

HBOT as a Healing Tool for Diabetics

By Julie Deardorff, jdeardorff@tribune.com

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Jim Keenan wasn't particularly alarmed by a small blister that developed on his heel. Five days later, the 62-year-old's foot was so seriously infected doctors feared they might need to amputate his lower leg. Keenan, who also has Type 2 diabetes, instead tried the emerging treatment called hyperbaric oxygen therapy. Best known as an antidote for underwater diving disorders, HBOT involves inhaling pure oxygen while reclining in a pressurized chamber.

The intense flood of oxygen to the blood can stimulate cell growth, promote the formation of new blood vessels and fight certain infections, said Dr. Alan Davis, who directs the Center for Wound Care and HBOT at Northwest Hospital outside Baltimore. Swedish researchers have shown HBOT can help foot ulcers heal in certain patients with diabetes, according to a 2010 study published in the journal *Diabetes Care*. A review of other trials also found that HBOT reduced the number of amputations in people with diabetes who have chronic foot ulcers, according to a Cochrane Review of the literature.

But while the data on chronic wound healing are extensive, approved by insurance carriers and totally positive, many physicians are still skeptical.

The Swedish study appeared to be "well done," but "it still doesn't tell us which patients will benefit from this very expensive treatment," said Dr. Tony Berendt, an infectious disease physician at Oxford and co-author of several clinical guidelines on diabetic foot infection.

Diabetes develops when a person's body can't make a normal amount of insulin, or uses it incorrectly. "Insulin controls blood sugar; if the levels are too high, blood vessel and/or nerves can be harmed," said Davis. Damage to the blood vessels or nerves can result in a loss of circulation or reduced sensation to the feet. This can make it difficult to detect a sore or injury. "Those with diabetes lose the gift of pain," said David Armstrong, director of the Southern Arizona Limb Salvage Alliance at the University of Arizona department of surgery. Armstrong's research has shown that up to 25 percent of those with diabetes will develop a foot ulcer. More than half of foot ulcers become infected; one in five infections require amputation. Four of five amputations require additional amputations with a 50 % mortality rate by the 4th year following the first.

HBOT may improve the oxygen concentration in the peripheral tissues, and that increased oxygen concentration may improve healing, Armstrong said. But, he said, if blood isn't able to flow, due to peripheral vascular disease, the super oxygenated blood won't be able to get to the extremities and HBOT will be nearly useless.

What's most critical for a patient is access to a team: a group of nurses and doctors of different specialties who work together, including a foot or podiatric surgeon and vascular surgeon, Armstrong said. "It's not what you put on a wound that heals it; it's what you take off," he said. "If you surgically and carefully remove what's dead and redistribute pressure so the person isn't pirouetting on a body part, in the face of good blood flow and absent infection, most wounds heal just fine."

Keenan, who lives in Bettendorf, Iowa, was diagnosed with diabetes at 58. At the Genesis Wound and Hyperbaric Institute in Davenport, he underwent 40 two-hour treatments in the pressurized hyperbaric chamber, five days a week, to improve oxygen flow to his foot. At the same time, he was treated with a series of dressings, grafts and vascular surgeries to improve blood flow to his foot. The treatment lasted nearly two years, ending in March; already Keenan is walking and riding his bike short distances. "I'm doing things I thought I might never do again," he said. Put your best foot forward!