



# Sara's Garden

Hyperbaric Oxygen Therapy & Conductive Education Center

## HYPERBARIC OXYGEN THERAPY: A CASE STUDY IN INFECTION CONTROL & HEALING

Judith Burkholder RN BS  
Sara's Garden-The Sara Joy Rychener-Burkholder Hyperbaric Center  
Wauseon, Ohio

*"HBOT (hyperbaric oxygen therapy) can provide an important weapon in the fight against numerous disorders. The more you know about HBOT the better prepared you'll be to understand your medical options."* **Dr. Richard Neubauer MD**

Hyperbaric oxygen therapy is the administration of 100% oxygen in the presence of pressure that is greater than atmospheric pressure. In a pressurized chamber, there exists the capability to deliver 10-15 times more oxygen than what is typically delivered at normal atmospheric pressure. The pressure literally dissolves the oxygen into the blood stream, making the oxygen-carrying, enormous red blood cell unnecessary, and allows the oxygen to saturate all tissue including otherwise restricted and/or unreachable destinations within the body.

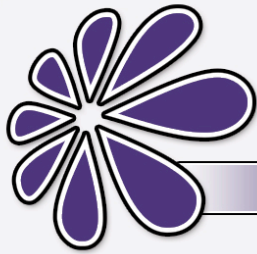
Oxygen is essential for every cell in the body. A body can survive for days without water but only minutes without oxygen. Healing cannot take place without oxygen. Oxygen is an odorless, colorless gas that composes approximately 21% of ambient air or our earthly atmosphere. Oxygen is one of the body's most basic building blocks, found in water, proteins, carbohydrates and fats. Oxygen is not only necessary for repairs but for energy production, for such functions as circulation, respiration, metabolism, digestion, body temperature maintenance, thinking, etc. A diminished or absent supply of oxygen will result in a reduction of bodily functions and/or perhaps death.

Oxygen is considered a drug. In the presence of pressure oxygen produces the following effects (but not limited to) within the human body:

- boosting the immune system.
- building new blood vessels and nerves.
- increasing mitochondrial function
- increasing stem cell production by 8 fold.
- increasing tissue perfusion.
- decreasing inflammation.
- decreasing oxidative stress
- decreasing neurotransmitter abnormalities.
- decreasing dysbiosis; promoting an antibiotic effect
- improving Ph balance.
- assisting synergically in the delivery of drugs.

W.S., a 66 year old, large statured but highly active, employed, married male, presented to Sara's Garden-The Sara Joy Rychener-Burkholder Hyperbaric Center on 08 August 2012 with the required chest x-ray report/xray waiver, physical information/health history and prescription for hyperbaric oxygen therapy.

W.S. had a primary history of obesity, chronic venous stasis, osteoarthritis and arthralgias in multiple sites. He successfully endured left knee replacement in May 2006 and right knee replacement. In 2008, W.S. submitted to lower back surgery and lap band surgery. In May 2009, he underwent umbilical hernia



# Sara's Garden

Hyperbaric Oxygen Therapy & Conductive Education Center

repair and a cholecystectomy, which was followed by pancreatitis. In 2012, W.S. developed venous thromboembolic disease with DVT of the left lower extremity. His left knee replacement was removed due to infection and a spacer was established in lieu of the knee. He began a regimen of antibiotics with an expectation of knee reimplantation in late July 2012. Rather than a knee replacement, W.S. had an insertion of IVC filter and a port placed for IV antibiotic administration. The anticipated knee replacement was preempted by an infection disease control protocol.

The primary diagnosis for W.S was infection due to orthopedic implant. His secondary complaints involved fatigue due to lack of physical activity; compromised mobility due to cumbersome adaptive devices and lack of knee prosthetic; and anxiety/depression due to the inability to be presently employed and physically functioning.

W.S. started hyperbaric oxygen treatments 08 August 2012 and finished twenty-three (23) treatments on 13 September 2012. Treatments were achieved at a pressure of 2.4 ATA, with a hood time of ninety (90) minutes per treatment with 100% oxygen, once (1) daily for an average of four (4) to five (5) weekdays until twenty-three (23) treatments had been successfully administered. During HBOT he was attended by a registered nurse licensed in the state of Ohio as well as other clients participating at the same prescriptive pressure. He tolerated treatments well, free from barotrauma and pain.

On 18 September 2012, W.S. tolerated another surgery to remove a spacer in his left knee and replace it with an artificial knee. He returned to Sara's Garden from 26 September 2012 to 01 November 2012 for twenty (20) additional HBOT following this surgery for the purpose of prompt and enhanced healing. His treatment plan continued in the same manner as his original HBOT.

**The following clinical observations were noted by W.S. and/or nursing staff and/or physician (and testing results) during and/or after hyperbaric treatments:**

- Client states orthopedic physician would be pleased with 90° flexibility with knee; client states currently > 100° flexibility; following HBOT flexibility is 103° but client desires 123° to match unaffected right knee
- Client states C-Reactive Protein at 1.1 and has remained unchanged for two weeks; client states Erythrocyte Sedimentation Rate dropped from 73 to 48; following HBOT ESR is normal
- Improved mobility noted but client expresses desire for greater improvements
- Decreased edema greatly noted in the morning, returns with extensive exercise but not to the rate with which it started
- Client states that pain level is never greater than 3 on a scale of 0-10; 0= no pain, 10=unbearable
- Client states weight loss of fifty (50) pounds; client states that recovery from surgery this time is much better and easier

W.S noted that HBOT had been approved for reimbursement through the Bureau of Workers Compensation as a last resort for healing; all other efforts and interventions had proven unsuccessful. As of 2013, W.S. was terminated from physical therapy, released from medical supervision and returned to his job.

In conclusion, HBOT has in the past been relinquished to the order borders of traditional medicine and implemented as a last resort for hopeless cases. It is proving more and more to be effective economically and medically as an adjunctive treatment and often most beneficial at the beginning of a treatment course rather than at the end.