

## **Management of Post-Traumatic Stress (PTSD) Dementia and Other Neuro-degenerative Disease with Photo-Medicine: Clinical Experience and Case Studies.**

William Stephan M.D. LLC, Buffalo, New York, Ronald Aung - Din M.D. Sarasota, Florida per affiliation, Louis J. Banas, CLT. Laser Innovations LLC, John Thomas PT.; Carolyn Kochert M.D., Lafayette, Indiana, Carol Spooner N.P. Phoenix Az.

### **Abstract:**

- **Objective:** In the course of using Photo-Medicine (also known as Low Level Laser. LLLT or Cold Laser) in clinical practice over 5 years, observations of improvement in cognition and personality were noted in several patients. As a result, select patients with Alzheimer's Disease, vascular dementia, post-traumatic brain injury and other neuro-degenerative diseases were treated at clinical practices in Buffalo, New York (Primary and Alternative Medicine); Sarasota, Florida (Neurology and Neuropsychiatry); Lafayette, Indiana (Alternative Pain Specialist Physician) and Phoenix, AZ (Natural Paths); to determine if clinical improvement occurred with Photo-Medicine in this patient population.

**Method:** Over 150 patients with the above conditions were treated in various areas (depending on diagnosis) including the prefrontal cortex, temporal lobe, Hippocampus and Circle of Willis for duration of two and one-half minutes every 48 hours for 5-6 treatments. We utilized the Theralase multi-probe (905 nm. /660 nm.) at 60 miliwatts. it utilizes 5- 905nm near infra-red diodes and 4 infra-red 660 laser diodes with a peak power of 50 W and pulse duration of 200 nanoseconds. [1]

**Conclusion:** Treated patients exhibited varying degrees of improvement in cognitive function and personality, leading to improved quality of life and decreased caregiver burden. In some patients, improvement was objectively measured by formal neuropsychological testing PET scan and reductions in dose or discontinuation of prior medications. Improved overall sense of well-being was frequently expressed by treated patients. One experienced return of ability to smell they had not had for 5 years.

Similar results were reported in a Japanese study where 15 patients were followed for a year. These results in combination indicate need for controlled double blind studies. This non-invasive and non-systemic modality of therapy could play a key role in treating progressive neurodegenerative conditions, improving quality of life and reducing health care costs.

## 1. Introduction

Dr. Richard M. Restak published **The Brain, The Last Frontier** due to the fact it is the one organ we still want to learn more about and how to treat. [2] It is well documented that many scientific discoveries are the result of a serendipitous event (Isaac Newton?) We believe that in 2009, we were the witness' for such a discovery. The opportunity to use this new technology, Low Level Laser Therapy (LLLT) now referred often referred to as Photo-Medicine (PM) was in Dr. Stephan's private practice. Extensive research is now being done in the United States. The most recent publication by Dr. Theodore Henderson utilizes a laser similar to the one used in our practice. His article published in May 2016 "Multiwatt near infrared light therapy as neurogeneration for TBI" [3] further reinforces the need for more formal studies in this field. One of the first formal studies done in 2013 concludes "...Shown to regulate neuronal function in cell cultures, animal models and clinical conditions. Light that intersects with the absorption spectrum of cytochrome oxidase was applied to the forehead...it was generally reported more positive effects then overall affect states then negative, overall affect improved significantly...Cytochrome oxidase is an ideal target for cognitive enhancement, as its expression reflects the changes metabolic capacity underlying higher order brain functions." [4] Dr. Stephan, a well respected, primary care physician, places heavy emphasis on preventive and alternative medicine. He has been using PM for over 11 years and as a primary care physician sees all types of injury. Although a great deal of success was experienced, the most remarkable improvements were for PTSD, migraine, concussion and dementia. Patients who had suffered a concussion or migraine had significant and sometimes total healing with just a few treatments. We knew this was remarkable but we assumed we were only treating superficially, not knowing **the skull is translucent. Similar results were duplicated by a very progressive Neurologist in Sarasota, Florida, Ronald Aug-Din M.D. co-author of this paper.** Michael Hamblin has been doing extensive work in this area and his recent publication **Shining light on the head: Photo biomodulation for brain disorders highlights the following observations:** "NIR light can penetrate the head and reach the brain; NIR is absorbed by cytochrome oxidase in mitochondria; Increased blood flow, energy, neuroprotection, less inflammation, brain repair; Can treat traumatic stroke (stroke TBI), neurodegenerative and psychiatric disease," [5]

