

Hyperbaric Oxygen Therapy Defined

An oxygen-vitalized body radiates youth and health

The effectiveness of HBOT is based on a common underlying principle: oxygen is delivered to tissues and cells by being temporarily incorporated in the hemoglobin within the body's red blood cells. Under normal conditions, when air is taken into the lungs and passes into the blood supply, hemoglobin is almost 100% saturated with oxygen. However, stress, injury or disease disrupts that process, depriving tissues and cells of some or all of their required oxygen. Under these circumstances, normal atmospheric pressure (ata) is not strong enough to force the required amount of oxygen into the body. Although the hemoglobin does not absorb much more oxygen, HBOT saturates the blood plasma, which comprises the bulk of the blood, with oxygen, thereby, increasing delivery to the tissues and cells. Plasma penetrates the tissues where red blood cell can't reach. The lymphatic system is an example. Compared to air, which has 21 percent oxygen at 1 ata, 100 percent oxygen at 3 ata (45' in depth in seawater) causes a 10-15 fold increase in plasma oxygen concentration with a resultant dramatic increase in tissue oxygenation. This hyper-oxygenation of every cell of your body lasts for hours.

Hyperbaric oxygen adheres to all gas laws, including "Henry's Law". The degree to which a gas enters into physical solution in body fluids is directly proportional to the partial pressure of the gas to which the fluid is exposed. "Boyle's Law" states, "If temperature remains constant, the volume of a gas is inversely proportional to its pressure. It also applies to the basic gas laws of oxygen, nitrogen and carbon monoxide solubility, as well as density, sound and temperature.

Note: Topical oxygen administered in a closed area of the body or limbs is not hyperbaric oxygen and does not meet any of the accepted standard of care of hyperbaric oxygen as recognized by the Hyperbaric Oxygen Therapy Committee of the Undersea and Hyperbaric Medical Society or the American College of Hyperbaric Medicine.

The Chief Benefits

- ◆ Increases oxygen uptake at the cellular level
- ◆ Dramatically boosts energy levels
- ◆ Strengthens the immune system
- ◆ Quickly heightens concentration and alertness
- ◆ Has a calming effect on the nervous system
- ◆ Allows the body to focus plenty of oxygen on its primary metabolic functions without having to draw down oxygen reserves to fight illness and disease
- ◆ Rapidly kills infectious bacteria, viruses, fungi, and parasites without harming beneficial microorganisms needed by the body

- ◆ Greatly enhances uptake of vitamins, minerals, amino acids, proteins, and other essential nutrients, from either natural food sources or from dietary supplements
- ◆ Gives the body the added oxygen it needs to oxidize and eliminate built-up toxins and poisons in the cells, tissues and bloodstream
- ◆ Promotes up to 50% faster recovery from injury, stress or strenuous exercise [Which is why hyperbaric oxygen is beginning to gain in its popularity with world-class athletes, sports figures and weight trainers-Ed.]
- ◆ Aids tremendously in the treatment of respiratory and allergy-related conditions such as asthma, sinus and upper respiratory infection

- MECHANISMS OF ACTION -

DISPLACES OTHER GASES

- i.e. follows time-honored gas laws in displacing gaseous air embolism and causing changes in gastrointestinal gas.

FOLLOWS THE LAW OF MASS ACTION

EFFECT ON OXYGEN DELIVERY

- a. Marked increase in paO_2 but little change in pvO_2
- b. Elevation of oxygen in tissue for up to 4 hours after exposure.
- c. Increase in pCO_2
- d. Increase in oxygen tension in bone, urine, and total body fluid (Henry's Law)
- e. Obliterates Bohr Effect
- f. Enhances Haldane Effect

CNS EFFECTS

- a. Paradoxical vasoconstriction during HBO followed by post-HBO vasodilatation.
- b. Increased blood-brain permeability
- c. Reduction of norepinephrine and monamine oxidase levels.
- d. Arrest or reduce CNS edema formation
- e. Improve microcirculation
- f. Increased O_2 in spinal fluid
- g. Evidence of axonal regeneration

HEMATOLOGIC EFFECTS

- a. Deaggregation of platelets
- b. Increased hemolysis of old RBCs

CARDIOVASCULAR EFFECTS

- a. Reduce cardiac workload
- b. Supportive in cardiogenic shock

ENDOCRINE EFFECTS

- a. Stimulation of thymus and endocrine glands
- b. Decreases insulin requirements
- c. Increases complement activity
- d. Improves metabolism

GASTROINTESTINAL EFFECTS

- a. Decreased gastric output
- b. Decreased pyloric tone
- c. Reduction of norepinephrine and monamine oxidase levels in the liver
- d. Increased intestinal motility

WOUND REPAIR

- a. Reduction of collagen deposition
- b. Increased callus formation

OSTEOGENESIS EFFECTS

- a. Increased osteoclastic activity
- b. Increased osteoblastic activity

ACTIVATES IMMUNE MECHANISMS

BACTERICIDAL AND BACTERIOSTATIC EFFECTS

- a. Anaerobic
- b. Aerobic

Table 1. THE CARRIAGE AND TRANSFER OF OXYGEN IN BLOOD

MECHANISMS OF HYPERBARIC OXYGEN PRESSURE UNITS

One Atmosphere Absolute =
760 mm Hg = 30 inches Hg = 14.7 PSI = 1.1 Kg/CM² = Sea Level

Two Atmospheres Absolute =
1520 mm Hg = 60 inches Hg = 29.4 PSI = 2.2 Kg/CM² = 33 ft. of Sea Water

Three Atmospheres Absolute =
2280 mm Hg = 90 inches Hg = 44.0 PSI = 3.09 Kg/CM² = 66 ft. of Sea Water

DISSOLVING OF OXYGEN IN THE BLOOD

-AVERAGES

15 gm Hg IN 100cc WHOLE BLOOD CARRIES ABOUT 18-22 cc of OXYGEN.

