

Therapeutic value of hyperbaric oxygen in lower extremity ulcerations

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The epidemic of non healing wounds secondary to the explosive increase of diabetes mellitus and the steady increase in longevity experienced by the elderly has caused the wound care specialist to seek new adjunctive modalities to help heal chronic wounds more rapidly. The wound care specialist of today is called in at an increasing rate for consultation on diabetic, venous stasis and decubitus ulcers. These chronic wounds are all characterized by varying underlying etiology, but many are hypoxic in nature, and all exhibit the same inherent inability for closure with standard wound care modalities.

Topical Wound Oxygen (TWO), which has been used in various forms since the early 1970's, has recently enjoyed a renaissance in use as an adjunctive therapy due to the clinical results experienced and it's relative ease in application. With this therapy, the affected limb is simply placed in a portable extremity chamber and is then treated with cyclical oxygen pressures of up to 50mmHg for ninety minutes daily. This treatment is provided as an adjunct to standard wound care practices, such as debridement etc.

The tremendous success of TWO, therapy in closing chronic ulcers of the extremities appears to be attributed to the improvement in a number of physiologic functions. The targeted delivery of oxygen to the wound site in a manner that provides an adequate diffusion gradient for the oxygen to reach the hypoxic cells themselves, thereby addressing the primary tissue hypoxia, can be seen in improved local TCP0₂ measurements. This 100% oxygen environment has also been proven to have an extremely effective bactericidal affect on pathogens. Additionally, the intermittent nature of the therapy provides a dual purpose compression of the limb, that not only seems to reduce peripheral edema, but also seems to stimulates perfusion at the wound site.

The exact cellular mechanisms of action of the therapy are thought to include; the stimulation of multiple angiogenesis associated growth factors (BFGF, HB-EGF, KGF and VEG-F) which in turn result in the awakening of the the cells from the dormant state, the stimulation of collagen synthesis, the enhancement of fibroblasts and improved leukocyte function.