**In a previous case study publication,** a young man was hit with a lead pipe and had intractable migraines for two years; he was healed with just 4 treatments. [6]. As a result of this observation, the issue of dementia and PTSD were addressed in the clinic. All patients were treated utilizing the Theralase TLC 900 series,

## 2. Case Studies.

**PTSD NOTE:** Over 50 individuals were treated over a one year period at 4 different locations: (Phoenix Az, Buffalo, NY, Lafayette Ind. and Sarasota, Fla.); virtually all patients exhibited and proclaimed remarkable improvement in their emotional stability and quality of life.

1. A 32-year-old independent business man in Buffalo, New York, witnessed the murder of his mother when he was 9 years old and the murderer was never convicted. He claimed the over the last 2-3 years he fired over 30 employees due to his inability to cope with stressful situations. He stated he no longer experienced the problem and his life is significantly better.
2. A 69-year-old Vietnam Vet after 50 years of emotional problems had just coincidentally contacted the VA the week before becoming aware of the treatments. The standard PTSD questionnaire was administered and he had a score indicating a high level of PTSD. After completing a series of 4 treatments over an eight-day period he scored a number indicating no PTSD Disorder. He did not follow up with the VA.
3. A 54-year-old woman from Rochester, NY was on SSI due to a diagnosis for PTSD as the result of an abusive spouse. After 6 treatments, her score indicated remarkable improvement in her emotional well-being. She was given a 3 more “maintenance” treatments over a 4-month period and her testimonial video can be viewed at [www.paintherapyusa.com](http://www.paintherapyusa.com).
4. A 75-year-old woman from Sarasota, Fla. was forced into prostitution at the age of 19 in New York City. After the second treatment, she had remembered she had an abortion at the age of 21. This event was “blanked out” in her memory and she cried in the office on subsequent occasions stating she had “killed” a baby something deeply against her convictions. After the 5<sup>th</sup> treatment among other “improvements” she now could enjoy dining, driving her car by herself, and her handwriting was now legible.
5. A 45-year-old man in Phoenix, Az endured multiple beatings as a child was accidentally electrocuted at work and thrown 30 feet to the ground; doctors felt the fall restarted his heart. Because of the accident, he underwent stress management, tempers management and had severe muscular skeletal pain for several months. The PTSD questionnaire was administered and he scored very high. After 5 treatments over a 10-day period he no longer suffered from PTSD, was virtually pain free, was relaxed, no longer short tempered and was no longer prone to sudden outbursts of anger.

### **Vascular Dementia**

1. An 88-year-old woman, wheel chair bound started having simple memory problems (dementia) eight years previously. She recently was forced to move in with her son due to aberrant behavior in the skilled nursing facility. She would have violent outbursts towards others when confused or if more than two or three people were in her presence. Her energy level was very low. Six treatments were administered over a twelve-day period. Her son reported that she was much more relaxed and outbursts were non-

existent. In addition, in the evening she maintained a much higher energy level and was much more alert. The son was very pleased with the change in her entire demeanor and after a 5-week period notices a small decline in her condition. Therefore, a monthly a monthly treatment is being administered for maintenance purposes

2. A 38-year-old female, under the care of this primary care physician for 3 months had a history of stroke and possible TBI due to spousal abuse. She sought treatment for severe migraines of various degrees 3-4 times per week over a 5-year period. Her previous primary care physician had her on a very high dosage of Oxycotin. After the first treatment, her headache pain was almost eliminated, however due to cut back on her medication the migraines continued. A course of 8 treatments (some on an emergency basis) were administered over a 14-day period and she received significant relief every time. However, after the seventh treatment the mother reported ***her daughter began speaking in full sentences and her memory had returned.*** In addition, she no longer needed to walk with a cane. The client was followed up intermittently over a two-year period and no regression was apparent.

### **Dementia: Early stage**

Case 1. A 77-year-old was first diagnosed with dementia 12 years previously and although taking several memory medications still had to be admitted to a memory home. His memory was severe and he recognized his daughter but did not know her name even though she visited him 3-4 times per week. After the fourth treatment, the daughter called and reported to me that his brother stopped by to see him for the first time in months and he not only called him by name but they cried and had a conversation. He was treated the next day and upon our arrival while sitting in the dining room he recognized his daughter waved to her and called out to her by name. This was a startling improvement which he had not demonstrated for years. A fifth treatment was administered at that time however the daughter then left for ten a day vacation. Upon her return, he had reverted to his previous condition and after several treatments the condition could not be duplicated.