87" (IN THE LUNGS THERE IS A 673 mm Hg) CONSTANT PRESSURE OF 47 mm EFFECTIVE WATER VAPOR & 40 mm CO₂.

1/3 IS FROM O₂ (673 - 5 = 154/6 OR ROUGHLY O₂ PRESSURE 155 mm IN LUNGS 155mm Hg WITH AIR AND 673 WHEN BREATHING PURE O₂.

Plasma will dissolve 2cc O₂ in 100 cc of whole blood at 1 ATA (Sea Level) when breathing 100% O₂.

Each additional atmosphere of pure O₂ contributes 2.3 cc O₂ in each 100 cc of blood.

In normal activity 35% of the hemoglobin's O₂ is dumped at the tissue level - 20 cc of O₂ in 100 cc of whole blood (when breathing air). 20 x .35 = 7.00 cc of O₂ at tissue level. The 35% desaturated Hb goes back for another load of oxygen.

If a person breathes 100% O₂ at 3 ATA, he gets in solution in the Plasma:
1st ATA 20 cc
2nd ATA 23 cc
3rd ATA 23 cc
66 cc or practically the amount in blood (6.5 - 7 cc) given up at the tissues when breathing air at ATA.

End E*, Long, CW: Oxygen under pressure in carbon monoxide poisoning. J of Industrial Hygiene and Toxicology, 24: 305-307, 1942 (Deceased)

CONDITIONS	INSPIRED GAS	PO ₂ OF DRY INSPIRED GAS		Arterial Blood Vol. % of O ₂ Carried		
		(mm Hg)	PO ₂ (mm Hg)	as Oxyhgb.	in sol	total
Sea Level Air		159	90	19.3	0.3	19.6
	O ₂	760	600	20.1	1.9	22.0
Altitudes of Air 20,000 ft.		73	35	13.5	0.1	13.6
	O ₂	350	230	20.1	0.7	20.8
Ambient Pressure of 3 ATA Air		477	350	20.1	1.1	21.2
	O ₂	2280	* 2000	20.1	6.2	26.3

CONDITIONS	INSPIRED GAS	PO ₂ OF DRY INSPIRED GAS		Mixed Venous Blood Vol. % of O ₂ Carried		
		(mm Hg)	PO ₂ (mm Hg)	as Oxyhgb.	in sol	total
Sea Level Air		159	38	14.5	0.1	14.6
	O ₂	760	50	16.8	0.2	17.0
Altitude of 20,000 ft.		73	23	8.5	0.1	8.6
	O ₂	350	43	15.7	0.1	15.8
Ambient Pressure of 3 ATA Air		477	45	16.1	0.1	16.2
	O ₂	2280	* 385	20.1	1.2	21.3

Hart, GB: Hyperbaric oxygen as clinical therapy: Hoax or Breakthrough. Proceedings of the San Diego Biomedical Symposium 12:313-320, Jan. 31-Feb. 2, 1973.

* Note the significant pO₂ A-V difference at 3 ATA in a closed circuit indicates significant tissue delivery.

Testimonials

"In all serious disease we find a very low oxygen state . . . Low oxygen in the body tissues is a sure indicator of disease . . . Hypoxia, or lack of oxygen in the tissues, is the fundamental cause of all degenerative disease."

Dr. Stephen Muntz
Renowned Molecular Biologist

"The link between insufficient oxygen and disease has been firmly established. Insufficient biological energy can result in anything from mild fatigue to life-threatening disease. Simply put, the best way to optimize health is to be sure that we oxygenate every cell in our body. "

Dr. Norman McVea

"If you don't have enough oxygen in your body, drugs, vitamins and food are of little help. You are just playing musical chairs on the Titanic."

Abraham A. Chaplan, M.D., Ph.D.

"Simply put, disease is due to a deficiency in the oxidation process of the body, leading to an accumulation of toxins."

Dr. Albert Wahl, Leading Researcher

"Cancer has only one prime cause. It is the replacement of normal oxygen respiration in the body's cells by cell respiration (i.e., anaerobic oxygen deficient)."

Dr. Otto Warburg,
Two-Time Nobel Laureate Winner of the
Nobel Prize for Cancer Research

"Lack of oxygen clearly plays a major role in causing cells to become cancerous."

Dr. Harry Goldblatt, Journal of Experimental Medicine

"Cancer is a condition within the body where the oxidation has become so depleted that the body cells have degenerated beyond physiological control."

Dr. Wendell Hendricks, Hendrick Research Foundation

"The link between insufficient oxygen and disease has now been firmly established."

Dr. W. Spencer Way,

Journal of the American Association of Physicians

"In all serious disease states we find a concomitant low oxygen state . . . Low oxygen in the body tissues is a sure indicator for disease . . . Hypoxia, or lack of oxygen in the tissues, is the fundamental cause for all degenerative disease."

Dr. Stephen Levine

Renowned Molecular Biologist

Author, Oxygen Deficiency: A concomitant to all Degenerative Illness

"The positive powers of hyperbaric oxygen are really a modification of God's gift to man."

Dr. Richard A. Neubauer,

M.D., Medical Director, Ocean Hyperbaric Center

"Hyperbaric Oxygen adhering to all the gas laws of physics delivers free molecular oxygen to the cells for immediate metabolic use without energy exchange, even with compromised circulation."

Edward Teller Ph.D.