Clinical Research Studies on Hyperbaric Oxygen Therapy for Concussion

1. Boussi-Gross, R., Golan, H., Fishlev, G., Bechor, Y., Volkov, O., Bergan, J., Friedman, M., Hoofien, D., Shlamkovitch, N., Ben-Jacob, E., & Efrati, S. (2013). Hyperbaric oxygen therapy can improve post concussion syndrome years after mild traumatic brain injury - randomized prospective trial. *PloS one*, *8*(11), e79995. https://doi.org/10.1371/journal.pone.0079995 Available from: https://pubmed.ncbi.nlm.nih.gov/24260334/

2. Tal, S., Hadanny, A., Sasson, E., Suzin, G., & Efrati, S. (2017). Hyperbaric Oxygen Therapy Can Induce Angiogenesis and Regeneration of Nerve Fibers in Traumatic Brain Injury Patients. *Frontiers in human neuroscience*, *11*, 508. https://doi.org/10.3389/fnhum.2017.00508 Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5654341/#B76

3. Ma J, Hong G, Ha E, Hong H, Kim J, Joo Y, Yoon S, Lyoo IK, Kim J. Hippocampal cerebral blood flow increased following low-pressure hyperbaric oxygenation in firefighters with mild traumatic brain injury and emotional distress. Neurol Sci. 2021 Feb 2. doi: 10.1007/s10072-021-05094-5. Epub ahead of print. PMID: 33532950. Available from: https://europepmc.org/article/med/33532950

4. Hu Q, Manaenko A, Xu T, Guo Z, Tang J, Zhang JH. Hyperbaric oxygen therapy for traumatic brain injury: bench-to-bedside. Med Gas Res. 2016;6(2):102-110. Published 2016 Jul 11. doi:10.4103/2045-9912.184720 Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5110132/

5. 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. Published 2009 Jun 9. doi:10.4076/1757-1626-2-6538 Available from: https://pubmed.ncbi.nlm.nih.gov/19829822/

6. Davis, M.C., Shoja, M.M., Tubbs, S.R. et al. Hyperbaric oxygen therapy for chronic post-concussive syndrome. Med Gas Res 4, 8 (2014). https://doi.org/10.1186/2045-9912-4-8 Available from: https://medicalgasresearch.biomedcentral.com/articles/10.1186/2045-9912-4-8

7. Brainline. “Types of Traumatic Brain Injury.” BrainLine, 13 Aug. 2018. www.brainline.org/article/types-traumatic-brain-injury.

8. Harch, P. G., Andrews, S. R., Fogarty, E. F., Amen, D., Pezzullo, J. C., Lucarini, J., Aubrey, C., Taylor, D. V., Staab, P. K., & Van Meter, K. W. (2012). A phase I study of low-pressure hyperbaric oxygen therapy for blast-induced post-concussion syndrome and post-traumatic stress disorder. Journal of neurotrauma, 29(1), 168–185. https://doi.org/10.1089/neu.2011.1895 Available from: https://pubmed.ncbi.nlm.nih.gov/22026588/

9. Jha S. K. (2003). Cerebral Edema and its Management. *Medical journal, Armed Forces India*, *59*(4), 326–331. https://doi.org/10.1016/S0377-1237(03)80147-8 Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4923559/

10. Johns Hopkins Medicine. (n.d.) *Hyperbaric Oxygen Therapy*. https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/hyperbaric-oxygen-therapy

11. Sukoff, M. H., & Ragatz, R. E. (1982). Hyperbaric oxygenation for the treatment of acute cerebral

edema. Neurosurgery, 10(1), 29–38. Available from: https://pubmed.ncbi.nlm.nih.gov/7057975/

12. Heitger, M. H., Jones, R. D., Macleod, A. D., Snell, D. L., Frampton, C. M., & Anderson, T. J. (2009). Impaired eye movements in post-concussion syndrome indicate suboptimal brain function beyond the influence of depression, malingering or intellectual ability. Brain : a journal of neurology, 132(Pt 10), 2850–2870. https://doi.org/10.1093/brain/awp181

13. Araujo, G. C., Antonini, T. N., Monahan, K., Gelfius, C., Klamar, K., Potts, M., Yeates, K. O., & Bodin, D. (2014). The relationship between suboptimal effort and post-concussion symptoms in children and adolescents with mild traumatic brain injury. The Clinical neuropsychologist, 28(5), 786–801. https://doi.org/10.1080/13854046.2014.896415

14. Heitger, M. H., Jones, R. D., Macleod, A. D., Snell, D. L., Frampton, C. M., Anderson, T. J. (2009). Impaired eye movements in post-concussion syndrome indicate suboptimal brain function beyond the influence of depression, malingering or intellectual ability, *Brain*. 132(10) 2850–2870, https://doi.org/10.1093/brain/awp181 Available from: https://academic.oup.com/brain/article/132/10/2850/330220

15. Leddy, J. J. MD, FACSM, FACP; Haider, M. N. MD; Ellis, M. MD, FRCSC; Willer, B. S. PhD. (2018) Exercise is Medicine for Concussion, *Current Sports Medicine Report*s. 17(8), 262-270 doi: 10.1249/JSR.0000000000000505 Available from: https://journals.lww.com/acsm-csmr/Fulltext/2018/08000/Exercise_is_Medicine_for_Concussion

16. Lawrence DW, Richards D, Comper P, Hutchison MG (2018) Earlier time to aerobic exercise is associated with faster recovery following acute sport concussion. PLoS ONE 13(4): e0196062. https://doi.org/10.1371/journal.pone.0196062

17. Leddy, J. J., Wilber, C. G., & Willer, B. S. (2018). Active recovery from concussion. *Current opinion in neurology*. 31(6), 681–686. https://doi.org/10.1097/WCO.0000000000000611

18. Lee, K. H., Cha, M., & Lee, B. H. (2020). Neuroprotective Effect of Antioxidants in the Brain. *International journal of molecular sciences*, 21(19), 7152. https://doi.org/10.3390/ijms21197152 Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7582347/

19. Erdman J., Oria M., Pillsbury L. (2011). Nutrition and Traumatic Brain Injury. *National Academies Press*. 7 (Antioxidants). Available from: https://www.ncbi.nlm.nih.gov/books/NBK209332/

20. Treatment of Traumatic Brain Injury With Hyperbaric Oxygen Therapy. https://www.psychiatrictimes.com/view/treatment-traumatic-brain-injury-hyperbaric-oxygen-therapy

21. Effect of hyperbaric oxygenation therapy on post-concussion syndrome. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6122203/

22. Could hyperbaric treatment heal the brain? https://www.washingtonpost.com/national/health-science/could-hyperbaric-treatment-heal-the-brain/2018/01/26/90b3acfa-df87-11e7-8679-a9728984779c_story.html