardest part for me was being away from my family and work. Starting the 8th day, I had a strong Jarish-Herxheimer reaction* which lasted about 2 weeks. I went from feeling pretty good to having difficulty standing, hearing problems, headache, joint pain, running eye, and spine pain that interfered with my sleep.

The scariest thing that I had happen was that I temporarily lost a lot of vision. The pressure can change the shape of your cornea and make vision blurry. Distant vision gets worse and close up vision improves. Three weeks after treatment, my vision started returning to normal.

I underwent treatment for 7 weeks, but missed a week in the middle. About the 5th week, I started feeling great. The shooting pains had stopped, the joint pains had stopped.

*Jarish-Herxheimer reaction is a phenomena that results when there is an intensification of the disease symptoms and often an expansion of similar symptoms to other places, all of a temporary nature because it takes 48 to 72 hours of therapy to initiate bacterial killing.

Hyperbaric oxygen therapy is expensive, and insurance doesn’t cover it. There are no guarantees that this is the therapy that will work for you, but I know that I have made immense progress. Have a safe journey to your inner spaces!

Research and Clinical Results:

- Texas A&M University controlled study. Forty patients with Lyme disease were treated with HBOT 5 days per week for approximately 4 weeks. 85% of patients showed recovery for symptoms or significant reduction of symptoms (70% or better).
- NY Medical College of Medicine, Microbiology and Immunodiagnostics Laboratory in Vitro test using controls:
 - ⇒ 14 of 17 strains had their growth inhibited by 33 to 94%
 - ⇒ Little or no results on 3 *Borrelia burgdorferi* (Bb) strains
- NY Medical College of Medicine, Microbiology and Immunodiagnostics Laboratory in Vitro test using controls. Mice were infected with 100,000 Bb. 2 to 4 weeks later, one group received HBO. Cultures of bladders from sacrificed mice prepared for media one day after last treatment.
 - ⇒ No Bb grew out of 80% of cultures from treated mice
 - ⇒ Bb organisms were recoverable from 90% of cultures from control mice not treated with HBO.

Results at Chico Hyperbaric

- 20 to 25% recover from symptoms
- 45 to 50% decrease in symptoms by 60 to 70%
- 25 to 35% mild improvement to no improvement

Approximately 80% remain on antibiotic treatment 18 months or more. Some patients who improve on HBO therapy subsequently relapse. HBO therapy should be considered an adjunctive therapy when traditional therapies fail to achieve the desired results.

A Childhood Predator

The Wilson Family Lyme Disease Story

By Dawn Wilson, mother of Michael and Brendan

Sometime in the Spring or Summer of 2000 I was unknowingly bitten by a tick and infected with Lyme disease. I was 8 months pregnant and delivered my second son on July 7, 2000. At the end of the summer I found two solid red rashes on my 2-year-old son's shin. I thought it might be Lyme disease, but my pediatrician said it had to look like a bull's eye rash. We waited four weeks and took a Lyme test and it came back negative. Another test taken in January 2001 came back negative again.

The following year at 3 years old, my son had behavioral issues at preschool. He was obsessed with the color blue, only wanted to play with one child at school and had transitional issues.

At this time we went to see a predominant Lyme disease Pediatrician who gave a clinical diagnosis of Lyme disease. And Michael's Lyme test came back positive for a current and persistent infection. At 4 years old, Michael was diagnosed with *Disseminated Neurological Lyme Disease* and started antibiotic treatment.

At the same time, my younger son Brendan, who was 2 yrs old, was also diagnosed with Lyme disease.

During the school year Michael showed significant development delays and was evaluated by the district and received Occupational Therapy (OT) twice a week, at 45-minute sessions. Michael's upper body was very weak. He had poor fine and gross motor function and had difficulty verbally expressing himself. He continued his OT through the summer months.

Michael entered kindergarten with a behavioral plan to address a series of symptoms. These included:

- Impulsivity
- Transitions
- Throwing
- Hitting
- Running out of gym class
- Very low level fine motor function
- Difficulty sitting in circle
- Difficulty focusing
- Very distracted
- High level of frustration
- Emotional meltdowns

Michael had other physical ailments that heightened his level of frustration—headaches, joint pain and fatigue. While he had moments of happiness, he was overall a very unhappy child.



We moved to Rye, NY May 2000. Brendan was born July 7, 2000. The same month Michael turned 2 years old. We all contracted Lyme disease that summer. I was infected while pregnant with Brendan (Brendan got it in-utero) and Michael was bitten late summer.

Brendan, now 3 years old, had many of the same issues. In addition, he often ran without direction or purpose and lost much of his vocabulary.

Now, at the end of the school year, we had seen some improvement for Michael, but not resolution. He had the same problems.

Brendan was about to turn 4 and received an evaluation from the school district. Brendan scored in the second percentile for Fine Motor Skills, had a 2-year-old's level for Expressive Language, and low scores in other areas.

After 2 years of a diagnosis and antibiotic treatment we saw minor improvements, but not resolution or good health. Behavior and health at the beginning of the school year was essentially the same at the end of the year in June 2004.

I was looking for a solution (and to eradicate the illness)—not to merely cope or tolerate it. I had lost my children to this horrible disease.

I had researched Hyperbaric Oxygen Treatment and read a study conducted by Dr. William Fife. The Fife study showed that 88% of patients who had been treated with antibiotics, orally and intravenously, and who still suffered from Lyme Disease, were treated successfully with Hyper-

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A Childhood Predator

The Wilson Family Lyme Disease Story

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baric Oxygen Treatment (HBOT).

HBOT is used to treat many neurological illnesses. Through my research and discussion with physicians, I realized this could be a solution for my family. In June, we started HBOT. Within weeks of treatment, Brendan could use scissors and cut out a shape of a diamond (a 4 year old skill level).

Through subsequent HBOT treatments both children improved on many levels.

- Improved focus
- Improved listening
- Decreased impulsivity
- Express feelings/likes/dislikes into words
- Developed sense of humor/joke telling
- Started laughing
- Telling stories with beginning/middle/end
- Imaginative play
- Greatly increased vocabulary
- Overall positive attitude/happiness/playfulness
- Michael could sit for 50 minutes in circle time

You can imagine that this has impacted every moment of our daily lives. Waking up, getting dressed, eating at the table, going to and leaving school—are now all positive experiences. We even drove to Chicago (15 hours) to visit my family and had a great vacation. Going to the pool, zoo, and playground all now relaxing and enjoyable.

