

## **DIABETES AND HYPERBARIC OXYGEN: WHAT'S THE CONNECTION?**

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Diabetes has reached epidemic proportions in the United States. Recent census figures, released by the government on March 27, 2002, show that an estimated 17 million Americans suffer from the effects of diabetes. This is 8% more than previously estimated and triple the percentage of three decades ago. The majority are suffering with adult-onset or type-two diabetes. The American Diabetes Association estimates that 5.9% of the 17 million people are currently undiagnosed. This disease is especially debilitating to senior citizens with 20% of Americans over 65 enduring type-two diabetes, but it affects all age groups. The effects and complications of diabetes are wide ranging and can include blindness, kidney and heart disease, impotence, nerve disease, diabetic neuropathy, or lower limb amputation.

One of the most incapacitating effects of diabetes is diabetic neuropathy. About 60% to 70% of diabetics have mild to severe forms of diabetic nerve damage. In severe forms, diabetic neuropathy and nerve damage can lead to lower limb amputations. The risk of leg amputation is 15 to 40 times greater for a diabetic with more than 56,000 amputations performed annually on diabetics. Diabetic neuropathy can cause pain or decrease the ability to feel pain, heat or cold. This loss of nerve feeling often means that the diabetic may not feel a foot injury, leading to a chronic wound. In fact, 1 in 5 diabetic hospitalizations are directly due to foot problems. The National Institute of Diabetes and Digestive and Kidney Disease estimate that 70% of all non-traumatic amputations are a result of chronic wound complications. In the United States alone, \$1 billion is spent annually to treat chronic wounds.

Diabetic wounds are extremely difficult to heal and require a multidisciplinary approach. One part of the overall approach is adequate oxygenation to the wound. Many diabetics suffer from tissue hypoxia, a lack of oxygen to the affected wound. Oxygen is the body's fundamental mechanism for healing itself. It is essential for any healing process, especially chronic open wounds. Currently there are two methods to raise tissue oxygen levels at the wound site. Both use hyperbaric oxygen to treat wounds. Hyperbaric oxygen is oxygen applied at pressures greater than one atmosphere. The first method, the one you may be most familiar with, delivers oxygen systemically, meaning you breathe it in directly. The second option applies topical oxygen directly to the wound. Both methods are effective in treating chronic wounds, but there are several important difference between the two modalities. Systemic oxygen is delivered in a full body hyperbaric chamber. The patients travel to a specialized hyperbaric center, where they are encased in a chamber and breathe high-pressure oxygen. The therapy is costly. Some of the many side effects associated with full body hyperbaric therapy include pulmonary or central nervous system toxicity, acceleration of cataract growth, and distortion of vision up to eight weeks. In addition, many patients develop severe claustrophobia and some can not tolerate the increased pressure in the ears and sinus cavity.

The second option to deliver hyperbaric oxygen to the wound site has none of these side effects. The topical hyperbaric oxygen chamber, distributed locally by Hyperbaric Solutions, Inc., delivers oxygen directly to the wound by encasing the limb in a rigid plexiglass chamber, approximately the size of a home microwave oven. The unit is hermetically sealed with oxygen delivered through rubber tubing. A latex leg sleeve is placed on the extremity, surrounding the limb, to create a seal. This FDA-approved unit is lightweight and portable. The patient is able to perform this non-invasive therapy in the comfort of their own home. As an added benefit, the topical hyperbaric oxygen chamber delivers beneficial, pulsating intermittent pressure directly to the wound site. Intermittent pressure stimulates circulation and reduces edema or swelling. The diffused oxygen delivered by the chamber raises the capillary PO<sub>2</sub> levels at the wound site, stimulating capillary budding and granulation of new, healthy tissue. The oxygen therapy increases leukocyte function to the wound bed thus enhancing antibacterial activity and suppressing bacterial growth. The incidence of infection is decreased dramatically while using the topical hyperbaric chamber. The addition of a topical hyperbaric chamber as an adjunctive treatment has been clinically proven to dramatically reduce the time and cost to heal a chronic wound versus traditional wound care modalities. In addition to diabetic wounds, topical hyperbaric oxygen therapy is also beneficial for pressure, venous, and arterial ulcers.

In addition to its widespread use in the home, topical hyperbaric oxygen treatment is also available in other settings. Patients can receive treatment bedside in many area hospitals or visit their local doctor's office. Nursing homes and wound care clinics are also beginning to see the benefits of this type of treatment. Veteran's Hospitals have relied on this proven therapy for limb salvage. Many insurance plans are covering topical hyperbaric therapy in the home on an individual case-by-case basis. For insurance plans that do not cover this therapy, reasonable rental rates can be arranged.

For further information visit [www.topoxny.com](http://www.topoxny.com) or contact: Owen J. Murtagh, Director, Hyperbaric Solutions, Inc., 28Arista Drive, Dix Hills, NY 11746. Telephone: (631) 385-5000. Fax: (631) 421-3655. E-mail [topoxny@optonline.net](mailto:topoxny@optonline.net).