Case 2.

A 67-year-old postal worker still working part time was getting concerned about memory lapse and sense of smell loss. Both his parents died of Alzheimer's in their 80's. A series of 6 treatments were administered as a preventive measure. He reported that he has regained sense of smell and in addition, he reported a side effect{?} of 3 small, fleeting headaches something which he never experiences. We conjecture this may be the result plaque or tau protein moving through his system? Two years later he shows no sign of any degeneration and still has his sense of smell.

### Case 3.

A 61-year-old retired housewife had a very rapid decline over a 9-month period. The daughter (caretaker) had planned on moving to another city where she would have more family. The daughter agreed to allow a least a series of six treatments. After the second treatment, the receptionist was shocked that she asked to sign her credit card receipt. After the sixth treatment, the daughter reported that she now dresses herself without help and if she makes a mistake the daughter points it out and she corrects the problem herself. In addition, she can now get into the car and fasten her seat belt without any assistance. Also, she had a problem eating a sandwich whereas she would pick up the top slice of bread and the daughter would need to correct her, which was no longer a problem.

### **Case 4. Advanced dementia case (on going case)**

An 82-year-old male with a 10 years' history is being treated 3 times a week continuously since November 2014. Subject is a retired medical researcher and wife a retired school teacher. Careful documentation is being kept by his wife. At the outset within a two-week period, the client slept through the night giving his caretaker wife and family much relief from anxiety and sleep deprivation; before this time, he would wander around the house at all hours of the night. His echoing also was minimized in the first few months and conversation was improved. A memory test is administered twice a week and he showed stabilization. However, after the fourth month echoing became more pronounced and he no longer could associate his wife as a loved one. He could not recognize his son he had not seen in two years who came to visit however his son who visits 2-3 times a year is recognized. Physical and OT therapists state he is doing extremely well at this stage, however much credit must be given to the wife for the many activities she engages him in including puzzles and the math games.

### **3. Discussion.**

There are more than 5 million Americans currently living with Alzheimer's disease and per the American Alzheimer's Association every 67 seconds someone in the United States develops the disease. Estimates of costs to American society are \$214 billion including Medicare and Medicaid. These costs are staggering yet if we do not find a cure the cost in today's costs would be \$1.2 trillion by 2050. Extensive research is being conducted world wide and recent studies that Alzheimer's (AD) could be more closely related to Small Vessel Disease (SVD) than previously thought. As recent as May of this year JAMA Network Journals reported "Cerebral SVD and AD disease pathology appear to be associated, new research indicates. 'Our study supports the hypothesis that the pathways of SVD and AD are inter-connected. SVD could provoke

amyloid pathology while AD –associated cerebral amyloid pathology may lead to auxiliary vascular damage’ researchers conclude.” [7] Dr. Sandra Black a prominent Alzheimer researcher in Toronto Canada during a recent radio talk show theorized that exercise is one area for prevention that could be a solution in mitigating the problem. The inference here is that increased blood during cardio vascular exercise might mitigate the buildup of plaque and protein. However, recent theory may conclude that good blood flow keeps neural tissue from degenerating. Specialist’s concede that Vascular Dementia is directly related to SVD which by estimates accounts for 10- 20% of all dementia cases. Alzheimer’s is a more insidious disease with the knowledge that the vascular system is hampered by the buildup of amyloid plaque and tau protein. As a result of this build up much attention is being given to prevention as well as cure. A study by Naser et al. looked at the use of LLLT for the treatment of Traumatic Brain Injury (TBI) stroke and neurodegenerative disease. Their results were very promising. Nightly treatments over a long period improved cognitive abilities. In addition, they showed that the use of LLLT increased ATP production, caused vasodilation and improved perfusion. They presented two cases where cognitive ability was regenerated. [8] Two recent mouse studies both concluded that LLLT showed promise:

