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Compressed Oxygen

Hyperbaric Therapy

A healthy person's hemoglobin (the red in red blood cells) holds 97% of the maximum amount of oxygen from normal air or 100% when breathing pure oxygen. This oxygen tension level (or oxygen partial pressure, Po2) is measured in units labeled mmHg. Whether you breathe air or pure oxygen, red blood cells can only deliver a limited level of oxygen to tissue cells, a Po2 of 40 mmHg or less. Injuries, infections and diseases can cause a drop in this tissue oxygen level down to almost zero!
As we age we loose vital capacity and the ability to effectively obtain adequate oxygen. Some disease conditions impair oxygen utilization. Forceful injuries with swelling can cause excessive pressure that cuts off healthy circulation flow. Swollen tissue causes a loss of oxygen circulation to areas of the body called ischemia. This problem drops the Po2 dangerously low, destroys tissue and slows healing.

Research has shown optimal tissue healing occurs if Po2 can rise to 80 mmHg. Oxygen given in a normal room is not enough to raise tissue oxygen levels that high because red blood cells cannot carry enough extra oxygen to do that. Every day an average adult consumes four pounds of food, two pounds of water and almost 6 pounds of oxygen. People consume nearly the same amount of oxygen by weight compared to food and water combined! From that six pounds of oxygen about 2 pounds gets into the blood for transport. However, sit inside a secure chamber pressurized at twice the normal air pressure and you breathe double the number of molecules. (Hyperbaric pressure allows breathing that is more efficient.) Breathing pure oxygen in such a chamber gives us 10 times our regular amount of oxygen. In one hour we can then inhale 2.4 pounds of oxygen! Instantly red blood cells 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. This action has been scientifically proven to stimulate healing function. In order to raise tissue oxygen tension to 80 mmHg for optimal healing one must have oxygen delivered under compressed atmosphere conditions, hyperbaric oxygen therapy!
Hyperbaric oxygen improves defender blood cells by turning them from ordinary scavengers into efficient warriors. These defender cells use oxygen as the ammunition to kill pathogens. Can you imagine ten times the normal ammunition supply? This is why people with serious infections have improved under hyperbaric oxygen even after failing under standard regimes. The modern way to raise tissue oxygen levels and

purge away ischemic trouble is with hyperbaric oxygen. Most everyone can enjoy the hyperbaric experience. Generally, you must be free from claustrophobia and be able to clear changes in ear pressure. The actual experience is little different than sitting in an airplane for one hour, without the movement! There are two styles of hyperbaric chambers. The single patient monoplace or a larger style multiplace for more than one. Either one does essentially the same, a pressurized atmosphere to breathe oxygen. What could be easier? Relax and heal with safe, reliable oxygen.

Now let's see what we can help with hyperbaric oxygenation:
Here we see some thermal burns (2nd and 3rd degree burns) [In the download there are photographs of various burn wounds]This is a sequence of pictures taken after a severe burn from boiling, sticky fluid accidentally dumped on a bare leg. From left to right, taken one day after the initial burn, then two and four weeks after the burn. Hyperbaric oxygen was begun 12 hours after this injury. (It would have been better to start sooner.) The patient was initially in severe pain but she declared that her pain ceased during her first hyperbaric session, and the pain never returned! In five weeks her leg completely healed without any scar formation. She had no other medical intervention except for the hyperbaric oxygen. The quick cessation of pain with the eventual wound resolution demonstrates that hyperbaric oxygen has remarkable healing properties. Skeptics may say, this is merely anecdotal promotion of a potential therapy. Therefore, we look to science for proof. There is a published prospective, randomized, double blind study that proves hyperbaric oxygen helps heal burns. The Effect of Hyperbaric Oxygen Therapy on a Burn Wound Model in Human Volunteers Journal of the American Society of Plastic and Reconstructive Surgeons May 1997 volume 99, #6 Hyperbaric therapy treats diseases caused by ischemia (oxygen depletion in tissues) with a phenomenal increase of oxygen into the blood circulation. To get the increased oxygen level you must be inside a pressure vessel. Think in these terms: pressure is the power, oxygen is the agent. They work together. Hyperbaric oxygen helps displace accumulated nitrogen bubbles in-patients with decompression sickness. The chamber helps patients with carbon monoxide poisoning and can reduce the oxygen starving effect noted in related cyanide poisoning (industrial fires have smoke that often contains cyanide). The extra oxygen in hyperbaric therapy diffuses directly into the plasma and can help patients with blood loss and anemia problems. Hyperbaric oxygen therapy produces helpful blood vessel constriction while promoting tissue health with an abundance of oxygen; thus, hyperbaric oxygen reduces swelling after burns or crush injuries and protects cellular function. Hyperbaric oxygen reduces tissue damage in osteoradionecrosis (radiation tissue damage). Plastic surgeons have used hyperbaric therapy to improve the outcome of compromised skin grafts and to enhance healing in selected problem wounds.
Hyperbaric oxygen can also improve function of the immune system. Hyperbaric therapy has an anti-bacterial effect against anaerobic bacteria. Immune system blood cells function better to kill pathogenic microbes when oxygen concentrations are optimal. This action helps control infections such as osteomyelitis (unmanageable bone disease). Improved immunity can reduce chronic
infections such as Actinomycosis (caused by the anaerobic gram-positive