My eldest son Michael is repeating Kindergarten, and from day one, has made friends with all his classmates. He is enjoying his friends, schoolwork, teacher, and gym. He is actually singing the songs from class and music.

Brendan, too, is enjoying and thriving in preschool.

We have our family back. The boys are now becoming the boys they were meant to be.

One my sons recently was exhibiting some Lyme symptoms and his Western Blot Lyme test came back positive. We are once again treating him with HBOT and antibiotics, and he has shown improvement already.

This is the roller coaster of Lyme disease. It can hide from antibodies and antibiotics. And, when they go away the Lyme disease can return. In children, Lyme disease can be totally eradicated. We will be as persistent with treatment as the Lyme disease.

The Wilsons live in Rye, New York. They currently treat at Valley Health Hyperbarics, under the direction of Guiseppina Feingold, MD. For more information please call Dr. Feingold's clinic at 845-278-6363.



Book Order Form

Item #	Description	Qty.	Price	Subtotal
SRO-HOU	Stroke Recovery w/ Oxygen – HOUSTON	<input type="text"/>	\$15	\$

Order total: _____

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L y m e s d i s e a s e

An Interview with Dr. Feingold

Shannon Kennitz from the International Hyperbarics Association met with board certified pediatrician, Guiseppina Feingold (Dr. Jo) from Valley Health Hyperbarics in New York to discuss the treatment of Lyme Disease with Hyperbaric Oxygenation. Her interview follows.

SK: What is Lyme disease?

Dr. Jo: It is an infectious disease that affects multiple organs and is caused by a spirochete that is transmitted to human via the deer tick.

SK: How does Hyperbaric Oxygen Therapy (HBOT) help?

Dr. Jo: The spirochete (*Borrelia burgdorferi*) is an obligate anaerobe. This means that it does not live well in an oxygenated environment.

Antibiotics are effective in the initial phase of the disease. In the chronic phase when the bacteria is intracellular, antibiotics have a limited use.

By placing the patient in a hyperbaric chamber, the intracellular oxygenation is increased, thereby creating an unfavorable condition for the bacteria to survive.

SK: So does HBOT cure Lyme disease?

Dr. Jo: We are not really sure... we know that many patients go into remission and remain symptom-free for years.

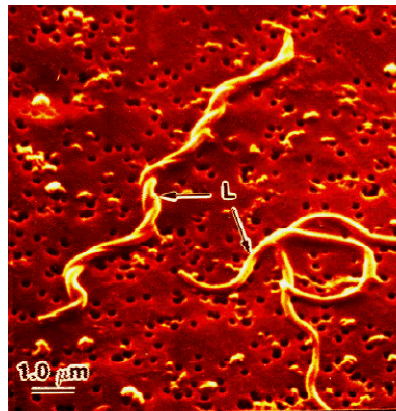
In the event that there is a hypoxic condition the spirochete becomes vitalized and begins to multiply.

SK: If this happens, can't he patient be re-treated?

Dr. Jo: Absolutely.

SK: Who is the average person who has Lyme disease?

Dr. Jo: There seems to be no preference for age, sex or race.



This scanning electron micrograph shows spirochete *Borrelia burgdorferi*, causative agent of the most common tick-bourne disease in the United States, Lyme disease.

While only 0.2-0.3 micrometers wide, the cell length may exceed 15 to 20 micrometers.

SK: So do you treat children with Lyme disease?

Dr. Jo: Absolutely, in fact many children display the symptom of Autism and in reality have Lyme disease. Both condition can potentially benefit from HBOT.

SK: Since Lyme disease seems to manifest as other diseases, how do you test for Lyme disease?

Dr. Jo: Lyme is called the great pretender because it has been misdiagnosed as many other diseases, such as ALS, MS, Fibromyalgia, Autism.

There is no good test to confirm the diagnoses of Lyme. I prefer all patients that are being treated for Lyme be followed by a Lyme disease literate doctor.

SK: So there isn't a blood test?

Dr. Jo: The blood test often gives the wrong results so Lyme disease remains a diagnosis of exclusion. It takes an average of three years and seven doctors before a diagnosis is made.

SK: This seems to be a huge hurdle and must cause the patients great distress?

Dr. Jo: Yes, that is correct. Most patients are faced with symptoms that are debilitating, and at times, life threatening. The medical community

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Q&A : *An Interview with Dr. Feingold*

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doesn't fully recognize they are ill.

SK: What is the protocol of HBOT for a Lyme disease patient?

Dr. Jo: The classic protocol was studied by Dr. William Fife and treated patients with 100 percent oxygen at 2.4 ATA.

I feel that this is dangerous and that an initial course of 10 treatments at 1.5 is safer and effective.

SK: So what do you do after 10 treatments?

Dr. Jo: After 10 treatments at 1.5 ATA the patient has an improvement of symptoms. This is due to a decrease in the inflammation around blood vessels. The immune system is also improved.

A slow increase to a pressure of 2.4 ATA has bactericidal effects. So it is at this pressure that the bacteria actually die.

SK: So how many treatments does a patient end up having?

Dr. Jo: It can vary. The usual course is 60 treatments.

SK: What do we see as the future for this disease?



The Bull's Eye (EM, or Erythema Migrans) rash is an early symptom of Lyme disease. If untreated, Lyme disease may progress to a chronic stage that can be disabling and difficult to cure.

Dr. Jo: First of all, the disease is on the rise so we can expect to see many more patients affected with it. And with that, there will come a need for diagnostic testing and treatment modalities.

Hyperbarics remains an effective way to get this disease under control and will probably play a bigger role in the future.

Announcement

Valley Health and Hyperbarics



Guisepina Feingold, MD is a board certified pediatrician, trained in Hyperbaric Medicine. Dr. Feingold runs her practice at two New York area clinics that specialize in Autism, Cerebral Palsy, Lyme Disease, stroke and other neurological disorders.

For more information on Dr. Feingold and her medical clinics, please call *Valley Health and Hyperbarics* at 845-278-6363.

Dr. Feingold serves on the IHA Physician Advisory Board.

