

## **Case Report for TBI (Traumatic Brain Injury) Patient Treated with A Protocol of HBOT (Hyperbaric Oxygen Therapy), Autologous Human Plasma, Cranial Therapy, EEG Biofeedback, IV Nutrition, and Adult Stem Cells**

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### **Abstract**

Traumatic brain injury (TBI) is one of the most prevalent injuries in the U.S. leading to death and long-term disability. CDC estimates are that 1.7 million individuals suffer annually with severe to moderate TBI due to blunt trauma or motor vehicle accidents as the biggest causes. Modern medicine proves very efficacious in the golden hour after the injury to save many patients from death. However, memory loss, inability to concentrate, loss of motor function, decision-making, emotional affect, pain, and other brain damage symptoms often confine these patients to a prison within their own bodies or compel them to suicide.

Most treatments for chronically debilitated traumatic brain injury patients have involved pharmaceutical drugs, occupational and physical rehabilitation, speech therapy, and cognitive maintenance. Many patients resign to accept their condition and gain very little improvement in their condition or begin a slow decline of cognitive or motor function. However, some patients gain some improvements using hyperbaric oxygen therapies (HBOT) at specific protocols (as developed by Dr. Paul Harsch—see <http://www.hbot.com/hbot-brain-trauma>).

While HBOT by itself as a treatment for TBI has gained moderate acceptance by the medical community around the U.S., it has been found that an entire protocol utilizing multiple modalities over a 3-9 month period is potentially the most effective way to treat sub-acute and chronic traumatic brain injuries. This protocol is not limited to, but may include, HBOT, autologous human plasma, adult stem cells, and cranial therapy along with the adjunctive therapies of EEG biofeedback, IV nutrition, TMS (transcranial magnetic stimulation), and low-level light therapy. Although several modalities in the protocol have been utilized singularly, the combination of these therapies in a synergistic manner is the novel step towards the long-term remediation of traumatic brain injury. Also, particularly unique to this patent application is the administration of activated plasma (in a proprietary solution of nutrients and drugs) as well as plasma-derived stem cells directly as a drip into the frontal area of the brain.

The following case study describes a male patient with a traumatic brain injury due to a serious motor vehicle accident in August 2012 where he experienced a direct blow to the frontal area of the head and brain. This patient experienced significant post-concussion symptoms secondary to the TBI including insomnia, photosensitivity, hyperacusis, memory loss, decreased ability to concentrate, emotional distress, depression, loss of libido, daily headache pain, loss of executive function as well as other related symptoms.

This patient, who will be referred to as Mr. Chad, after initial evaluation and treatment with neurology and a neuropsychologist continued to experience significant symptoms 11 months after the motor vehicle accident in August 2012. In the late spring of 2013, Mr. Chad had experienced some relief of symptoms with the daily use of a home hyperbaric oxygen chamber and five

sessions of EEG biofeedback in Boulder, Colorado. However, Mr. Chad was still significantly mentally impaired in mid-July 2013 when he presented to Dr. John Hughes in Basalt, Colorado (see Appendix A for Mr. Chad's personal historical review of his experience). Mr. Chad received an evaluation by Dr. John Hughes, D.O. in July 2013 for commercialized HBOT therapy for traumatic brain injury. After an initial 25 sessions of HBOT at 1.5 atmospheres, Dr. Hughes offered cranial therapy and activated plasma to Mr. Chad in the form of injections, intravenous administration, and an intranasal drip. Mr. Chad also was given IV nutrition to assist with his healing and recovery. He continued to receive 25 more HBOT treatments until the end of September 2013. In October 2013, Mr. Chad also received adult stem cells derived from fat, plasma, and bone marrow in Miami, Florida.

From July 2013 to October 2013, Mr. Chad made significant, rapid improvements in cognition, executive function, emotional affect, insomnia, fatigue, fear, and pain along with having a decrease in light and sound sensitivity. In July 2013, Mr. Chad reported living in darkness being only able to "withstand five seconds of sunlight." In October 2013, Mr. Chad was able to fly on an airplane to Miami, Florida after only three months of treatment with HBOT, activated plasma, IV nutrition, and cranial osteopathic therapy. Six months after receiving adult stem cells, Mr. Chad demonstrated continued improvement and stabilization of his mental state in April 2014. His neuropsychiatric evaluation by Dr. Hughes' clinic showed improvements (see Appendix B for Mr. Chad's pretreatment neurophysiologic testing and Appendix C for post-treatment neuropsychiatric testing). Third party follow-up post-treatment evaluations by neuropsychologist Dr. Mary Ann Keatley, PhD of Boulder, Colorado also demonstrated improvements.

