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## Hyperbaric Oxygen Therapy and Brain Health in Veterans: What You Need to Know

### **How does Hyperbaric Oxygen Therapy (HBOT) work?**

Hyperbaric Oxygen Therapy (HBOT) is a medical treatment in which patients breathe 100% oxygen inside a pressurized chamber. Under normal conditions, we breathe 21% oxygen at sea level (1.0 atmosphere absolute, or ATA), and oxygen is transported through the body almost entirely by red blood cells. Inside a hyperbaric chamber, pressure is typically increased to 2.0 ATA - the equivalent of being 33 feet underwater. According to Henry's Law, the higher the pressure, the more gas dissolves into liquid. Under these conditions, oxygen no longer relies solely on red blood cells for transport; instead, it dissolves directly into the blood plasma, dramatically increasing the concentration of oxygen available throughout the body.

**This enhanced oxygen delivery allows HBOT to reach even the most compromised tissues, including:**

- Swollen or injured tissues
- Regions with reduced blood flow after trauma
- Deep structures of the brain affected by TBI or PTSD

**By saturating these areas with oxygen, HBOT:**

- Reactivates dormant cells and jump-starts repair processes
- Reduces inflammation and swelling
- Stimulates stem cell release to promote regeneration
- Encourages new blood vessel growth for long-term healing

*HBOT transforms oxygen into a powerful therapeutic tool - restoring circulation, calming inflammation, and activating the body's own regenerative systems.*

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### **How does HBOT help veterans with PTSD & TBI?**

*Both PTSD and TBI are now recognized as physical brain injuries.*

PTSD, once viewed mainly as a psychological disorder, is now known to cause measurable changes in brain structure and function. Trauma damages neurons, alters blood flow, and disrupts communication between key regions like the hippocampus (memory), amygdala (emotion), and prefrontal cortex (decision-making). Brain scans of veterans often reveal reduced gray matter, abnormal activity, and impaired connectivity, evidence that trauma leaves a biological wound.

TBI, caused by blast exposure, concussions, or blunt trauma, is a direct physical injury to brain tissue. These injuries also disrupt blood flow, trigger inflammation, and damage neurons, leaving portions of the brain with reduced metabolism and oxygen use - in effect, "idling" or shut down.



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### **Stop Suicide & Restore Lives with Hyperbaric Oxygen**

HBOT4Heroes is a 501c3 nonprofit registered in the US under EIN 92-3494632  
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HBOT addresses these injuries by restoring oxygen delivery, reducing inflammation, and activating the brain's repair mechanisms:

- **Enhanced oxygen delivery:** Plasma-dissolved oxygen penetrates swollen or under perfused brain regions, reaching areas red blood cells cannot. This supports healing of injured neural pathways.
- **Reduced inflammation and swelling:** HBOT calms neuroinflammation and decreases cerebral edema, lowering pressure and preventing secondary damage.
- **Neuroprotection and neurogenesis:** Protects surviving neurons while stimulating the growth of new ones in regions responsible for memory, mood, and executive function.
- **Improved cognition:** Enhances neuroplasticity — the brain's ability to rewire itself — leading to gains in attention, memory, focus, and problem-solving.
- **Symptom relief:** Many veterans report reductions in headaches, dizziness, fatigue, chronic pain, anxiety, and depression.
- **Psychological health benefits:** Improved sleep, mood stabilization, and reduced hyperarousal, helping restore emotional balance.
- **Angiogenesis (new blood vessel growth):** Promotes long-term healing by improving blood flow and sustained oxygen delivery to damaged brain areas.

#### Supporting Evidence:

- **[Harch et al. \(2017, LSU Study\)](#):** In veterans with persistent post-concussive symptoms and PTSD, 40 sessions of HBOT produced significant improvements in PTSD and depression scores, reduced suicidal ideation, and brain imaging showed normalization of ~75% of abnormal areas.
- **[Weaver et al. \(2025, Double-Blind RCT\)](#):** Veterans and civilians with persistent symptoms from non-stroke brain injuries (including TBI) who received 40 HBOT sessions showed significantly greater improvements in neurobehavioral symptoms compared to sham treatment. Benefits included better cognition, sleep, mood, and vestibular function, with effects sustained up to 12 months.