An Overview of Lyme Disease and Hyperbaric Oxygen (HBO) Therapy

Mitchell L. Hoggard and L. James Johnson

Authors' Note:

This article is an overview of Lyme disease and hyperbaric oxygen (HBO) therapy. We acknowledge that the medical areas we explore can be complex and that any attempt to define and explain them in a way that is not overly technical can be incomplete and/or inadvertently confusing. We have attempted to be both clear and exact. Mitchell L. Hoggard is a pharmacist. He is also President and founder of the Chico Hyperbaric Center.

All three of his children have received HBO therapy for Lyme disease. Mitchell Hoggard's son Ted was 14 years old when he took part in William Fife's HBO research study on Lyme disease (more on the study later). L. James Johnson, formerly a broadcast journalist, is now a marketing consultant. He has received extensive HBO therapy for Lyme disease.

We have written this article to focus attention on what medical science knows and what it does not know about Lyme disease and HBO therapy. A lack of clarity in the diagnosis and treatment of Lyme disease has impacted both of our lives and the lives of our families. Also, this article was written to be supportive to a patient's relationship with their physician—not to take the place of that relationship.

Information on how to contact the authors follows this article.

Lyme Disease

Lyme disease is a bacterial infection caused by a spirochete (spiral-shaped bacteria) called *Borrelia burgdorferi* (Bb). The bacterium is named after the person who discovered it, Dr. Willy Burgdorfer. Lyme disease is named after the Connecticut town of Lyme where it was first recognized in the United States in 1977. The first record of a condition associated with Lyme disease dates back to the 1880's.

Both humans and animals can be infected with the Bb organism through the bite of an infected tick. Over 100 strains of the bacterium that cause Lyme disease have been identified in the United States. Lyme infection is usually transmitted by, though not limited to, three species of tick:

- The black-legged tick (*Ixodes scapularis*) on the East Coast and in the Midwest (commonly known as the deer tick).
- The western black-legged tick (*Ixodes pacificus*) in the Western U.S. (also commonly known as the deer tick).

Adult deer tick looking for a place to feast.



- The lone star tick (*Amblyomma americanum*), located within a rectangle encompassing Texas, Florida, Rhode Island, and Iowa.

Lyme disease is also a global problem. There are reports that 300 bacterial strains of the Bb organism have been identified throughout the world. Cases of Lyme disease have been reported in North and South America, Europe, Asia, Africa and Australia.

Symptoms

Early signs of Lyme disease include flu-like symptoms (headache, fever, muscle aches, joint pain and fatigue) and a Lyme rash. Most symptoms show up days or weeks and occasionally months following infection.

The Lyme rash is referred to as erythema migrans or EM. It is important to remember that the rash may not show up at all, or it may appear too light in color to be noticed. The rash can be shaped like a bulls-eye, can be smooth or bumpy, may or may not feel warm, and there can be multiple rashes that can appear at the site of the tick bite or elsewhere on the body.

Once the infection becomes established, symptoms of Lyme disease vary, but may include pain in muscles and joints, fatigue, swollen glands, fever, upset stomach, headache, forgetfulness, sleep disorders, depression, and sensitivity to light and sound, to name a few.

Lyme Confusion

The medical community is often perplexed by the highly individual and complex nature of Lyme disease. Some people experience Lyme disease as a minor illness that appears to be easily treated with antibiotic therapy without any long-lasting complications. Others are not as fortunate.

When Lyme disease goes undetected, undiagnosed and untreated for months or years following infection, the bacteria can spread to the nervous system, the heart and other organs, tendons and joints. This late-stage infection can result in a wide variety of physical, emotional, and mental or cognitive symptoms. The late-stage list of symptoms is long and can include arthritis, heart abnormalities, Bell's palsy (paralysis of one or both sides of the face) and severe cognitive or mental dysfunction including memory loss, confusion, psychiatric problems, etc.

Lyme disease is often referred to as the Great Pretender because the symptoms of Lyme disease can so closely mimic the

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An Overview of Lyme Disease

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symptoms of other diseases. Although no official numbers exist on this subject, Lyme patients have been misdiagnosed with chronic fatigue syndrome, fibromyalgia, multiple sclerosis, menopause, depression, Alzheimer's disease, and Lou Gehrig's disease. Other patients have failed to receive any kind of definitive diagnosis long after the presentation of symptoms.

Early Detection Is Paramount

Nearly all Lyme medical specialists agree that early detection and treatment of Lyme disease significantly improves the chance of a full recovery. Although not proven, some experts believe that there is up to a six to eight week window of opportunity following infection when treating the disease with antibiotic therapy can result in a high cure rate and lessen the chance of chronic, long-term problems.

It has been reported that it takes an average of 22 months and seven doctors for the average Lyme patient to be diagnosed with a Bb infection. This follows the fact that many people infected with Lyme disease do not remember being bitten by a tick, which can further delay treatment. The inability to diagnose and treat Lyme disease in a timely fashion may be adding to the number of patients who suffer from chronic symptoms.

It is estimated by some that as many as 20 percent of Lyme patients suffer from persistent and chronic symptoms. This figure may be too low. Obviously, more research would be helpful. However, what is clear is that the importance of early diagnosis and treatment cannot be over-emphasized.

Treatment

Lyme disease is a bacterial infection and like other bacterial infections it is treated with antibiotics. Antibiotics are administered orally, with intramuscular (IM) injections, or intravenously (IV) through the veins. Physicians often prescribe combinations of antibiotics to take advantage of the diverse ways that individual antibiotics affect the Bb organism.

Physicians not only prescribe more than one oral antibiotic at a time, but they combine oral antibiotics with IM or IV antibiotics. This shotgun (or multiple) approach to antibiotic therapy is used in hopes of affecting the Bb organism in as many ways as possible.

Just as no two Lyme patients appear to be affected by Lyme bacteria in the same way, a patient's response to antibiotic therapy is highly individual, too. The individual nature of an antibiotic's effect on a patient is believed to be due in part to the theory that different strains of the bacteria react differently to each antibiotic. Other factors may include the duration of infection, the amount of time between the onset of symptoms and treatment, and the location of the Bb organism in the body. Also, co-infections or the transmittal of more than one infectious disease, can occur from a single tick bite. This can make diagnosis and treatment more difficult still.

Co-infections

Co-infections may include more than one strain of the Bb organism and may include the tick-borne disorders of babesiosis and/or ehrlichiosis. Babesiosis and ehrlichiosis are also bacterial

infections that present Lyme-like symptoms. However, treatment is often handled in a different manner from Lyme disease. Babesiosis requires a treatment program that is altogether different from antibiotic therapy for Lyme disease. Not all antibiotics that are used to treat Lyme disease are effective in treating ehrlichiosis.