Note: Because Mr. Chad's traumatic brain injury was more neuro-psychological than purely neurological, MRI and CT scans were not relied upon to determine significant effects of the protocol offered by Dr. Hughes.<sup>1</sup> It is noted that Mr. Chad had "fraying of his spinal cord" in the thoracic area as well as a cervical disc extrusion upon initial MRI but no major defects on MRI of the brain were observed upon initial presentation to Dr. Hughes in July 2013. The MRI of Mr. Chad's cervical spine is listed in the case presentation below. Also see Appendix D for Mr. Chad's cervical and lumbar spine studies.

## **Introduction**

This is a case report for Mr. Chad, a 46 year-old male patient who received significant benefit from a novel TBI treatment protocol offered by Dr. John Hughes of Basalt, Colorado. On August 28, 2012, Mr. Chad was involved in a motor vehicle accident in which his automobile was struck at speed by another vehicle. Mr. Chad remembers his head hitting the visor and possibly the windshield before he felt a twisted snap and then "blacked out" and was taken to the emergency room. He reports that his right eye "popped out" of his socket and then having left-sided numbness for awhile with tingling into his left arm. He also reports having pain in his neck, left sacroiliac joint, and left lower extremity. He reports musculo-skeletal pain improvements over

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<sup>1</sup> <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2626927/>

Traditional imaging techniques, such as computerized tomography (CT) and conventional magnetic resonance imaging (MRI) have proven to be highly effective in identifying macroscopic lesions, which is a necessary component in managing acute trauma. ...Typically, individuals with mild TBI have normal appearing neuroimaging studies despite manifesting cognitive and behavioral problems. It is possible that enhanced analysis of brain function and anatomy following mild TBI may assist in delineating the neurophysiologic basis of post-concussion symptoms. Given the limitations of conventional imaging technologies, it is not surprising that they are poorly prognostic of outcomes (Diaz-Marchan et al 1996) and offer little information regarding the assessment of efficacy of TBI-related treatments.

time since the injury with use of a home HBOT chamber and intramuscular “stem-cell” injections from another clinic. However, Mr. Chad’s primary concerns upon first seeing Dr. Hughes on 7/15/2014 are the symptoms from his head injury. He reports extreme sound and light sensitivity as well as an inability to do math or other focused exercises such as reading. He also experienced bouts of depression, anxiety, physical and mental fatigue. He also reports memory loss, space and time recognition, loss of libido, inability to carry on conversations as well as daily, continuous headaches.

Mr. Chad has been evaluated by neuropsychologist, Dr. Mary Ann Keatley, PhD and Dr. Chris Centeno, MD of the Centeno-Schultz Clinic, and many other specialists and therapists since the motor vehicle accident in August 2012. He reports gaining benefit from stem cell and plasma (as PRP) injections into spinal area around his neck.

Mr. Chad denies current medications but reports using amino acids, 5 HTP and a supplement known as Neuroreplete. He reports an allergic reaction to Codeine. His past medical history includes a tracheal cyst and stomach ulcer. His family history is noncontributory. He denies the use of alcohol, tobacco, and drug abuse (with the exception of medical cannabis for headache pain). He lives alone in a warehouse.

Mr. Chad’s review of systems is significant for the following. He reports daily headaches. He reports trouble with temperature changes. He reports loss of peripheral vision that has improved since using HBOT at home. He reports seeing dark spots in his vision. He reports hyperacusis. He reports constant neck pain and stiffness. He reports indigestion and reflux. He reports pain in low back and sacro-iliac area; he reports right knee pain secondary to hitting on dashboard in the motor vehicle accident. He reports having no medial collateral ligament. He reports having trouble initiating words, actions; trouble following through with plans; trouble with concentration. He reports depression, anxiety, and insomnia.

### **Physical Findings and Assessment**

On physical exam on July 15, 2013, Mr. Chad has stable vital signs and presents with no acute distress. He is tender to palpation in the frontal area and temporal areas of his skull. He is wearing sunglasses and noise-canceling large headphones. He is able to hear in both ears. He has loss of vision peripherally, particularly significant in the right lower quadrant. His neck has a loss of range of motion and he is most tender to palpation at C5-C6 vertebral area bilaterally to the spine as well as C0 at the splenius capitus attachments. His lungs are clear to auscultation. His heart has a resting rate and regular rhythm with audible S1, S2 and no murmurs and no clicks. His abdomen is soft, with mild tenderness to palpation in the mid-epigastric area. He is mildly obese. His upper back is tender to palpation at the bilateral rhomboid attachments near vertebral areas of T7-T8. He is tender to palpation at the left L5-S1 lumbro-sacral ligaments. He has tenderness to palpation the left SI ligament. His upper extremity and lower extremity reflexes are intact and 2/4 bilaterally. He has tenderness to palpation at the right medial knee. He has decreased grip strength of 3/5 in left hand. There are no obvious skin lesions. His affect is mildly depressed but he feels some hope about his HBOT treatments.

