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HBOT RESEARCH AND SCIENCE

1. Peer-reviewed published articles

[a] Shi XY, Tang ZQ, Sun D, He XJ. Evaluation of hyperbaric oxygen treatment of neuropsychiatric disorders following traumatic brain injury. Chin Med J (Engl). 2006;119(23):1978-82. http://www.ncbi.nlm.nih.gov/pubmed/17199942

[b] Hardy P, Johnston KM, De Beaumont L, Montgomery DL, Lecomte JM, Soucy JP, et al. Pilot case study of the therapeutic potential of hyperbaric oxygen therapy on chronic brain injury. J Neurol Sci. 2007;253(1-2):94-105. http://www.ncbi.nlm.nih.gov/pubmed/17234213

[c] Lin JW, Tsai JT, Lee LM, Lin CM, Hung CC, Hung KS, et al. Effect of hyperbaric oxygen on patients with traumatic brain injury. Acta Neurochir Suppl. 2008;101:145-9. http://www.researchgate.net/publication/51416688_Effect_of_hyperbaric_oxygen_on_patients_with_traumatic_brain_injury_injury

[d] Wright JK, Zant E, Groom K, Schlegel RE, Gilliland K. Case report: Treatment of mild traumatic brain injury with hyperbaric oxygen. Undersea Hyperb Med. 2009; 36(6):391-9. http://www.echa.net/36-6%20UHM-P391-399.pdf

[e] Harch PG, Fogarty EF, Staab PK, Van Meter K. Low pressure hyperbaric oxygen therapy and SPECT brain imaging in the treatment of blast-induced chronic traumatic brain injury (post-concussion syndrome) and post traumatic stress disorder: a case report. Cases J. 2009;2:6538. http://www.ncbi.nlm.http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2740054/nih.gov/pmc/articles/PMC2740054/

[f] Sahni T, Jain M, Prasad R, Sogani SK, Singh VP. Use of hyperbaric oxygen in traumatic brain injury: Retrospective analysis of data of 20 patients treated at a tertiary care centre. Br J Neurosurg. 2011. http://www.ncbi.nlm.nih.gov/pubmed/22085249

[g] Stoller KP. Hyperbaric oxygen therapy (1.5 ATA) in treating sports related TBI/CTE: two case reports. Med Gas Res. 2011;1(1):17. PMCID: 3231948. http://www.medicalgasresearch.com/content/pdf/2045-9912-1-17.pdf

[h] Paul G. Harch, Susan R. Andrews, Edward F. Fogarty, Daniel Amen, John C. Pezzullo, Juliette Lucarini, Claire Aubrey, Derek V. Taylor, Paul K. Staab, and Keith W. Van Meter. A phase I study of low-pressure hyperbaric oxygen therapy for blast-induced post-concussion syndrome and post-traumatic stress disorder. J Neurotrauma. 2012 Jan 1;29(1):168-85. http://online.liebertpub.com/doi/pdf/10.1089/neu.2011.1895

[i] Rockswold, Rockswold, Zaun and Liu. A prospective, randomized Phase II clinical trial to evaluate the effect of combined hyperbaric and normobaric hyperoxia on cerebral metabolism, intracranial pressure, oxygen toxicity, and clinical outcome in severe traumatic brain injury. *Journal of Neurosurgery, Jun 2013 / Vol. 118 / No. 6 / Pages 1317-1328* *http://www.ncbi.nlm.nih.gov/pubmed/23510092*

2. Data from NBIRR-01 observational study

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The International Hyperbaric Medical Foundation. Summary report from, "The National Brain Injury Rescue and Rehabilitation Trial – a multicenter study of hyperbaric oxygen for mild traumatic brain injury." 32 subjects improved significantly. May 2014. In pre-publication.