Information on Lyme disease and co-infections is relatively new. It is highly recommended that those suffering from long-term, chronic symptoms be tested for babesiosis and ehrlichiosis if they have not already done so. Obviously, patients who have recently been diagnosed with Lyme disease should make sure that they are tested for co-infections, too.

It is our experience that many Lyme patients have not been tested for babesiosis and ehrlichiosis. This is a situation in which many patients, and health care professionals alike, have not yet adopted the most current medical practices.

Testing is a Problem

The diagnosis of Lyme disease remains clinically based—that is, a diagnosis based primarily on symptoms alone—because, unfortunately, there is no test available that is 100 percent accurate to rule out or confirm the infection. False positive results and false negative results are common. Accordingly, the patient's entire clinical picture is taken into account when diagnosing and treating Lyme disease.

We can better understand the lack of proper testing for Lyme disease by identifying the fact that there is not a common test that allows health care professionals to accurately determine if Lyme bacteria are present in the body. Amazingly, the lack of a common test also means that medical science cannot precisely determine whether someone is cured. This leads to contradictory treatment protocols and results in treatment guidelines that are more guesswork than many patients prefer, and less exact than many physicians and health insurance companies are comfortable with.

Science in general, and medical science in particular, prefers absolute and unmistakable testing, data and conclusions on which to base treatment protocols (or guidelines). Lyme disease was not recognized in the United States until 1977. Scientific research is lagging and there is much we don't know. Based on current scientific knowledge, the diagnosis and treatment of Lyme disease cannot be absolute and unequivocal. Instead—and no matter how unsettling this may be—until research catches up, the treatment of Lyme disease cannot be anything but subjective, open to question, individualized, and often complex.

Current Testing

The most common and current tests that are available today are limited to determining if antibodies to the Bb organism exist. The body creates antibodies after being exposed to the Bb organism. Lyme antibodies can remain in a person's body long after the Lyme organism has been eliminated. This means that a positive Lyme antibody test does not accurately indicate if active Lyme bacteria continue to be present in the body.

The ELISA and Western Blot tests are the most common tests currently used to confirm the presence of Bb antibodies. Current testing protocols were proposed in 1994 at the Second National Conference on Serological Diagnosis of Lyme Disease. A two-step process was established. The first step calls for a

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An Overview of Lyme Disease

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test such as the ELISA to be conducted. If positive, a Western-blot test is done in hopes of confirming that Lyme antibodies exist. However, even if Lyme antibodies exist, it does not mean that the patient has Lyme disease.

The Lyme Urine Antigen Test (LUAT) is a newer antibody test that is being used more frequently by Lyme physicians. As of this writing the Food and Drug Administration (FDA) has not approved the LUAT test for use in the clinical diagnosis of Lyme disease.

Further complicating matters is the fact that antibody tests can confuse Lyme antibodies with antibodies created by other complications in the body, including antibodies created in reaction to bacteria other than the Bb organism. This means that most of the current tests are not completely accurate. It also means that it is not uncommon to receive false positive and false negative results when using the ELISA, Western Blot or LUAT tests.

In other words, a negative test result cannot guarantee that Lyme antibodies do not exist. Conversely, a positive test result cannot guarantee that you actually have Lyme antibodies in your system. In both cases, accurate positive antibody test results do not mean that you even have active Lyme bacteria in your system. As we stated earlier, a positive antibody test result does not mean that you have Lyme disease.

The PCR Test

Two final notes on testing. First, some physicians use a Polymerase Chain Reaction (PCR) test to confirm that Lyme bacteria are present in the body. The PCR test is relatively new. It is designed to confirm that Lyme bacteria DNA are present. A positive PCR test almost always guarantees that you have Lyme disease, depending upon the accuracy of the lab that performed the work. However, because it can be difficult to isolate the Bb organism's DNA, a negative PCR test does not eliminate a Lyme disease diagnosis. The PCR test is usually more expensive than the ELISA, Western Blot or LUAT antibody tests.

The second note on testing has to do with the fact that test results often vary depending upon which lab performs the test. Some Lyme patients assume that testing for Lyme disease—and the test results—are uniform, standard and guaranteed. They are not. When we combine this fact with what we have already learned about testing for Lyme disease, it becomes obvious that the diagnosis of Lyme disease is not an exact science.

Jarisch-Herxheimer Reaction

A proper understanding of the Jarisch-Herxheimer reaction has helped Lyme specialists better manage the diagnosis and treatment of Lyme disease. This is especially true in light of inadequate testing. A Herxheimer reaction occurs in Lyme patients after they begin antibiotic therapy. It is important to note that a Herxheimer reaction is not a common reaction that is associated with most other diseases or with other viral, bacterial or fungal infections. A Jarisch-Herxheimer reaction is limited to a few specific bacterial infections such as syphilis and Lyme disease. It is interesting that syphilis and Lyme disease stem from spirochetal or spiral-shaped bacteria.

A Herxheimer reaction occurs when symptoms recur, flare up or

become exaggerated. Some call it a healing crisis, while others describe it as getting worse before you get better. Lyme patients refer to this reaction as a herx, or say that they are herxing.

A Herxheimer reaction usually occurs within days to weeks of starting antibiotic therapy. When antibiotics directly kill Lyme bacteria or work with the body's immune system to kill the organism, toxins are released that cause either *direct reactions* or *indirect actions through stimulation of the immune system*. In simpler terms, a Herxheimer reaction occurs when Lyme bacteria are killed off more quickly than the body's organs (kidneys and liver) are able to process them. This increases the number of toxins in the blood stream. The higher the toxin count, the more severe the symptoms the patient experiences.

Without accurate testing, the Herxheimer reaction is often used as a clinical diagnostic tool to help determine the presence of the Bb organism. It can also be used to confirm the effectiveness of specific antibiotics or combinations of antibiotics. Specifically, some health care professionals believe that a Herxheimer reaction can confirm that the Bb organism is present in the body by the fact that a bacteria die-off is causing the herx. Thus, for the frontline physician, the Herxheimer reaction can assist in the clinical diagnosis by unofficially confirming the presence of the Bb organism.

