HYOX

HYPERBARIC MEDICINE HEALS.

HYPERBARIC OXYGEN THERAPY FOR PLASTIC & RECONSTRUCTIVE SURGERY

HyOx treats the following approved and covered conditions:

- **Compromised skin grafts and flaps**
  - ***Referral Protocol:*** Immediately, when post-surgical site shows signs of poor perfusion (dehiscence, necrosis, blistering, erythema) and infection
- **Pre- and post- surgery in a previously radiated area (prior to breast reconstruction or augmentation)** to create viable, hyper-oxygenated tissue
  - ***Referral Protocol:*** When patients with a history of radiation therapy require surgery in the affected are
- **Acute peripheral arterial insufficiency** (chronic, non-healing wounds PO_2 of $\leq$ 40 mmHg common in peripheral arterial occlusive disease and diabetic lower extremity wounds)
  - ***Referral Protocol:*** After 30 days of patient presenting no healing progression with traditional wound care
- **Necrotizing soft tissue and bone infections** (including necrotizing fasciitis, chronic osteomyelitis, non-clostridial myonecrosis, crepitant anaerobic cellulitis, zygomycosis, and Fournier's Gangrene)
  - ***Referral Protocol*:** Immediately, after confirmation of progressive infection
    - In chronic refractory osteomyelitis, when the progressive infection fails to respond to definitive surgical debridement and four to six weeks of antibiotic therapy
- **Thermal burns**
  - ***Referral Protocol:*** Immediately, to help minimize edema, preserve marginally viable tissue, protect the microvasculature, enhance host defenses, and promote wound closure

Benefits of Hyperbaric Oxygen Therapy:

- Supports and salvages tissues at risk from circulatory compromise: free skin grafts, pedicle flaps, random flaps, irradiated wounds and flaps, composite grafts, as well as free flaps by supersaturating the body with oxygen to promote healing of hypoxic tissue (**1**)
    - Thereby reducing the need for regrafting and repeat flap procedures
- Helps heal ischemic-reperfused tissues in skeletal muscle (**2**)
- Improves local host immune response, clears infection, enhances tissue growth and angiogenesis leading to progressive improvement in local tissue oxygenation and healing of hypoxic wounds
- Prevents conversion of partial to full thickness injury
- Preserves microcirculation (**3**)
- Stimulates angiogenesis in irradiated tissue helping achieve better outcomes in reconstructive surgery in previously radiated areas, especially the breast and abdomen (**4**)
- Reduces edema and fibrosis
- Elevates the tissue oxygen tension in third degree burns and the adjacent areas (**5**) to promote angiogenesis and epithelial regeneration
- Increases axial skin flap survival when administered during or immediately after total flap ischemia (**6**)
- 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) (**7, 8**)

REFERENCES:
(**1**) Friedman HI, Fitzmaurice M, Lefaivre JF, et al. An evidence-based appraisal of the use of hyperbaric oxygen on flaps and grafts. Plast Reconstr Surg. 117 (Suppl): 175S-190S, 2006.
(**2**) Nylander G, Norstrom H, Lewis D, Larsson J. Metabolic effects of hyperbaric oxygen in post-ischemic muscle. Plast Recon Surg 1987; 79:91-7.
(**3**) Zamboni WA, Roth AC, Russell RC, et al. Morphological analysis of the microcirculation during reperfusion of ischemic skeletal muscle and the effect of hyperbaric oxygen. Plast Reconstr Surg. 91: 1110-1123, 1993.
(**4**) Marx RE, Ehler WJ, Tayapongsak P, Pierce LW. Relationship of oxygen dose to angiogenesis induction in irradiated tissue. Am J Surg 1990; 160:519-524.
(**5**) Gruber RP, Brinkley B, Amato JJ, Mendelson JA. Hyperbaric oxygen and pedicle flaps, skin grafts and burns. Plast and Recon Surg. 1970; 45:24-30.
(**6**) Zamboni WA, AC Roth, et al. The effect of acute hyperbaric oxygen therapy on axial pattern skin flap survival when administered during and after total ischemia. J Reconstr Microsurg 1989; 4: 343-347.
(**7**) Hollabaugh RS, Dmochowski RR, Hickerson WL. Fournier's Gangrene: Therapeutic impact of hyperbaric oxygen. Plast Reconstr Surg 1998; 101: 94-100.
(**8**) Verklin RM, Jr, GL Mandell. Alteration of effectiveness of antibiotics by anaerobosis. J Lab Clin Med, 1977. 89 (1) 65-71.