

MOST RECENT RESEARCH in Hyperbaric Oxygen Therapy

[a] Xavier A. Figueroa, PhD and James K. Wright, MD (Col Ret USAF), **Hyperbaric Oxygen: B-Level Evidence in Mild Traumatic Brain Injury Clinical Trials.** *Neurology*® 2016;87:1–7
"There is sufficient evidence for the safety and preliminary efficacy data from clinical studies to support the use of HBOT in mild traumatic brain injury/persistent post concussive syndrome (mTBI/PPCS). The reported positive outcomes and the durability of those outcomes has been demonstrated at 6 months post HBOT treatment. Given the current policy by Tricare and the VA to allow physicians to prescribe drugs or therapies in an off-label manner for mTBI/PPCS management and reimburse for the treatment, it is past time that HBOT be given the same opportunity. This is now an issue of policy modification and reimbursement, not an issue of scientific proof or preliminary clinical efficacy."

[b] Amir Hadanny & Shai Efrati (2016): **Treatment of persistent post-concussion syndrome due to mild traumatic brain injury: current status and future directions,** *Expert Review of Neurotherapeutics*, DOI: 10.1080/14737175.2016.1205487. Persistent post-concussion syndrome caused by mild traumatic brain injury has become a major cause of morbidity and poor quality of life. Unlike the acute care of concussion, there is no consensus for treatment of chronic symptoms. Moreover, most of the pharmacologic and non-pharmacologic treatments have failed to demonstrate significant efficacy on both the clinical symptoms as well as the pathophysiologic cascade responsible for the permanent brain injury. This article reviews the pathophysiology of PCS, the diagnostic tools and criteria, the current available treatments including pharmacotherapy and different cognitive rehabilitation programs, and promising new treatment directions. **A most promising new direction is the use of hyperbaric oxygen therapy, which targets the basic pathological processes responsible for post-concussion symptoms; it is discussed here in depth.**

[c] Baughman Shively, S., Iren Horkayne-Szakaly, Robert V Jones, James P Kelly, Regina C Armstrong, Daniel P Perl. **Characterisation of interface astroglial scarring in the human brain after blast exposure: a post-mortem case series.** *The Lancet, Neurology*, June 2016. DOI: [http://dx.doi.org/10.1016/S1474-4422\(16\)30057-6](http://dx.doi.org/10.1016/S1474-4422(16)30057-6). In what is being called a breakthrough study, Dr. Daniel P. Perl and his team at the Uniformed Services University of the Health Sciences in Bethesda, Md., [the medical school run by the Department of Defense], have found evidence of tissue damage caused by blasts alone, not by concussions or other injuries. The New York Times calls it the medical explanation for shell shock: preliminary proof of what medicine has been saying without proof for nearly 100 years -- **blasts cause physical damage, and this physical damage leads to psychological problems, i.e., PTSD.** The importance of this admission cannot be overstated: this is a DOD discovery with documented evidence that blast injury [IEDs, breaching, whether in training or combat, enemy and/or friendly fire] can lead directly to physical brain damage and the accompanying effects, many of which have been heretofore diagnosed as "only PTSD."
[Commentary on above: Robert F. Worth. "What if PTSD is More Physical Than Psychological?," *The New York Times Magazine*, June 10, 2016. <http://nyti.ms/1TYyp6U> **A new study supports what a small group of military researchers has suspected for decades: that modern warfare destroys the brain.**

[Additional commentary on above]: Alexander, Caroline. "Mystery of How Battlefield Blasts Injure the Brain May Be Solved. **A landmark study sheds new light on the damage caused by "blast shock"—the signature injury of wars for more than a century.**" *National Geographic*. JUNE 9, 2016 <http://news.nationalgeographic.com/2016/06/blast-shock-tbi-ptsd-ied-shell-shock-world-war-one/>

[d] Wang F, et al. *Hyperbaric oxygen therapy for the treatment of traumatic brain injury: a meta-analysis.* *Neurol Sci.* 2016 Jan 8. PubMed PMID: 26746238.
"Compelling evidence suggests the advantage of hyperbaric oxygen therapy (HBOT) in traumatic brain injury. ...Patients undergoing hyperbaric therapy achieved significant improvement....with a lower overall mortality, suggesting its utility as a standard intensive care regimen in traumatic brain injury."

[e] E.G. Wolf, L.M. Baugh, C.M.S. Kabban, et al. **Cognitive function in a traumatic brain injury hyperbaric oxygen randomized trial.** UHM 2015, Vol. 42, No. 4, 2015. Dr. Wolf is a principle co-author of the first Army study. This recent USAF paper reanalyzing the data in the cornerstone DOD/VA/Army study concludes: "This pilot study demonstrated no obvious harm [and] both groups showed improvement in scores and thus a benefit. Subgroup analysis of cognitive changes and PCL-M results regarding PTSD demonstrated a relative risk of improvement There is a potential gain and no potential loss. The VA/Clinical Practice Guidelines define a "B evidence rating" as "a recommendation that clinicians provide (the service) to eligible patients. **At least fair evidence was found that the intervention improves health outcomes and concludes that benefits outweigh harm**. . . .[emphasis added] Hyperbaric oxygen therapy for mild traumatic brain injury and PTSD should be considered a legitimate adjunct therapy if future studies demonstrate similar findings or show comparable improvement to standard-of-care or research-related treatment modalities." [NOTE: subsequent worldwide studies already published and those underway show comparable