The Politics of Lyme Disease

This leads us to a pivotal and controversial issue that divides the medical community concerning the diagnosis and treatment of Lyme disease.

Some health care professionals are more tradition-bound and conservative in their approach to Lyme disease. They have adopted protocols for treating Lyme that don't go much beyond relatively short-term antibiotic therapy. This group believes that in almost all cases, one or two courses of oral antibiotics are all that are required to eradicate the bacteria. They believe that persistent, chronic Lyme symptoms are not the result of an ongoing infection—of active Lyme bacteria in the body—but rather, are probably the result of a dysfunctional auto-immune system response or some other process occurring in the body.

Others—especially those physicians who remain on the frontline of the long-term treatment of Lyme patients—believe that Lyme bacteria are not always eliminated by short-term courses of antibiotics. They believe that this is especially true if the disease went undiagnosed and untreated for months or years following infection.

Further, this latter group believes that the Bb organism can persist through months and even years of antibiotic therapy, depending upon a wide range of individual factors relating to the patient and to the strain(s) of bacteria. The survival characteristics of the bacteria themselves also play a crucial role in Lyme bacteria's persistent longevity.

Survival Tactics?

Research has shown that the Bb organism can use the body's own protein to encapsulate itself. This is also described as the Lyme bacterium shifting to a dormant or sleeping state. The reason that the organism undergoes this change is not fully understood. Some believe that this is a survival tactic because it may not be possible for our immune system to destroy the bac-

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terium when it is in this state. Also, antibiotics may have little or no effect on the Bb organism when it is encapsulated and dormant.

Research also shows that the Lyme bacterium appears to be able to enter certain types of human cells. This ability may also be considered a survival tactic because it results in the bacterium evading some or all antibiotics as well as the body's immune system.

Alternative Health Care

Antibiotics are the main tools that medical science uses to combat Lyme bacteria. However, it is our experience that many Lyme patients invest time, money and energy into exploring non-antibiotic, alternative health measures to treat Lyme symptoms. These can vary from taking supplements to visiting alternative health care practitioners. This area is much too large and diverse to explore in this article. Suffice it to say that Lyme disease is a highly individual ailment. Not only are symptoms experienced individually (and differently) by each Lyme patient, but every form of treatment (including antibiotic therapy) works differently for each individual. We do not know why this is so.

Most chronic Lyme patients have learned through experience that ultimately, it is their responsibility to manage their own health care. Many Lyme patients have made a conscious decision to explore alternative health care practices along with exploring conventional medical practices with their physician(s). We encourage responsible curiosity in both areas.

Antibiotics

Because antibiotics are the main tools that are used to fight Lyme disease, we can gain a better understanding of Lyme disease if we better understand how antibiotics affect the Bb organism. For a better understanding of how antibiotics work it helps to understand the mechanism of action they employ. Generally speaking, antibiotics fall into two categories:

- Bactericidal—An agent that directly destroys bacteria.
- Bacteriostatic — An agent that arrests or hinders the growth of bacteria.

Antibiotics that are bactericidal (for example, think... homicidal) can directly attack the cell wall of the bacteria. This causes a rupture and the death of the organism follows. Antibiotics from the penicillin family of antibiotics are usually bactericidal, unless concentrations fall too low.

Antibiotics that are bacteriostatic (for example, think... manipulative) do not directly attack bacteria. Instead, they interfere with the ability of the organism to reproduce. Without the ability to reproduce the bacteria can eventually die out. Bacteriostatic antibiotics include tetracyclines such as Doxycycline. It is important to remember that most antibiotics can be both bactericidal and bacteriostatic, depending upon the amount or concentration of the antibiotic in the body. More clearly still, most bacteriostatic antibiotics can become bactericidal if the concentrations are strong enough.

One of the main points to understand about bacteriostatic antibiotics is that they are usually effective in debilitating bacteria only when bacteria reproduce. This is significant for two reasons. First, it is believed that dormant Lyme bacteria don't reproduce, which diminishes bacteriostatic antibiotic's effectiveness in fighting Lyme

disease. Second, Lyme bacteria have a long reproductive cycle. A mature Lyme bacterium reproduces once every 7 hours or so. This reproductive cycle may vary from species to species. In comparison, some species of the strep throat bacterium reproduce once every 20 to 30 minutes. It is not known how many reproductive cycles are needed before all Lyme bacteria are debilitated by antibiotics.

However, according to Karen Vanderhoof-Forschner in her book, *Everything You Need To Know About Lyme Disease*, the strep bacterium is normally treated with antibiotics through 480 reproductive cycles. She says that if we were to treat Lyme disease through the same number of cycles, it would take somewhere between 5 to 30 months of antibiotic therapy. If this is true, it is significant that some physicians follow a protocol for treating Lyme disease that allows just two to six weeks of antibiotic therapy. Based on the above scenario this may be inadequate.

If either of the above examples are true, this may mean that physicians who are acting in good faith by using conservative treatment protocols may actually be prolonging, and thus complicating, Lyme infection in their patients. However, much of this theory is speculative. Obviously, more research is needed.

Devastating Survival Tactic?

We have discussed how it is believed that Lyme bacteria primarily use two methods of invading the body's immune system and evading certain antibiotics. If the theory behind this belief is true then the two methods of evasion used by the Bb organism include:

- The Lyme bacterium encapsulates itself in the body's protein (the cell wall membrane) and lies dormant for undetermined periods of time.
- The Lyme bacterium hides by entering the body's cells.

In both cases the bacteria may be able to evade the body's specialized defensive mechanisms, along with evading the offensive mechanisms of antibiotics. However, the final piece of this puzzle has to be considered a genetic marvel no matter how devastating it is to Lyme patients. When Lyme bacteria shift from a dormant to an active state they can resume reproduction and effectively re-seed the body. This reestablishes the Lyme infection. If it is true that dormant bacteria can wake up and re-seed the body, this particularly devastating maneuver indicates that short-term courses of antibiotics may be ineffective in eradicating Lyme bacteria from the body.

Mechanism of Action

Antibiotics and other anti-infective agents (anything that counteracts infection) can kill different kinds of bacteria. However, an antibiotic's mechanisms of action—or how they kill bacteria—varies depending upon the type of antibiotic used. Because the mechanism of action varies among antibiotics and anti-infective agents, a specific antibiotic—or specific combinations of antibiotics—may be a better choice than other combinations when attempting to eradicate the Bb organism.

