



**HYPERBARIC MEDICINE HEALS.**

## **HYPERBARIC OXYGEN THERAPY FOR INFECTIOUS DISEASE**

HyOx treats the following approved and covered conditions:

- **Chronic refractory osteomyelitis**
  - **Referral Protocol:** Post four to six weeks of antibiotic therapy with no healing progression
- **Necrotizing soft tissue infections** (necrotizing fasciitis, Fournier's Gangrene, nonclostridial myonecrosis, crepitant anaerobic cellulitis, progressive bacterial gangrene, zygomycotic gangrenous cellulitis)
  - **Referral Protocol:** Immediately, in the acute phase, after a wound culture, MRI or bone biopsy show necrotizing bone or soft tissue 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
- **Clostridial myonecrosis** (gas gangrene)
  - **Referral Protocol:** Immediately when gas gangrene manifests (typically hours after injury or an operation) with a severe and sudden pain in the infected area followed by fever, shiny and tense skin then becoming dusky and bronze-like
- **Refractory actinomycosis / other mycoses**
  - **Referral Protocol:** As an adjunct to conventional therapy when the disease process is refractory to antibiotics and surgical treatment
- **Intracranial abscess**
  - **Referral Protocol:** Immediately, upon diagnosis of multiple abscesses, abscesses in a deep or dominant location, in a compromised host and in situations where surgery is contraindicated or where the patient is a poor surgical risk and when there's no response or further deterioration in spite of standard surgical (e.g. 1 - 2 needle aspirates) and antibiotic treatment

## Benefits of Hyperbaric Oxygen Therapy

- Fights infection synergistically with antibiotic therapy by boosting the efficacy of aminoglycosides **(1)** by restoring immune mechanisms that have become dysfunctional due to hypoxia (*this directly affects neutrophilic killing of organisms as phagocytosis becomes inefficient*)
- Reduces the amount of hypoxic leukocyte dysfunction/adherence occurring within an area of hypoxia and infection providing oxygenation to ischemic area limiting the spread and progression of infection **(2)**
- Helps resolve infections combined with antibiotic and surgical debridement, by augmenting the transport of certain antibiotics across bacterial cell walls (antibiotic transport does not occur if oxygen tension levels are below 20 to 30 mmHg) **(3)**
- Salvages tissue and, in some cases, limbs by supplementing oxygen availability to hypoxic tissues with inadequate perfusion by supersaturating the plasma with oxygen to promote angiogenesis
- Stops alpha-toxin production in gas gangrene and inhibits bacterial growth, bacteriostatic at 300 mmHg, and bactericidal to clostridium perfringens at 1500 mmHg, which enables the body to utilize its own host defense mechanisms **(4)**
- Fights against acute tissue necrosis **(5)** caused by clostridia (and other anaerobes) by forming oxygen free radicals in the relative absence of free radical degrading enzymes, such as superoxide dismutases, catalases and peroxidases, by radically increasing oxygen tensions in the body **(6)**
- Assists in the salvage of life, limb and tissue-threatening infection thereby reducing hospitalization and further infection control procedures

### REFERENCES:

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- (3)** Verklin RM, Jr, GL Mandell. Alteration of effectiveness of antibiotics by anaerobiosis. *J Lab Clin Med*, 1977. 89 (1) 65-71.
- (4)** Hill GB, Osterhout S. Experimental effects of hyperbaric oxygen on selected clostridial species I in vitro studies and II in vivo studies in mice. *J Infect Dis* 1972; 125: 17B35.
- (5)** Stevens DL, Tweten RK, Awad MM et al. Clostridial gas gangrene: Evidence that alpha- and theta-toxins differentially modulate the immune response and induce acute tissue necrosis. *J Inf Dis* 1997; 176: 189-195.
- (6)** Van Unnik AJM. Inhibition of toxin production in *Clostridium perfringens* in vitro by hyperbaric oxygen, *Antonie Leeuwenhoek Microbiol* 1965; 31: 181B - 186.

