Bay Area
HYPERBARICS
The power to heal

Research Shows that Hyperbaric Oxygen Therapy Induces Neuroplacticity and Speeds Stroke Recovery

Hyperbaric Oxygen Therapy (HBOT) has been shown to activate neuroplasticity in chronic neurological deficiencies resulting from strokes.

How Hyperbarics Helps

- Induces neuroplasticity
- Reduces inflammation
- Mobilize stem cells
- Increases tissue oxygen delivery
- Improves blood - brain barrier reactions
- Upregulates axon guidance agents
- Increases levels of neutrophils & nitric oxide
- Speeds recovery and rehabilitation
- Enhances mitochondrial function (neurons and glial cells)
- Stimulates angiogenesis and cell proliferation needed for axonal regeneration

(408) 356-7438
https://qrco.de/Ischemia
info@oxygenheals.com
14589 South Bascom Ave Los Gatos, CA 95032

What Research Says

Hyperbaric Oxygen Therapy (HBOT) has been shown to activate neuroplasticity in chronic neurological deficiencies resulting from strokes[1]. Neuroplasticity is the ability of the brain to form and reorganize synaptic connections.

Bay Area Hyperbarics has treated hundreds of stroke patients over the last 20 years, with consistent improvements to patients' quality of life. On the more remarkable side of the spectrum, we observed patients who could not walk, and who were showing no signs of improvement before HBOT, regain the ability to walk upstairs without assistance. Others improved their speech so they could return to work. Yet others regained the ability to read, and others to think clearly and articulate thoughts when previously they were unable. Some patients though experienced more mild improvements, such as improved strength and balance, the ability to assist in transferring from bed to a wheelchair, or to push up from a wheelchair and stand without assistance.

In one recent randomized and controlled study[1], participants showed increases in brain regeneration and in their quality of life indices. Participants' strokes occurred as few as six months and as many as 36 months prior to the study. Participants in this study were treated with 40 sessions, five days per week over eight weeks.

Of the 57 participants who underwent HBOT, 43% to 55% showed significant improvements, while 29% to 35% showed mild improvements. Overall, 72% of the patients had mild to significant improvements.

Some of those improvements included participants being able to move previously paralyzed fingers, dress themselves, shop and cook. One of the patients who could barely walk regained the ability to climb stairs. She could also feed herself, and she regained speech and reading abilities.

Researchers in this study worked with stroke patients who were no longer improving. Before administering HBOT, researchers analyzed each participants' brain using CT scans to identify necrotic tissue. They also used SPECT scans to assess the metabolic activity level of neurons surrounding damaged areas. They then administered the same scans after 40 HBOT treatments. In short, they found that HBOT restored significant neurological function in brain tissue that had appeared chronically damaged. In contrast, participants who received no HBOT did not demonstrate any improvement. Because this was a crossover study, the non-HBOT group later received HBOT, and showed the same improvements as the initial experimental group. Pre- versus post- images of the brain demonstrated improvements in blood supply and the increased viability of damaged tissue. They found that idling neurons in many areas again became active. Researchers confirmed that administering oxygen under pressure increases oxygenation in brain tissues by between 10 and 400 times, even into areas of necrotic tissue. This increased oxygen infused into the brain appears to speed up the process of neuroplasticity, as well as angiogenesis (the growth of new blood vessels to areas previously not receiving sufficient oxygen).

Numerous studies have shown the importance of increased oxygen to the brain after acute ischemia or stoke, and on the value of hyperbaric oxygen in particular. The research to-date proves promising, with few, if any, adverse effects.

When patients breathe oxygen under pressure (hyperbaric oxygen therapy), it increases arterial oxygen tension as well as brain oxygen tension [13],[14],[15]. It also facilitates the flow of blood-dissolved oxygen across the blood-brain barrier. At the minimum then, it is reasonable to expect that HBOT can be an effective method of increasing oxygen to brain tissues, and evoking neuroplasticity, angiogenesis in non-active areas, and increased neuronal activity after a stroke.

For example, numerous studies have suggested that the oxygen supply to blood vessels in stroke-affected areas is severely restricted, leading to oxygen deficiency [6], [7]. Such decreased oxygen levels not only cause a reduction in neuronal activity, but also prevent angiogenesis to replace the stroke-damaged blood vessels and the generation of new synaptic connections. They stress the importance of a high oxygen supply to repair stunned regions of the brain. Several previous studies have shown that an increase in dissolved oxygen has several beneficial effects in damaged brain tissues [8], [9], [10], [11], [12], [13].