microorganism Actinomyces israelii; control bacterial infections associated with clostridial myonecrosis (gangrene) and necrotizing soft tissue infections (deadly skin ulcers). The combined action of hyperbaric oxygen helps improve outcomes in selected problem wounds that might otherwise progress toward amputation. Michael Capria, the director of Tampa Hyperbaric Enterprise says, Hyperbaric oxygen can indeed save lives and limbs.

Early Hyperbaric History

- 1620 Cornelius Drebbel developed a diving bell for underwater work
- 1662 Henshaw used compressed air for the treatment of pulmonary disease
- 1670 Boyle gave the first description of decompression phenomenon
- 1837 Pravaz of France constructed largest hyperbaric chamber of that time to treat a variety of aliments
- 1921 Orville J. Cunningham completed construction on a hyperbaric chamber in Lawrence, Kansas used to treat a variety of aliments
- 1928 Cunningham built a 64' steel hyperbaric sphere with five floors in Cleveland
- 1928 Harvard Medical School built a hyperbaric chamber for research

In Veterinary Medicine:

It is ironic that hyperbaric research first used animals to demonstrate the effectiveness of hyperbaric oxygen for human disease treatment; now veterinarians are using hyperbaric oxygen to treat animals! The variety of conditions treated include the general categories of gastrointestinal pathology,neurological applications, infection and wound control, vascular pathology, heart pathology, and oncological applications. There are many specific selected applications including placenta hypoxia, complicated eclampsia, venom-induced myonecrosis, brown recluse spider envenomation, diabetes mellitus, chronic hearing disorders, toxic goiter and so on. It appears that animal treatment is not encumbered by the same restrictions placed on human treatment so there are more applications tried with successful outcomes. This should help propel research for human disease treatment in the near future.

In China:

The first Chinese hyperbaric chamber was built in 1964 by Wen-ren Li, M.D. and that today more than 800 hyperbaric chambers are in use today. The number of people treated with hyperbaric oxygen is exceeding 3.5 million and that officially more than 60 kinds of diseases are treated with this therapy.

In Italy:

Hyperbaric techniques are so widely appreciated that physicians have been disciplined for not giving hyperbaric therapy where it would have been clearly helpful. Italy has nearly the largest number (34%) of European hyperbaric installations. Update on the recently reported hyperbaric chamber fire in Italy: This fire started after a couple of rare errors: 1) One patient had a (prohibited) pocket warmer inside the chamber. 2) The water deluge system was empty for repairs. 3) The oxygen flow to the hoods was started without the overboard dump function. These errors can easily be eliminated in the future by: 1) Close patient supervision. 2) Close supervision of all maintenance work on chamber 3) Only start the oxygen flow in multiplace chambers when patients are ready to put them over their heads and constantly monitor the chamber oxygen

percentage. Refresh the chamber with new air if the oxygen level rises to unacceptable levels.

In Russia:
Unverified reports suggest that the largest number of chambers are located in Russia (over 1200 in current use). Hyperbaric oxygen is used in almost every branch of clinical medicine in over 60 medical institutions either as an extra therapy or as a basic treatment.