



Healing with Hyperbarics

How does hyperbarics heal?

Hyperbaric Therapy is a specialized therapy that uses an increase in the atmospheric pressure to allow the body to incorporate more oxygen into its blood cells, blood plasma, cerebral-spinal fluid, and other body fluids.

At sea level we have 1ATA (14.7psig) which allows our lungs to absorb oxygen from the air. If we go to higher altitudes, the pressure drops and we the lungs would not be able to absorb the oxygen from the air. This is why oxygen masks drop in an airplane at high altitudes – to increase the O₂ content due to the lack of pressure. The exact opposite happens when you go to lower altitudes (below sea level). There the pressure is greater (above 1ATA) and now the lungs can more easily absorb the oxygen.



Consider this analogy. A bottle of soda-pop is a pressurized vessel. In the bottle we have a liquid. We then have 'carbonation' (the gas) and also pressure. When the bottle is sealed we do not see bubbles. The moment we twist off the cap and break the seal, we hear the 'swish' and the pressure is released in the bottle. Now, all of a sudden we see the formation of bubbles in the bottle and as time goes they grow and float to the top of the liquid. Certainly the pressure in the bottle is quite high and the na-

ture of the gas (carbonation) is a different than the 21% O₂ in the ambient air. However the concept is the same. In the hyperbaric chamber, as the pressure goes up, more O₂ from the air is 'pushed' into the fluids of the body.

The healing occurs when a severely compromised tissue in the body begins to receive oxygen, and blood circulation to the tissue resumes. Note: A damaged tissue may not have been receiving enough blood for it to heal, due to a lack of blood circulation caused by the initial trauma.

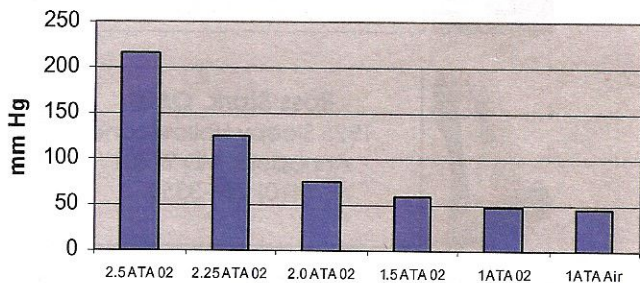
The Gas Laws of Physics state that more gas is dissolved in a liquid by increasing the pressure of the gas.

Here lies the healing magic of Hyperbaric Therapy. Inside the pressurized chamber, the story changes. The injury site now begins to receive a healing dose of oxygen through the surrounding body fluids and plasma—even if the blood supply to the tissues are compromised.

Furthermore, to boost the oxygen concentration in the chamber, supplemental oxygen may be added into the chamber during treatment. As explained before, this oxygen will become infused into the numerous types of liquids in the body—blood, plasma, cerebral fluids.

And like the soda-pop in our analogy, the oxygen-uptake will remain in the body for a time after treatment.

Chart of Venous Oxygen Levels

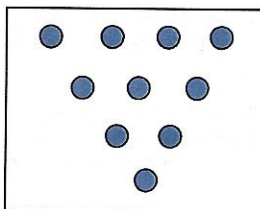


Hyperbaric Oxygenation

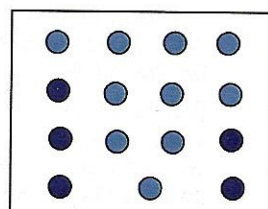
Chart: The goal here is to increase tissue oxygen delivery above 50mmHg. Notice in the graph, that even 100% O₂ at one atmosphere has little effect on increasing the level of deliverable oxygen to the tissue level. You need pressure to do this (especially if circulation is compromised).

Note: Breathing pure oxygen at 2 Atmospheres, gives 10 times the regular amount of oxygen (2 x 100% vs. 21%). In one hour, humans can inhale 2.4 pounds of oxygen! (Normal is 6 pounds/ day). Red blood cells instantly fill with oxygen and the extra oxygen dissolves directly into the blood fluid. In a few minutes, this extra oxygen builds up tissue oxygen levels far above normal.

**Oxygen per Unit—
Volume of Inhaled gas**



OF OXYGEN MOLECULES AT 1.0 ATA
(10)



OF OXYGEN MOLECULES AT 1.5 ATA
(15)

The Principle of Hyperbaric Oxygen Therapy is simple. Increase the atmospheric pressure and get a *directly proportional* increase in available oxygen.

In other words, a two fold increase in the pressure would equal twice the available oxygen *molecules* to breathe. [Half that, would yield half more, as shown].