Research Studies

Neurology Research International

A Clinical Study on Ischemic Stroke

This study investigated the impact of HBOT as a therapeutic intervention following stroke across a number of functional domains including speech, language, cognition, physical function, and quality of life. We found a beneficial effect of HBOT on memory, processing speed, gait velocity, upper extremity mobility, sleep, and overall recovery. We also observed significant transient changes in neural and inflammatory biomarkers in response to HBOT that may result in the sustained functional changes that were observed. Despite these encouraging results further research is needed to more clearly define the mechanism and potential role of HBOT following stroke.

Plos One

Clinical Effectiveness of stroke and TBI

Recovery after stroke correlates with non-active (stunned) brain regions, which may persist for years. The current study aimed to evaluate whether increasing the level of dissolved oxygen by Hyperbaric Oxygen Therapy (HBOT) could activate neuroplasticity in patients with chronic neurologic deficiencies due to stroke.

BMJ One

Retrospective analysis by Dr.Amir Hadanny

In the largest published cohort of patients suffering from chronic deficits post-TBI of all severities, HBOT was associated with significant cognitive improvements. The clinical improvements were well correlated with increased activity in the relevant brain areas.

Taylor & Francis Online

Hyperbaric oxygen and cerebral physiology

HBO therapy involves breathing 100% oxygen at pressures greater than sea level. It has been used to treat various conditions, including ischemic stroke, but its mechanisms of action are not fully understood. This review summarizes the effects of HBO on brain oxygenation, cerebral blood flow, and intracranial pressure in healthy and injured brains, and how these changes can provide protection.

Researchgate

Rationale of Hyperbaric Oxygenation in Cerebral Vascular Insult

Cerebrovascular diseases, including ischemic stroke, result from insufficient oxygen supply to neural tissue due to thromboembolic events and obstructive vessel disease. Hyperbaric oxygenation (HBO), through breathing 100% oxygen under hyperbaric conditions, can increase oxygen concentration in tissue with impaired blood supply. Experimental and clinical studies show positive effects of HBO therapy, improving survival rate and neurological outcomes. However, optimal pressure levels, duration, and number of HBO sessions need clarification before routinely recommending HBO as additional therapy in clinical practice.

National Library of Medicine

Ischaemic brain damage after stroke

Future stroke therapies will target inflammatory responses, the neurovascular unit, neurogenesis and angiogenesis, and cell-death pathways. High-throughput technologies like proteomics, genomics and siRNA screening will be used to investigate further mitochondrial cell-death pathways, systemic immune responses and reversible phosphorylation. Strict criteria such as the Stroke Therapy Academic Industry Roundtable (STAIR) criteria are necessary for successful transfer of experimental research into clinical practice.

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Patient Experiences

Bay Area Hyperbarics has healed hundreds of patients with stubborn and non-healing wounds over the last 20 years.

Amelia, a 42 year old woman, had significant problems with her balance while walking. Two years after her stroke she had only been up to her bedroom upstairs once. And that was with someone standing walking next to steady her should she start to fall. So she had not slept in her own bed for two years. She lived and slept only on the main floor of the condo. After Hyperbaric oxygen treatments, she was able to navigate the stairs alone and slept in her own bed every night to her great pleasure and relief.

Amelia, 42

Had significant problems with her balance while walking.

Henry, an 81 year old man, came in to our clinic 8 years after his stroke. He had lost his eyesight in his right eye, which returned during his treatments. Additionally, his grandson had to translate what he was saying for us because his mumbling speech made it difficult to understand him. During HBOT his speech became clear enough so translations were no longer necessary.

Henry, 81

Lost eyesight in his right eye, which returned during hyperbaric treatments.

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Ming, a 33 year old woman, came with a fear of being around people, because she had lost her ability to recognize and remember faces. After treatment with hyperbaric oxygen therapy, she was so excited when she realized that she could remember our faces. It allowed her to feel safe and at ease in her normal day-to-day activities.

Ming, 33

She regained the ability to recognize and remember faces after HBOT

Refer a Patient

Refer a patient in three easy steps.

1 **You submit patient's information**

As a provider, your office fills out and faxes back the Patient Referral Form. Have questions? Call us!

2 **We get authorizations**

We make sure the patient understands treatment and then follow the prescribed protocol to get the patient on the road to recovery!

3 **Patient starts HBOT**

Our medical staff meets with the patient to ensure that HBOT is appropriatre, and contacts Medicare or private insurance to receive authorization.

Call Us: (408) 356-7438

Scan for Patient Referral Form