#### What is a standard HBOT session like in a hard-shell chamber & how many treatments are needed?

- Timing: About 85 minutes total: 10-minute descent, 60 minutes at pressure breathing 100% oxygen, 10-minute ascent.
- Air breaks: Sessions often include cycles of oxygen breathing and brief air breaks to stimulate stem cell production.
- For veterans, with PTSD or TBI, 40 sessions is usually recommended, but this can change based on the injury and time of when the injury occurred. If brain injury is in the acute stage, the number of treatments needed can sometimes be as low as in the single digits.
- Frequency: Daily sessions are typical, with the average patient being prescribed to dive a maximum of 2x a day. First three sessions are ideally consecutive to maximize benefit and reduce early inflammation.
- 40 treatments should be completed as soon as possible, preferably within four months.



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## Is HBOT safe?

Yes. HBOT is generally well-tolerated when delivered under proper medical supervision.

- **Mild side effects:** Temporary ear or sinus pressure, and short-term vision changes are the most common.
- **Precautions:** Diabetic patients require blood sugar monitoring; individuals with heart or lung disease (e.g., COPD) may need additional screening such as echocardiograms or pulmonary function tests. Patients with a seizure history need to be stable with seizures managed.
- **Contraindications:** Patients with pneumothorax or pulmonary blebs are not eligible for treatment.
- **Safety protocols:** HBOT is administered only with a physician's prescription in accredited clinics. Treatments follow strict pressurization standards, using air to pressurize the chamber while maintaining OSHA-compliant ambient oxygen levels. Medical-grade oxygen is delivered through a breathing apparatus, with scheduled air breaks and continuous medical supervision. Protocols are tailored to the patient's specific condition.

## What results have been recently documented in veterans?

[HBOT4Heroes Legislative 2023 – 2024 impact report](#) showed

- 57% reduction in suicidal ideation severity

Median Improvement % as follows -

- 69% improvement in post-concussive syndrome
- 68% improvement in depression symptoms
- 37% improvement in PTSD symptoms
- 75% improvement in anxiety disorder

All 86 veterans assessed showed statistically significant improvement in all cognitive and mood domains of the ANAM test. HBOT has proven to be a highly effective intervention for addressing post-concussion syndrome, depression, anxiety, PTSD, and suicidal ideation among military personnel. The consistent results across multiple evaluations reinforce HBOT's potential to significantly improve mental health and overall quality of life for veterans and service members.

*Veterans often report improved sleep, sharper cognition, calmer moods, and renewed purpose after completing HBOT.*

## What does the research say about HBOT's impact on veterans with TBI and PTSD?

In addition to the research given above, several other peer-reviewed studies demonstrate compelling improvements in brain function, symptoms, and imaging:

- [Systematic Review & Dosage Analysis](#) (Andrews & Harch, 2024)



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- Scope: 8 clinical studies (7 randomized trials + 1 imaging case-control), 393 total subjects with PTSD symptoms.
- Efficacy: Statistically significant and clinically meaningful symptom improvements with 40–60 sessions across 1.3–2.0 ATA and varied oxygen doses.
- Dose–response: Symptom relief increased linearly with cumulative oxygen dose (atmosphere-minutes); at the highest doses, a reversible severe exacerbation of emotional symptoms occurred in 30–39% of subjects.
- Imaging: Three studies reported associated functional/anatomic brain imaging changes consistent with clinical gains.

• [Doenya-Barak et al. \(2022, PLoS ONE\)](#) - This was one of the first RCTs to show that HBOT not only reduces PTSD symptoms but also produces objective structural and functional brain changes on advanced imaging.