For example, Zithromax (azithromycin) is known to have higher tissue concentration levels when compared to the blood concentration levels it usually attains. Zithromax is also known to have an ability to penetrate some cells in our body more effectively than other antibiotics. This may have an added benefit when treating the Bb organism because we believe that Lyme bacteria have the ability to enter certain types of our cells.

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Later, we will discuss in more detail why specific combinations of antibiotics work better than other combinations when treating Lyme disease. At this point we simply want to identify how the treatment of Lyme disease becomes a complex task with a myriad of options and protocols that are dependent upon an ever-widening circle of circumstances. As we stated earlier, until research catches up, the treatment of Lyme disease cannot be anything but subjective, open to question, individualized, and often complex.

Between a Rock and a Hard Place

While the medical community waits for research to help our understanding of how we can better detect the Lyme organism, front-line Lyme physicians are left with the question, "What is the best way to treat chronic Lyme symptoms?" Many of these physicians emphatically state that their experience indicates that the effects of long-term antibiotic therapy are a lesser consequence compared to what life would be like for their patients if they were left untreated and the bacteria left unchecked in their system.

The Lyme controversy is fueled by the fact that current Lyme testing cannot definitively prove or disprove the presence of active Lyme bacteria in a person's body. Not having an accurate Lyme test forces physicians to rely on less than exact medical science. The alternative is to rely on no treatment at all. Thus, the controversy shows no sign of abating as long as testing methods that conclusively determine the existence of active Lyme infection remain unavailable to the frontline physician.

A final comment on Lyme disease. The medical community will continue to be perplexed and divided about Lyme disease until proper testing options become available. This has serious consequences for Lyme patients who are often left to fend for themselves in a confusing and contradictory medical environment. In an ideal world, people who are in various stages of illness—many of whom have been incapacitated by their Lyme symptoms—should not be put in this situation by a medical system whose purpose is to help, not frustrate their recovery.

Hyperbaric Oxygen (HBO) Therapy

HBO therapy is a medical treatment that uses the administration of 100 percent oxygen at controlled pressure (greater than sea level) for a prescribed amount of time—usually 60 to 90 minutes. HBO therapy is commonly used to treat conditions such as burns and difficult or stubborn healing wounds.

HBO therapy increases the amount of oxygen in the body, which in turn causes several physiological changes that can result in accelerated healing. The basis for these changes is the fact that HBO therapy increases the amount of oxygen in the blood by up to 2000 percent, depending on the treatment depth. This, in turn, dramatically increases the amount of oxygen at the cellular level and creates other physiological changes. These changes can be extremely complex. One scientific research study indicates that Lyme bacteria are microaerophilic, or debilitated in high oxygen environments.

William Fife, Ph.D.

In the case of Lyme disease, William Fife, Ph. D., a Hyperbaric Medicine specialist at Texas A & M University (now retired), estab-



Dr. Fife established Hyperbaric Oxygen protocols for Lyme disease.

lished the protocols for HBO treatment in his Texas A & M research project, to be discussed later. Dr. Fife's Lyme disease protocol calls for HBO therapy to be administered at 2.36 ATA (Atmospheres absolute), or equivalent to a depth of 45 feet below sea level. Each treatment lasts one hour and two treatments are prescribed each day, five days per week.

The total number of treatments given in each case varies. It is common to administer 30 to 60 treatments in the first phase of treatment. The question of further HBO therapy is then resolved after the patient's condition is reevaluated. However, many believe that if the patient has been impacted by the first phase of HBO therapy, such as by experiencing a Herxheimer reaction (this can help to confirm Lyme bacteria die-off), then a break of three to six weeks should be taken followed by another 30 to 60 HBO treatments. A physician can prescribe more sets of HBO therapy based on the patient's individual evaluation.

Risks?

HBO therapy is a medical procedure and like any other medical procedure there can be risks. However, when HBO therapy is administered by trained health care individuals, these risks are minimal. (As with any medical procedure, the evaluation and understanding of the current health status of the patient is of prime importance.)

Minor ear discomfort is the most common inconvenience related to HBO therapy. It is helpful to remember that the initial stage of each HBO treatment is similar to sitting in an aircraft while it descends. Like the airline passenger, the patient's ears have to adjust to a change in air pressure. The hyperbaric health care professional works with the patient or parent and teaches them various techniques on how to equalize pressure in the ears, such as swallowing.

If one cannot equalize the pressure in the ears, damage can occur to the eardrum. However, this is very rare. Some individuals who experience ear discomfort may require a procedure called a Myringotomy, or what is commonly called placing tubes in the ears. An ear, nose and throat specialist (otolaryngologist) usually performs this outpatient procedure right in the doctor's office.

Other complications can occur if a patient has lung abnormalities such as emphysema. However, with proper evaluation prior to HBO treatment any concerns can be eliminated.

A Promising Therapy

Why does HBO therapy show promise in helping Lyme patients? First, we are reminded that Lyme bacteria are microaerophilic, or debilitated in high oxygen environments. Research by F. Austin demonstrated the effect of oxygen on the Lyme organism. The study suggests that the Bb organism is sensitive to high concentrations of oxygen at the cellular level, or what is termed, elevated tissue partial pressures. In other words, the Bb organism doesn't do well in a biological environment similar to that created in the body during HBO treatment.

Once it was clinically determined that Lyme bacteria may be adversely affected by the conditions created in the body during HBO

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therapy, the next step was to conduct a more in-depth study. One such subjective study was completed in 1997 by William Fife, Ph. D. at the Texas A & M Hyperbaric Laboratory and approved by the Texas A & M University Review Board.

The results of the study were significant: improvement in approximately 85 percent of the 66 patients treated. Improvement is defined as a decrease or the elimination of symptoms. (See the outline of Dr. Fife's study, *Effects of Hyperbaric Oxygen Therapy on Lyme Disease* under the treatment section at <http://www.HBOToday.com>.)

It is also notable that all of the study's participants were veterans of antibiotic therapy. These were adults and children who had tried and failed antibiotic therapy, including the big gun in the antibiotic arsenal: intravenous antibiotics. It appeared that the study had chosen the most difficult subjects to test. These were Lyme patients with chronic symptoms and most of them probably had nothing to lose. The fact that 85 percent of these Lyme patients showed improvement seems remarkable.