3. Peer-reviewed Israeli research on stroke and TBI

[a] Hyperbaric Oxygen Therapy Can Improve Post Concussion Syndrome Years after Mild Traumatic Brain Injury - Randomized Prospective Trial
http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0079995

[b] Hyperbaric Oxygen Induces Late Neuroplasticity in Post Stroke Patients - Randomized, Prospective Trial
http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0053716

[c] Reflections on the neurotherapeutic effects of hyperbaric oxygen
http://informahealthcare.com/doi/pdf/10.1586/14737175.2014.884928

4. Animal studies showing effects of HBOT on brain injury

[a] Blast Exposure Induces Post Traumatic Stress Disorder-Related Traits in a Rat Model of Mild Traumatic Brain Injury. Gregory A. Elder, Nathan P. Dorr, Rita De Gasperi, Miguel A. Gama Sosa, Michael C. Shaughness, Eric Maudlin-Jeronimo, Aaron A. Hall, Richard M. McCarron, and Stephen T. Ahlers. Journal of Neurotrauma. http://online.liebertpub.com/doi/abs/10.1089/neu.2012.2510

[b] Research Report: Hyperbaric oxygen therapy improves spatial learning and memory in a rat model of chronic traumatic brain injury. Paul G. Harch, Christopher Kriedt, Keith W. Van Meter, Robert James Sutherland, BRAIN RESEARCH 1174 (2007) 120-129.
http://www.researchgate.net/publication/5971941_Hyperbaric_oxygen_therapy_improves_spatial_learning_and_memory_in_a_rat_model_of_chronic_traumatic_brain_injury

[c] The effect of hyperbaric oxygen on intracephalic angiogenesis in rats with intracerebral hemorrhage. Peng ZR, Yang AL, Yang QD. J Neurol Sci. 2014 May2.
http://www.ncbi.nlm.nih.gov/pubmed/24836574

[d] Kraitsy K, Uecal M, Grossauer S, Bruckmann L, Pfleger F, et al. (2014) Repetitive Long-Term Hyperbaric Oxygen Treatment (HBOT) Administered after Experimental Traumatic Brain Injury in Rats Induces Significant Remyelination and a Recovery of Sensorimotor Function. PLoS ONE 9(5): e97750. http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0097750

5. Expert Opinion

"What the *Bleep* is going on with Hyperbaric Oxygen Therapy? Brain Health and Healing Foundation. Xavier Figueroa. PhD has been performing neurological clinical research since 1995 in the field of Alzheimer's research, as well as basic research in neuron biology, cancer research, bioengineering and the biophysics of water in cells. He has a long history of involvement with research using hyperbaric oxygen therapy for brain injury.
http://brainjury.org/blog/2014/05/01/what-the-bleep-is-going-on-with-hyperbaric-oxygen-therapy/
and
http://brainjury.org/blog/2014/07/03/what-the-bleep-is-wrong-with-the-dodva-hbot-studies/
and

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http://brainjury.org/blog/2014/11/23/what-the-is-going-on-with-hyperbaric-oxygen-therapy-part-3/

UHM 2012, Vol. 39, No. 4 – How many deaths will it take? AN EDITORIAL PERSPECTIVE. Undersea & Hyperbaric Medical Society, Inc***. How many deaths will it take till they know?*** Monkeys, madmen and the standard of evidence. George Mychaskiw II, DO, FAAP, FACOP, Editor-in-Chief Chair, Department of Anesthesiology, Nemours Children's Hospital, Orlando, Florida USA. The Journal of Hyperbaric Medicine is the most prestigious journal on Hyperbaric Medicine in the world. . . . . ."Hyperbaric oxygen is a safe, easily used treatment that, in many cases, has resulted in a dramatic improvement in the symptoms of patients with [TBI]. Every day we are…. gathering more data validating its efficacy…. I feel , as do many of my colleagues, that there is sufficient clinical and research evidence to justify the use of [HBOT] as a standard-of-care treatment for [TBI] that should be reimbursed by CMS and Tricare…. I have no doubt that, over the next several years, [HBOT] will be proven beyond a reasonable doubt to be one of the most effective treatments for [TBI]…. There is a preponderance of evidence now to justify the use and funding for the treatment…."
http://www.therapiehyperbare.com/images/hyperbare/2012-06_uhms_editorial.pdf

Chamber of Hopes for Brain Repair. Eshel Ben-Jacob , PhD. January, 27, 2013.
http://www.assafh.org/sites/en/Documents/Chamber%20of%20Hopes%20for%20Brain%20Repair.pdf

6. Data from DoD/Army studies, with responses

Summary of positive findings in Army Studies: Army medicine has run trials investigating the use of Hyperbaric Oxygen to treat and help heal Traumatic Brain Injury. They have shown that HBOT is both safe and effective: "***Randomization to the chamber . . . . offered statistical and in some measures clinically significant improvement over local routine TBI care.***" Also: ".... ***total scores for [both] groups revealed significant improvement over the course of the study for both the sham-control group .... and the HBO2 group***....." Expert outside consultants to DOD declared that ***"[HBOT] is a healing environment."***

