



# A randomized trial of hyperbaric oxygen in U.S. Service Members with post-concussive symptoms

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## Introduction

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**Introduction:** In prior Department of Defense studies, participants with persistent post-concussive symptoms after mild traumatic brain injury exposed to hyperbaric oxygen (HBO<sub>2</sub>) or sham chamber sessions reported improvement regardless of allocation.



### PRIOR STUDY REFERENCES:

Wolf G, Cifu D, Baugh L, Carne W, Profenna L. The effect of hyperbaric oxygen on symptoms after mild traumatic brain injury. J Neurotrauma 2012;29:2606-12.

Cifu DX, Hart BB, West SL, Walker W, Carne W. The effect of hyperbaric oxygen on persistent postconcussion symptoms. J Head Trauma Rehabil 2014;29:11-20.

Miller RS, Weaver LK, Bahraini N, et al. Effects of hyperbaric oxygen on symptoms and quality of life among service members with persistent postconcussion symptoms: a randomized clinical trial. JAMA Intern Med 2015;175:43-52.

BIMA was conducted at 3 U.S. military sites: Fort Carson, Colorado, Camp LeJeune, North Carolina, and Joint Base Lewis-McChord, Washington.

No conflicts of interest to disclose.

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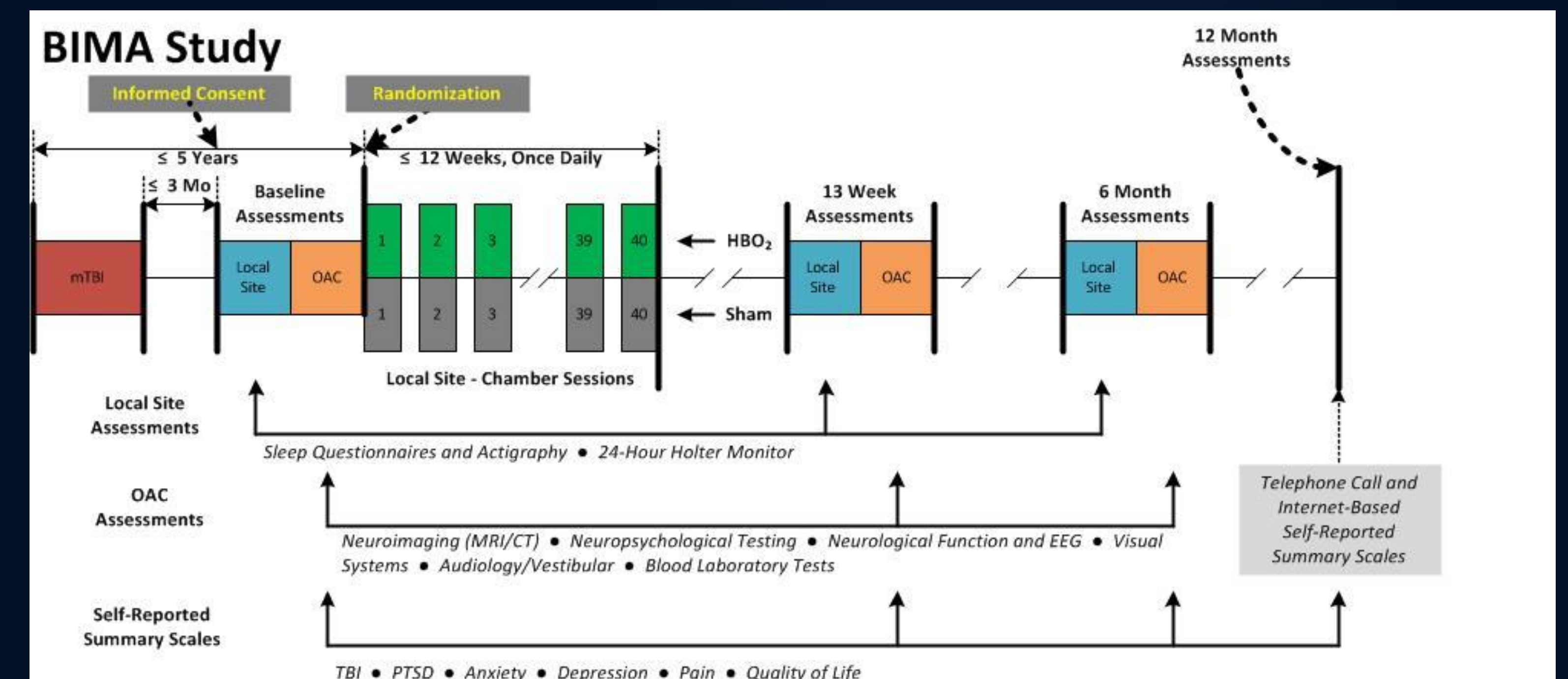
Conclusions

**Methods:** In this exploratory, double-blind, sham-controlled trial of HBO<sub>2</sub> for military personnel with persistent post-concussive symptoms, 71 randomized participants received forty 60-minute HBO<sub>2</sub> (1.5 atmospheres absolute, n=36) or sham chamber sessions (air, 1.2 atmospheres absolute, n=35). At baseline, 35 participants (49%) met post-traumatic stress disorder (PTSD) criteria.

Outcomes included post-concussive symptoms, quality of life, neuropsychological, neurological, EEG, sleep, audiology/vestibular, autonomic, visual, brain imaging, and laboratory testing, at baseline, 13 weeks (shortly post-intervention), and 6 months, plus 12-month symptom questionnaires.

No conflicts of interest to disclose.

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## Key findings:

- By the Neurobehavioral Symptom Inventory, the HBO<sub>2</sub> group had improved 13-week scores compared to sham (HBO<sub>2</sub> mean change -3.6 points, sham mean change +3.9 points, p=0.03).
- In participants with PTSD, change with HBO<sub>2</sub> was more pronounced (-8.6 points vs. +4.8 points with sham, p=0.02).
- Rivermead Post-Concussion Symptom Questionnaire RPQ-3 improved with HBO<sub>2</sub> compared to sham (mean change difference -1.5, p=0.01). The PTSD Checklist-Civilian version scores also improved in the HBO<sub>2</sub> group, and more so in the subgroup with PTSD.
- Improvements regressed at 6 and 12 months.
- HBO<sub>2</sub> improved some cognitive processing speed and sleep measures.

*No conflicts of interest to disclose.*

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## Key findings (continued):

- Participants with PTSD receiving HBO<sub>2</sub> had improved sensory organization test scores and reduced vestibular complaints at 13 weeks.
- Participants without PTSD had improved anger control with HBO<sub>2</sub>.
- Most measures independent of patient reports did not change over time or did not change in a way that consistently favored one intervention over another.

**Conclusions:** By 13 weeks, HBO<sub>2</sub> improved post-concussive and PTSD symptoms, cognitive processing speed, sleep quality, and vestibular symptoms, most dramatically in those with PTSD. However, most changes did not persist to 6-12 months. For military personnel, additional HBO<sub>2</sub> studies are warranted.

*No conflicts of interest to disclose.*

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