**Research evidence:** *There are now thousands of HBOT studies worldwide demonstrating its effectiveness across a wide range of medical conditions. Within the field of brain health alone, hundreds of studies document improvements in oxygen delivery, neuroplasticity, and recovery from injury. Importantly, there are now dozens of clinical studies — including randomized controlled trials — specifically showing HBOT's benefits for veterans with PTSD and TBI.*

## How many states have passed legislation for HBOT for veterans with TBI and PTSD?

According to the official [TreatNOW State Campaigns](#) listing, 14 states have enacted legislation or resolutions authorizing HBOT for TBI/PTSD treatment. These states are:

- Oklahoma, Texas, Indiana, Kentucky, Arizona, Florida, North Carolina, Maryland, Wyoming, Virginia, North Dakota, Tennessee, Louisiana, and Missouri (joined mid-2025)

## Which states have paired their HBOT law with funding (and how much)?

While these state-level initiatives are a start, the reality is that funding is far too limited to meet the overwhelming demand. Most programs are small pilot projects or short-term appropriations that reach only a fraction of the veterans who could benefit. In North Carolina alone, the \$1.25 million allocation since 2021 helped hundreds of veterans access HBOT, but with no new funding confirmed for 2025, treatment is now reliant on private donations and grants. Other states have provided even smaller appropriations, leaving thousands of veterans without access.

Meanwhile, [new data](#) suggests 44 veterans die by suicide every single day in the United States. Too many of our heroes are struggling with PTSD and TBI, invisible wounds of war that HBOT has been shown to heal. For those heroes, time is running out.



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According to TreatNOW's July 2025 report, seven states have legislated or supported either partial or full funding:

- Indiana – \$1 million five-year pilot program
- Arizona – \$25,000 state appropriation (FY 2018/19)
- Florida – \$200,000 pilot (2019), later expanded to \$14 million in 2023
- North Carolina – \$1,250,000 allocated since 2021; private funding now continuing treatments with no new 2025 funding confirmed
- Kentucky – \$1.5 million over a two-year budget cycle, starting 2024
- Virginia – Authorized HBOT contracts under the state Department of Veterans Services (2023)
- Maryland – \$1 million special non-lapsing fund for veterans (2024)

*Federal leadership is urgently needed. Congress must expand access, standardize protocols, and ensure sustainable funding so that veterans in every state, not just a handful, can receive HBOT without financial barriers. Our heroes deserve more; they deserve a nationwide commitment to save lives and end the suicide epidemic among veterans.*

## What federal legislation is currently advancing to support HBOT for veterans?

In 2025, several bills were introduced in Congress to expand access to Hyperbaric Oxygen Therapy for veterans with PTSD and TBI. Among them:

- [\*\*H.R. 72 \(House\)\*\*](#): Directs the VA to furnish HBOT directly to veterans with PTSD or TBI. As of May 2025, this bill has passed House VA Committee markup and continuing through the legislative process.
- [\*\*H.R. 1336 \(House, Rep. Greg Murphy, R-NC-3\)\*\*](#): The “Veterans National Traumatic Brain Injury Treatment Act,” a bipartisan bill establishing a five-year pilot program in three Veterans Integrated Service Networks (VISNs), supported by a dedicated VA HBOT Fund seeded by private donations.
- [\*\*S. 862 \(Senate\)\*\*](#): Requires the VA to make HBOT available after veterans have not improved with standard treatments.

These bills do represent meaningful progress and a growing recognition of HBOT's value. Together, these initiatives mark an encouraging shift: lawmakers are acknowledging that veterans with PTSD and TBI deserve access to new solutions that work. But these efforts are only first steps.

Pilot programs and targeted mandates are important steps to build momentum, but cannot meet the nationwide demand. Tens of thousands of veterans (many at risk of depression, disability, and suicide) will still go without care unless the VA acts boldly. True impact will come when the VA scales beyond pilots, adopts HBOT as a standard covered treatment, and commits to stable federal funding.

Only then will every veteran have access to this life-saving therapy, without being forced to rely on charity or chance.



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