Other Benefits of HBO Therapy

There are other benefits of HBO therapy that may play a role in treating Lyme disease, but were not mentioned in the Texas A & M study. Some of these benefits are theoretical and not proven; others are well known and considered established fact in Hyperbaric Medicine. Many of these additional benefits are based on the belief that HBO therapy and antibiotic therapy work in a synergistic manner. In this context, synergistic is defined as the combination of both treatments (HBO therapy and antibiotic therapy) being greater than the effect of either one alone. First, let's review.

Earlier we discussed how antibiotics and the immune system might not be able to adversely affect (or kill) Lyme bacteria for two distinct reasons. First, it is believed that the Bb organism is able to switch from an active to a dormant (or sleeping mode) by coating itself in the body's protein. It is also believed that the Bb organism can hide in the body's cells. Both tactics may result in the immune system failing to react to the Bb organism as a foreign organism that should be destroyed. Some believe that this has the effect of neutralizing the body's defensive mechanisms and the offensive mechanisms employed by antibiotics.

Complicated Therapy

Lyme physicians take all of this relatively new knowledge about bacterial biology into account when deciding which antibiotic, or combination of antibiotics to prescribe. The above scenario suggests that, depending upon dosage, some classes of antibiotics such as penicillins and cephalosporins may not be able to eradicate Lyme

bacteria from the body because they circulate mainly in the body's fluids and are incapable of entering cells where the Bb organism can reside. If true, this contradicts many current conservative antibiotic protocols for Lyme disease.

“It is also notable that all of the study's participants were veterans of antibiotic therapy...who had tried and failed antibiotic therapy...”

The fact that 85 percent of these Lyme patients showed improvement seems remarkable.”

The good news is that other classes of antibiotics, such as macrolides (azithromycins such as Zithromax) are prescribed specifically to attack the Bb bacteria that may become established within the

body's cells, along with killing Lyme bacteria residing outside the cells in deep tissue areas of the body.

It is important to recognize that this is a case in point, where a shotgun approach to antibiotic therapy may be an effective tool in fighting Lyme disease. For example, a physician may prescribe a penicillin such as Amoxicillin, along with a macrolide such as Zithromax. The Amoxicillin stays mostly in the body's fluids and blood stream. Meanwhile, Zithromax not only penetrates the cell wall where the Bb organism is residing (and/or hiding), but it also penetrates deep tissue areas, which Lyme bacteria also inhabit. When Lyme bacteria move to deep tissue areas they have effectively moved away from normal blood flow and away from fluid-based antibiotics. Antibiotics such as Zithromax can help to counter this survival tactic.

Also, Amoxicillin is mainly bactericidal (remember, think... homicidal), which means that it directly kills the Bb organism. Zithromax is a macrolide, which means that it can either be bactericidal or bacteriostatic (think... manipulative) depending upon concentration levels. By prescribing these two antibiotics, physicians hope to increase the opportunities for killing as many bacteria as possible, and affecting Lyme bacteria in numerous and complex ways. Obviously, physicians prescribe many other combinations of antibiotics to combat the Bb organism.

Even though physicians can out-manuever some of the Lyme bacterium's survival tactics—such as using combinations of antibiotics—there are those who believe that antibiotics probably cannot eliminate the Bb organism if it is in a dormant state. Again, if this is true, it has serious consequences for the diagnosis and treatment of chronic, persistent symptoms. Specifically, this means that conservative treatment protocols, which call for short-term courses of antibiotics, may actually prolong some cases of Lyme infection. If chronic Lyme symptoms are the result of an active, late-stage Lyme infection, any delay in full and comprehensive antibiotic treatment may have devastating results for the Lyme patient.

Adding HBO Therapy

Now we add HBO therapy to the mix. We previously stated that Dr. Fife's study suggests that the Bb organism is sensitive to elevated levels of oxygen at the cellular level. This is an environment similar to that created in the body during HBO therapy. Unfortu-

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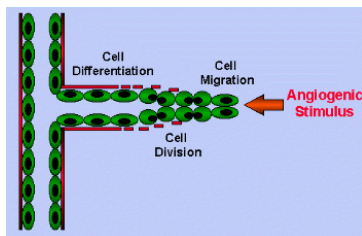
nately, at this time we do not know much about HBO's effect on dormant Lyme bacteria. However, Fife's study conclusively showed that HBO therapy does have a significant and positive impact on a high percentage of Lyme patients who failed antibiotic therapy. The exact reasons why this is so are not clear.

It is interesting to note that some believe that HBO therapy can kill the Bb organism directly. This begs the question, "Can HBO therapy directly kill the Bb organism on its own?" It seems possible that the answer to this question may be yes. A positive response seems reasonable because Lyme patients who have undergone HBO therapy without taking antibiotics seem to have experienced a Herxheimer reaction during treatment. This suggests that HBO therapy alone was responsible for the bacteria die-off. If true, HBO therapy would indeed be capable of killing the Bb organism directly. Again, more research would be helpful.

Angiogenesis Plays a Role

HBO therapy facilitates angiogenesis. Angiogenesis is defined as the development of blood vessels in the body. This may become

important in the treatment of Lyme disease because it is believed that Lyme bacteria effectively evade antibiotics by moving away from normal blood flow into tissue, organs and bone. Thus, the farther that the antibiotic can move into these areas through a more dense and extensive system of blood vessels, the greater the opportunity to kill the Bb organism. HBO therapy's facilitation of angiogenesis allows the antibiotic to potentially have a greater effect on Lyme bacteria by helping to move the antibiotic closer to those parts of the body where the bacteria may be residing.



Bacterial Cell Wall Penetration

There is emerging evidence that certain antibiotics may be more readily incorporated into the cell wall of the bacteria itself in the presence of elevated oxygen tension, which is an environment similar to that created in the body during HBO therapy. If true, this is a clear example of HBO therapy working in a synergistic manner with antibiotic therapy. In other words, the effectiveness of antibiotics to kill the Lyme organism is increased through the use of HBO therapy.

Research is currently being conducted that may indicate that the Bb organism can be killed by oxygen free radicals. Oxygen free radicals are produced during HBO therapy. The deeper the depth of treatment, the greater the number of free radicals produced. It is believed by many that oxygen free radicals have an antibiotic-like effect.

Finally, it is well understood that HBO therapy can enhance certain aspects of the body's natural immune system. This may play a significant and positive role for Lyme patients be-

cause their immune systems have probably been compromised over a long period of time as a result of persistent symptoms.

