



HYPERBARIC MEDICINE HEALS.

HYPERBARIC OXYGEN THERAPY FOR HOSPITALISTS

HyOx treats the following approved and covered complications:

- **Acute peripheral arterial insufficiency**
 - **Referral Protocol:** Immediately, as an adjunct used in combination with standard therapeutic measures when loss of function, limb or life is threatened
- **Compromised skin grafts and flaps**
 - **Referral Protocol:** Immediately, when post-surgical site shows signs of dehiscence, necrosis, blistering, erythema, infection
- **Crush injury and skeletal muscle-compartment syndromes**
 - **Referral Protocol:** Immediately to increase tissue oxygen tensions to sufficient levels post-crush injury and prevent progression of skeletal muscle - compartment syndrome
- **Air or gas embolism**
 - **Referral Protocol:** Immediately, post-surgery to deflate the air or gas bubbles in the bloodstream
- **Chronic, non-healing wounds (diabetic wounds of the lower extremity)**
 - **Referral Protocol:** When wound healing hasn't progressed with 30 days of traditional wound care including antibiotic regimen in Wagner Grade III or higher wounds
- **Chronic refractory osteomyelitis**
 - **Referral Protocol:** When osteomyelitis fails to respond to definitive surgical debridement and to heal after four to six weeks of antibiotic therapy (Stage 3 and 4 - localized and diffused respectively - chronic osteomyelitis as classified by the Ceirny-Mader system, are most likely to benefit from hyperbaric oxygen therapy)
- **Necrotizing soft tissue infections (necrotizing fasciitis, gas gangrene)**
 - **Referral Protocol:** Immediately, in the acute phase, after a wound culture, MRI or bone biopsy show progressive necrotizing infection - when anatomic levels of involvement of skin, superficial or deep fascia and muscle involvement can be assessed by biopsy, MRI and deep tissue cultures

- **Delayed effects of radiation therapy** (soft tissue radionecrosis, osteonecrosis, radiation cystitis/ proctitis)
 - **Referral Protocol:**
 - Pre- and post-operatively in a previously irradiated area
 - Immediately, when symptoms manifest (edema, bleeding, pain, wound)
- **Carbon monoxide poisoning**
 - **Referral Protocol:**
 - Immediately as an emergent condition to decrease mortality and improve neurocognitive morbidity
- **Thermal burns**
 - **Referral Protocol:**
 - Immediately as an emergent condition alleviate the body's intense inflammatory reaction to the heat damage and expedite healing

Benefits of Hyperbaric Oxygen Therapy

- Accelerates healing of chronic wounds by maximizing oxygen delivery through the blood's plasma to encourage growth of new blood vessels in oxygen-deprived tissue – normal steps to wound healing are impaired due to inadequate perfusion and oxygen availability
- Promotes fibroblast, collagen deposition, angiogenesis **(1)**, resistance to infection **(2)** and intracellular leukocyte bacterial killing – all oxygen sensitive responses essential to normal wound healing
- Establishes adequate oxygen availability within the vascularized connective tissue compartment that surrounds the wound to assist in wound repair
- Promotes vascular endothelial growth **(3)** factor and formation of granulation tissue
- Decreases the risk of amputation in patients with ischemic, infected, Wagner Grade III or higher diabetic lower extremity wounds and foot ulcers **(4)(5)**
- Improves oxygenation through angiogenesis, induces neovascularization and reduces fibrosis in irradiated tissue **(6)**

REFERENCES:

- (1) Hopf HW, et al. Hyperoxia and angiogenesis. *Wound Rep Regen* 2005; 13 (6): 558-564.
- (2) Grief R, Akca O, et al. Supplemental perioperative oxygen to reduce the incidence of surgical wound infection. *New England Journal of Medicine* 2000; 342 (3):161-167.
- (3) Sheikh AY, Gibson JL, Rollins MD, Hopf HW, Hussain Z, Hunt TK. Effect of hyperoxia on vascular endothelial growth factor levels in a wound model. *Arch Surg* 2000; 135: 1293-1297.
- (4) Kranke P, Bennett M, Roeckl-Wiedmann I, Debus S. Hyperbaric oxygen therapy for chronic wounds (Cochrane Review). In: *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons, Ltd.
- (5) Kalani J, Brismar K, Fagrell B, Ostergren J, Jorneskog G. Transcutaneous oxygen tension and toe blood pressure as predictors for outcome of diabetic foot ulcers. *Diabetes Care* 1999; 22(1): 147-151.
- (6) Marx RE, Ehler WJ, Tayapongsak P, Pierce LW. Relationship of oxygen dose to angiogenesis induction in irradiated tissue. *Am J Surg* 1990; 160: 519-24.

