

THE EFFECT OF HYPERBARIC OXYGEN ON SCLERODERMA

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Background: Scleroderma is an autoimmune condition in which there is abnormal deposition of collagen in the subcutaneous tissue and other various areas of the body. In some cases, this restricts blood supply to the skin and prevents normal wound healing. Wounds then fester and become infected, decreasing even further oxygen delivery to the ischemic areas. Hyperbaric oxygen is a well known modality to deliver oxygen to ischemic marginal wounds and it is known to accelerate wound healing by as much as 50%. Additionally, hyperbaric oxygen is an immunomodulator, which decreases the production of ICAM and Tumor Necrosis Factor Alpha by vascular endothelial cells and neutrophils (Refs 1, 2, 3).

Study Design: A 50 year-old white female ceramic artist with diffuse scleroderma for 10 years was referred to our Institution for evaluation of over 10 open wounds in both her upper extremities, present for at least 6 months, and refractory to every conventional therapy (see Fig 1).

A 46 year-old white male trumpet player with cutaneous scleroderma for 7 years was referred to our Institution for symptoms of Raynaud and ulcers on his fingertips lasting the entire winter season, associated with numbness of his fingers on both hands.

Each patient was given 50 consecutive 90 min. sessions of Hyperbaric Oxygen with a mild hyperbaric chamber at 1.3 ATA.

Results: In both cases, initial oxygen saturation readings were not obtainable in any of the 10 fingers. Fingers were pale and insensate. Both patients had 5 to 10 episodes of Raynaud per day. No change was observed during the first 10 treatments. After the 20th treatment, it was observed that the episodes of Raynaud, which had been decreasing, had abated. Oxygen saturation readings became obtainable and improved slowly. At 30 treatments, both patients showed definite evidence of healing of their wounds. Additionally, sensation had returned to the tip of their fingers. At 40 treatments, their pulse oxymeter readings were consistently 98% in all fingers, and there was a dramatic progress in their wound healing. Treatment was stopped at 50 sessions. Approximately a year after hyperbaric oxygen therapy was discontinued, wounds had healed completely, and pulse oxymeter readings were 98%, suggesting that new capillary growth had been permanently achieved with hyperbaric oxygen therapy. Additionally, new wounds did not get infected and healed rapidly.

Conclusions: Although scleroderma is not an approved indication for hyperbaric oxygen therapy, the ischemia it causes can be combated by hyperbaric oxygen. The diffusion of oxygen in ischemic areas of the body caused by scleroderma changes the capillary structure of these areas permanently, thus allowing healing. Additionally, hyperbaric oxygen may ameliorate this debilitating chronic autoimmune condition.

References:

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