Further Research

The benefits of HBO therapy appear to be far reaching, as well as having particular significance for Lyme patients. However, further research would be helpful in establishing better diagnostic testing procedures for Lyme disease and precise protocols of treatment for HBO therapy. The former obviously includes a precise test to directly measure the presence of Lyme bacteria in the body, or absence thereof. The latter includes the ideal total number of HBO treatments (and their depth) necessary to treat Lyme disease.

It would also be helpful to better understand the exact mechanism of action that occurs in HBO therapy. After all, Dr. Fife's study showed improvement in 85 percent of the 66 patients who were monitored during his Lyme disease/HBO therapy research study. Simply, it would be helpful to understand precisely why so many Lyme patients got better.

In general, a better understanding of the Lyme bacterium will enable us to develop new and better methods of treating this devastating disease.

In Conclusion

This article has attempted to use current scientific knowledge to inquire into, and to speculate on possible explanations of why HBO therapy is helpful for some Lyme patients. As we stated earlier, just as the diagnosis and treatment of Lyme disease is "subjective, open to discussion, individualized, and often complex," we acknowledge that this article has been subjective and it should be open to question. However, we also feel that no stone should be left unturned in society's effort to understand a disease that has done the following three things:

- Devastated so many individual lives
- Strongly impacted so many families
- Afflicts an untold number of people around the world

We know that antibiotic therapy helps some people who suffer from Lyme disease. We don't fully know why this is so. We also know that HBO therapy helps some people who suffer from Lyme disease. Again, we don't fully know why this occurs. In both cases we feel that it is important to learn why each of these treatments work for some people and not for others.

However, we believe that the major focus of medical science should be on developing an accurate test for Lyme disease. Such a test will do more to eliminate the current controversy and confusing protocols surrounding the diagnosis and treatment of Lyme disease than anything else will. Clarifying better ways of diagnosing and treating Lyme disease through more accurate testing methods will go a long way toward relieving the suffering that many Lyme patients continue to endure.

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In the News: Terri Schiavo

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is acting in the best interest of Terri—with regard to her medical condition. Without a formal medical directive from the patient prior to her injury, Mr. Schiavo has taken upon himself to ask that his brain-injured wife be let to die by the withdrawal of dietary sustenance.

Terri's parents see things differently. They believe the doctors who offer a hope for rehabilitation, based on Terri's spoken utterances and on moments of awareness that they have seen in their daughter. They have even asked Terri if she wants to live or die and have heard a response that Terri's mother says was an undeniable, "I want to live!"

The Hope of Rehabilitation

So what would be* in store for Terri Schiavo if she was allowed to eat, drink and start a rehabilitation program?

Mainstream neurologists give mixed opinions. There are some who have seen improvement in a 1992 CAT Scan; some that claim there are errors. Hyperbaricists believe Terri Schiavo could improve, even though she has been allowed to deteriorate thus far. The key to her rehabilitation would be a combination of therapies that tap into brain function that is still salvable.

With proper functional MRI testing, the full extent of her injuries can be assessed. As of yet, only the preliminary and latter CAT scan of Terri's brain has been used to assess her status.

Terri Schiavo would not return to a normal health status, but would regain functions lost, such as a stronger swallowing impulse, which she now has, but which is relatively weak. Depending on what areas of her brain respond to treatment first, she would experience gains from the stimulation of therapy.

And, this is a scenario many parents and caregivers of the chronically disabled and brain-injured face. Until recently, actor Christopher Reeve faced arduous rehabilitation, endless operations, and a true fight to the finish. With a clear directive, his wife followed and helped him to the end.

Many more everyday people face the same plights with disabled children and loved ones who have similar or worse injuries than Terri Schiavo. Many seek standard medical care... many seek more.

Hyperbaric Medical Gains

Already, hyperbaric medicine has made a mark on hundreds of patients—children and adults—suffering from brain injury. Children born with cerebral palsy, devel-

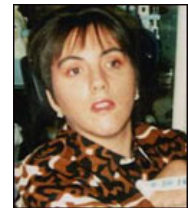


Left: A collage of Terri through the years.

In 1990, Terri Schindler-Schiavo collapsed in the home she shared with her husband, Michael Schiavo. The cause of her collapse is unknown to this day.

Terri fell into a coma but awakened from her comatose state weeks later. She was left in what medical professionals call a "locked in state" with limited abilities to communicate or move.

During the first months that followed Terri's mysterious collapse, she made progress. Medical practitioners noted her efforts to speak and her responsiveness.



Terri remained disabled. Though she is (was)* responsive to stimuli, interacts (interacted)* with her environment and her loved ones and is (was)* capable of communicating in limited ways, she is (was)* a disabled and vulnerable adult—requiring protection, therapy and the route to recovery.

opmental and genetic disorders have seen gains the likes of which traditional medical doctors are still trying to explain.

Adults too, debilitated to the point of immobility, incontinence, and other major losses of function by stroke, chemical and brain injuries begin to regain control over their bodies.

The quality of life of these patients is subjective. To many looking from outside these patients' lives, the few gains seem miniscule, not worth building a life upon. Yet, for those who care for and love the patient, even a small mouthing of a word is enough to keep them pushing forward to the next level of recovery.

The Terri Schiavo case is landmark on many levels—legally, ethically and medically. Who decides medical care? Does quality of life dictate life worth? And, what medical outlook can new therapies hold for patients in the most dire conditions?

These will continue to be the burning questions of the century. That we come to clearer solutions is the task of an enlightened society.

**NOTE: Since the initial start of this story, Terri Schiavo passed away (March 31, 2005, 9 a.m.). If she could have been helped, we will never know.*

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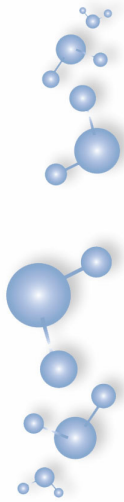
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The International Hyperbarics Association is a coalition of doctors, parents, patients, corporate chamber-industry professionals, hyperbaric center owners, and above all members who are committed to the cause of medical hyperbarics.

Our members come to us from all geographical areas with one common goal— to share their knowledge and information regarding the latest hyperbaric news.

Our driving force is our members, who are committed to do all we can “to give life to the world.”

— “Mundo vitam dare”



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