Mr. Chad’s MRI study of the brain with and without contrast (dated October 11<sup>th</sup>, 2012) is unremarkable for bleeding, mass, or appreciate insult to any area of the brain. CT-scan nor PET/CT imaging studies were not performed. See Appendix D for more information.

Mr. Chad’s MRI study of his neck (dated October 11<sup>th</sup>, 2012) demonstrates a left sided cervical disc extrusion at C5-6 on the left.

Mr. Chad's assessment on July 15, 2013 is moderate traumatic brain injury with post-concussion syndrome with a wide neurological array of symptoms (See Appendix B for his neuropsychiatric assessment). He has cervical disc extrusion with possible radiculopathy into his left hand. He has sciatica, vision loss, and daily headaches.

Mr. Chad's plan on July 15, 2013 is HBOT treatments with the Colorado Center for Hyperbaric Medicine at the standard TBI protocol of 1.5 atmospheric pressures for 40 sessions. He is given a neuropsychiatric evaluation to be completed in one week. He is to report about his sciatic pain and neck pain to Dr. Hughes in 2-3 weeks. He is advised to take a baby aspirin daily and continue long-term follow with neuropsychology, neurology, PT, and consider manual therapy to this head.

## **Management and Outcome**

Mr. Chad's personal historical account of events is found in Appendix A. Mr. Chad's neuropsychiatric testing in July 2013 is below in Appendix B. His actual course of treatment is below.

From July 15, 2013 to October 2013, Mr. Chad was treated initially with HBOT for 50 sessions at variable pressures ranging from 1.5atm to 2.9atm. He received activated plasma injections by Dr. Hughes on August 26<sup>th</sup>, 2013. He received activated plasma injections in the neck (composed of autologous human plasma, dextrose 5%, and calcium chloride (1/2cc)) and activated plasma infusions (composed of autologous human plasma, dextrose 5%, 1cc glutathione (200mg/cc), ½ cc methylcobalamin (5000mcg/cc), 20 units of insulin, and 4cc O3 at 12 ug/cc) intra-nasally via pipette to the cribriform fossa. He received IV nutritional therapy two times over the course of three months. He received cranial therapy eight times over the course of 12 weeks. In October 2013, Mr. Chad received autologous adult stem cell treatments derived from the adipose tissue harvesting from his abdomen and bone marrow from his ilium.

Improvements on physical exam and neuropsychiatric testing formed the primary assessment tool for understanding Mr. Chad's condition and effectiveness of this his treatment regiment. Physical exam findings in April 2014 (approximately nine months after treatment initiation in July 2013) include diminished light and sound sensitivity, decreased tenderness in affected musculo-skeletal areas, reduced fatigue, and calm affect.

Neuropsychiatric findings are located in Appendix B (pre-treatment neuropsychiatric evaluation), and Appendix C (post-treatment neuropsychiatric testing).

## **Conclusions**

From physical exam evidence and neuropsychiatric testing, Mr. Chad, a surviving TBI patient, made significant improvements in his mental capabilities and psychological response to the core treatment protocol involving HBOT, human plasma, cranial therapy, and adult stem cells along with the adjunctive therapies of IV nutrition and EEG biofeedback. Mr. Chad's results demonstrate improvements intellectually, physiologically, and psychologically along with mood and personality improvements. Improvements in Mr. Chad's brain condition and symptoms have been verified by neuropsychologist Dr. Mary Ann Keatley, Ph.D. of Boulder, Colorado. Other patients with mild to moderate traumatic brain injuries have also benefited from a similar treatment protocol with reported findings of "a 37% increase in my Lumosity score, less crying, and more timed thoughts." Another mild-TBI patient who has completed a limited protocol

reported that “my mind is more clear than it has been in years... I am much closer to the vitality and clarity that I used to feel in my mind every day.”

It is clear that Mr. Chad’s case report demonstrates benefit of Dr. Hughes’ treatment protocol with HBOT, human plasma, adult stem cells, and cranial therapy (including the intranasal delivery of the autologous human plasma, nutrient, and insulin cocktail) for patients with mild to moderate traumatic brain injury. Utilization of EEG readings, PET scans, functional MRI scans, and more neuropsychological testing is warranted to further determine the full efficacy of Dr. Hughes’ TBI treatment protocol.