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

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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 (HBO₂) or sham chamber sessions reported improvement regardless of allocation.

PRIOR STUDY REFERENCES:
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Methods: In this exploratory, double-blind, sham-controlled trial of HBO$_2$ for military personnel with persistent post-concussive symptoms, 71 randomized participants received forty 60-minute HBO$_2$ (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.
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Key findings:

• By the Neurobehavioral Symptom Inventory, the HBO₂ group had improved 13-week scores compared to sham (HBO₂ mean change -3.6 points, sham mean change +3.9 points, p=0.03).

• In participants with PTSD, change with HBO₂ was more pronounced (-8.6 points vs. +4.8 points with sham, p=0.02).

• Rivermead Post-Concussion Symptom Questionnaire RPQ-3 improved with HBO₂ compared to sham (mean change difference -1.5, p=0.01). The PTSD Checklist-Civilian version scores also improved in the HBO₂ group, and more so in the subgroup with PTSD.

• Improvements regressed at 6 and 12 months.

• HBO₂ 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 HBO₂ had improved sensory organization test scores and reduced vestibular complaints at 13 weeks.
- Participants without PTSD had improved anger control with HBO₂.
- 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, HBO₂ 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 HBO₂ studies are warranted.