[a] 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(17):2606-12. (DoD) (USA)
http://biawa.org/docs/pdf/MTBI%20PCS%20J%20Neurotrauma%202012.pdf

[b] Paul G. Harch, MD. Letters to the Editor. Journal of Neurotrauma. Hyperbaric Oxygen Therapy for Post-Concussion Syndrome: Contradictory Conclusions From a Study Mischaracterized as Sham-Controlled. 2014
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3837504/

[c] Cifu DX, Hart BB, West SL, Walker W, Carne W. The Effect of Hyperbaric Oxygen on Persistent Postconcussion Symptoms. J Head Trauma Rehabil. 2013. (DoD) (USA)
http://journals.lww.com/headtraumarehab/Fulltext/2014/01000/The_Effect_of_Hyperbaric_Oxygen_on_Persistent.2.aspx

[d] Weaver LK, Cifu D, Hart B, Wolf G, Miller RS. Hyperbaric oxygen for post-concussion syndrome: Design of Department of defense clinical trials. Undersea Hyperb Med 2012; 39(4); 807-814.

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[d] Paul G. Harch, MD. Letters to the editors, UHM 2013, Vol. 40, No. 5 – LETTERS. Department of Defense trials for hyperbaric oxygen and TBI: Issues of study design and questionable conclusions. http://www.ncbi.nlm.nih.gov/pubmed/24224289

[e] Walker WC, Franke LM, Cifu DX, Hart BB. Randomized, Sham-Controlled, Feasibility Trial of Hyperbaric Oxygen for Service Members With Postconcussion Syndrome: Cognitive and Psychomotor Outcomes 1 Week Postintervention. Neurorehabil Neural Repair. 2013. DoD/USA http://nnr.sagepub.com/content/28/5/420

[f] Cifu DX, Walker WC, West SL, Hart BB, Franke LM, Sima A, et al. Hyperbaric oxygen for blast-related postconcussion syndrome: Three-month outcomes. Ann Neurol. 2014;75(2):277-86. (DoD) (USA). Available upon request.

[g] Army Trials Report from UHMS Conference, June 2013. Press Release: " DoD announces results of first three DoD-Sponsored trials using hyperbaric oxygen for mild traumatic brain injury." Available upon request.

[h] R. Scott Miller, M.D., COL, US Army, Director, Hyperbaric Oxygen Research Program, US Army Medical Materiel Development Activity, Ft. Detrick, MD. ***Effects of Hyperbaric Oxygen on Symptoms and Quality of Life Among Service Members With Persistent Postconcussion Symptoms.*** *JAMA Intern Med.* doi:10.1001/jamainternmed.2014.5479. Published online November 17, 2014.

8. 14 on-label indications for HBOT already approved and insured

1. Air or Gas Embolism**
2. Carbon Monoxide Poisoning**
   Carbon Monoxide Poisoning Complicated By Cyanide Poisoning
3. Crush Injury, Compartment Syndrome and Other Acute Traumatic Ischemias**
4. Decompression Sickness**
5. Arterial Insufficiencies:
   Central Retinal Artery Occlusion**
   Enhancement of Healing In Selected Problem Wounds
6. Clostridial Myositis and Myonecrosis (Gas Gangrene)
7. Severe Anemia
8. Intracranial Abscess
9. Necrotizing Soft Tissue Infections
10. Osteomyelitis (Refractory)
11. Delayed Radiation Injury (Soft Tissue and Bony Necrosis)
12. Compromised Grafts and Flaps
13. Acute Thermal Burn Injury
14. Idiopathic Sudden Sensorineural Hearing Loss (Approved on October 8, 2011 by the UHMS Board of Directors)

** These indications are similar to conditions found in brain injury

Just out: Johns Hopkins reports that the brains of Iraq and Afghanistan combat veterans who survived blasts from improvised explosive devices and died later of other causes show a honeycomb of broken and swollen nerve fibers in critical brain regions, including those that control executive function. The pattern is different from brain damage caused by car crashes, drug overdoses or collision sports, and may be the never-before-reported signature of 'shell shock' suffered by World War I soldiers. **http://www.sciencedaily.com/releases/2015/01/150114140600.htm**