

# Harnessing the power of oxygen

Oxygen therapy promotes healing and rejuvenation for those with serious health issues

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**H**yperbaric oxygen therapy (HBOT) is an FDA-approved therapy that involves breathing pure oxygen in a pressure chamber. The treatment is based on the fact that oxygen at high pressure is pushed into cells, tissues and fluids of the body, thereby promoting healing and rejuvenation. Ozone therapy works in a similar manner and involves administration of the molecule (O<sub>3</sub>) via injection, external application, gas bath or ozonated water routes. Ozone is never inhaled as it can cause toxicity as the molecule is unstable. The fundamental difference is that HBOT uses oxygen under pressure and ozone therapy uses ozone as the compound, which is able to generate messengers crucial for activating several biological functions.

## The concept

**HBOT WAS** originally indicated in decompression sickness, common among divers and astronauts, to normalise pressure of gases in the body. Dr Pradeep Mahajan, regenerative medicine researcher, StemRx Bioscience Solutions Pvt Ltd, says, “We breathe in oxygen, which then passes through the lungs into the bloodstream where it is utilised by cells and tissues. A simple example of cellular utilisation of oxygen would be uptake of the gas by haemoglobin present in the red blood cells, which is then spread to all parts of the body. Subsequent research revealed that this treatment can be used in conditions associated with compromised blood supply to tissues and organs—such as cases of wounds and gangrene. HBOT works on the principles of cell proliferation, tissue oxygenation, collagen synthesis, angiogenesis, and subsequent healing. “Ozone therapy works on similar principles. Medical grade ozone therapy has proved to be beneficial in several infectious as well as inflammatory conditions. Ozone is known to have antibacte-

rial properties. In addition, this molecule also has anti-inflammatory and haemodynamic properties,” says Mahajan. Both therapies are beneficial in neurological conditions as well. The proposed mechanism behind the effects is related to reduction in cerebral edema, normalisation of the water content in the brain, decrease in the severity of brain infarction and maintenance of the integrity of the blood-brain barrier. These therapies also increase blood flow and perfusion of tissues. This aids in improvement of motor deficits caused by conditions such as stroke and other circulatory disturbances. Effects of HBOT and ozone on cell survival and proliferation, inhibition of brain cell death also aid in improved outcomes of conditions such as Parkinson’s disease and multiple sclerosis. HBOT and ozone therapies have also shown to be beneficial in respiratory disturbances, blood-related conditions such as anemia, neuropsychiatric conditions, sleep disorders and more.

### The specifics

**DR HIMANSHU AGARWAL**, HBOT expert, Fortis Escorts, Jaipur, says, “The increased pressure in the chamber during hyperbaric oxygen treatment will facilitate more oxygen to get dissolved in the blood plasma—it is up to 20 times more than normal levels. This increases the amount of oxygen in the patient’s blood. The high level of oxygen in the blood enhances the body’s ability to kill certain bacteria and allows oxygen delivery to tissues.” Ozone therapy helps to produce new, healthy cells in the body. Ozone therapy may also disrupt the growth of harmful bacteria in the body. If there is some infection in the body, ozone therapy stops it from spreading it further. Dr Pradeep Muley, head interventional radiolo-

gist, Fortis Hospital, Vasant Kunj, says, “In the chamber of hyperbaric oxygen therapy, the air pressure is increased to three times higher than normal air pressure. Under this high pressure, the lungs can gather more oxygen as compared to breathing pure oxygen at normal air pressure. Then blood helps to carry this oxygen throughout the body which stimulates the release of growth factors and stem cells that promote healing.”

Sometimes, cancer patients can get injured from the treatment. Radiation therapy, for example, can cause serious injury. It can lead to issues such as bleeding from the bladder, gut or rectum, harm to the jaw bone, teeth, and throat, non-healing wounds, tooth decay, soft tissue damage in the chest wall and osteo radio necrosis. The introduction of HBO into the body can help heal these tissues by helping grow

new blood vessels by getting more oxygen to the affected areas. It reduces swelling and allows better blood flow. The higher oxygen levels help white blood cells to kill bacteria and stop infection. Dr Gautam Shah, orthopaedic surgeon, Daivam Wellness, says, “The more oxygen our body carries in our bloodstream, the better it can fight bacteria and inflammations. With the help of hyperbaric oxygen therapy chamber, in which the supply of oxygen is increased to three times the amount than normal, the lungs gather more oxygen and pump it back into the organism. For clients suffering from cancer, this therapy helps to strengthen the cellular strength, and the overall immune system. HBOT affects cancer cells through a reduction in hypoxia—a low-oxygen condition that is common in cancerous tumors. Thus, it has tumor-inhibitory effect in cancer cells.

### Ozone treatment

**WHEN THE IMMUNE** system is depleted, ozone will stimulate it. This occurs by ozone’s unique interaction with white cells to release immune messengers called cytokins. In the absence of adequate DPG, our cells become starved for oxygen. In simple terms, ozone therapy refers to the process of administering medical grade ozone gas to cleanse the system or treat a disease. When the body is exposed to toxins for a prolonged time period, it loses its ability to eliminate it from the system properly. The accumulated toxins block the cells from absorbing oxygen, leading to a number of illnesses. Ozone therapy helps detoxify the body and is effective for patients suffering from allergies, skin conditions, obesity, digestive issues, and insomnia. “Ozone gas is excellent at inactivating microorganisms, stimulating the production of oxygen, and activating the immune system. It helps flush out the infected cells and helps your body to produce new, healthy ones. Ozone therapy is effective at reducing complications for people suffering from diabetes. Diabetic complications are usually the result of oxidative stress, and ozone therapy helps introduce fresh oxygen to the tissues. It also boosts the immune system by stimulating the production of white blood cells,” says Dr Babina N.M, Jt CMO, Jindal Naturecure Institute.

### Treatment responses

**HBOT AND OZONE** therapy are minimally invasive therapeutic modalities. Therefore, patient compliance is good. These therapies can be advised as an adjunct to mainstream treatments. For example, in regenerative medicine and cell-based therapy, which is based on the principle of utilising the innate regenerative potential of the body, these modalities are recommended in order to achieve additional benefits. “You are capitalising on the inherent healing potential of the body, through minimal external intervention,” says Dr Mahajan. HBOT directly oxygenates the blood; therefore, results in transient hyper-concentration. Thus, the effects of HBOT, while immediate, are short-lived. Ozone therapy on the other hand gradually works by delivery of oxygen to hypoxic tissue through vasodilation and also facilitates release of growth factors over a period of time, thus showing lingering effects. Nonetheless, both forms ultimately rely on increased oxygen concentration and are beneficial in treatment of a myriad conditions. Dr Navita Purohit, consultant, pain medicine, Kokilaben Dhirubhai Ambani Hospital, says, “Hyperbaric oxygen therapy is a treatment process

involving 100 per cent pure oxygen in a closed chamber at pressures higher than normal atmospheric pressure under observation of a trained physician or nurse. HBOT improves local tissue circulation and angiogenesis. Increases in superoxide and other free radical levels causing increased tissue scavenger action, reduces local oedema. Patients of diabetic foot, infected wounds and cancer wounds have reduction in wound size, improved wound healing, reduced discharge from the wounds and better healthy granulation tissue.” The other benefits include stimulation of immune system to speed up healing, purification of blood and the lymph, inactivation of bacteria, viruses, fungi, parasites, yeast and protozoa and pain reduction. □