Farfara D., et al, recently reported: “LLLT stimulated mesenchymal stem cells increased their ability to mature towards monocyte lineage as to increase phagocytosis activity towards soluble amyloid beta (*A $\beta$* ) Furthermore, weekly LLLT administered to the bone marrow of Alzheimer mice for two months starting at 4 months of age (progressive stage of AD) improved cognitive capacity and spatial learning as compared to the sham group. Histology revealed a significant reduction in *A $\beta$*  burden.” [9]

Another study by Sivaraman Purushothuman et al. concluded: “our results in two transgenic mouse models with existing AD related pathology suggest that (LLLT) can reduce characteristic pathology, oxidative stress and mitochondrial dysfunction in susceptible regions of the brain. These results when taken together with those other models of neurodegeneration strengthen the notion that LLLT is a viable neuro-protective treatment for a range of neurodegenerative conditions. We believe this growing body of work provides the impetus to begin trialing LLLT as a broad base therapy for AD and other neurodegenerations. [10]

Promising work was published in Japan by Kazuyoshi Zenba. Zenba utilizing similar technology in 1993 treated senile dementia with very good results. They followed 15 patients with Alzheimer’s over a one year period, treating them 2-3 times a week for that period. He reported “Among evaluation items, cooperativeness and the lack of composure were observed as useful as an effect, the effect appeared half a year after and continued for one year and later. It was suggested that there was an improvement of orientation disturbance, normalization of clothing and dress....it was also reported the coldness of hands and legs of patients vanished and joints and muscular stiffness were

also mitigated.” He continues: “Also in excretion care, it became very easy to carry out the care of the patients.” Also, “...the following effects were confirmed, namely the advance of condition of Alzheimer’s diseases has been blocked and the expression of patients changed to smiling from disinterestedness, cooperativeness came out and understanding came to be shown to a partner.” [11]

#### 4. Conclusion.

These case studies presented indicate the veracity of PM as being a minimal invasive, painless modality that that may mitigate and in many cases reverse neurodegeneration in the present population. We hypothesize currently that PM is unique in its ability to penetrate to the brain tissue providing rapid vasodilation (increase in blood flow) and reduced oxidative stress enabling the processes to formulate. Moriyama compares standard, therapeutic wavelengths and concludes the 905nm is vastly superior to produce Nitric Oxide responsible for vasodilation. [12]

More extensive clinical studies need to be conducted to verify the efficacy of the treatment, if the treatments are to be used as an acceptable, medical, preventive measure with patients who may not be demonstrating symptoms but have a family history. PET scans of patients who have a family history of dementia or Alzheimer’s could be identified as having SMD, therefore qualifying them as the proper candidates for a study. A pilot study for PTSD is being planned at the VA Hospital in Buffalo, NY. and should be concluded by this fall (2017). Currently 8 clinics are now providing this therapy in the United States.

#### References:

1. Theralase Inc. Toronto, Canada
2. Richard M. Restak M.D. *The Brain , The Last Frontier, Mass Market Paperbooks, January 1, 1980*
3. Henderson, T.A. *Multiwatt near-infrared light therapy as neurogeneration for TBI*, Neural Regan Res 2016, April 11 (4 ) 563-565
4. Julio C. Rojas, F. Gonzalez-Lima *Neurological and psychological applications of transcranial lasers and LEDS*. Biochemical Pharmacology, 15 August 2013, Vol. 86 (4) 447-457, doi 10.1016
5. Hamlin, Michael R.; *Shining light on the head: Photo biomodulation for brain disorders*. Science Direct BBA Clinical, December 2016, vole 6, 113-124, doi 10.1016/j.b, Open Access, Creative Commons License.
6. William Stephan M.D. et al, *Efficacy of super-pulsed 905 nm Low Level Laser Therapy in the management of traumatic brain injury (TBI) A case study*. World Journal of Neuroscience, November 2012. <http://www.Scirp.org/journal/wjns/>
7. Jama Network Journals, *Association between small vessel disease, Alzheimer pathology studied*. Jama Network Journals May 12, 2014

8. Naser, M.A. and M.R. Hamblin, Potential *for transcranial laser or LED therapy to treat stroke, traumatic brain injury and neurodegenerative disease*. Photomed LaserSurg, 2011, 29(7) pp. 443-448 [www.ncbi.nlm.nih.gov/pubmed/21172691](http://www.ncbi.nlm.nih.gov/pubmed/21172691)
9. Farfara D, Tuby H, Trudler d, Doron –Mandel E, Maltz L, Vassar RJ, Frenkel D, Oron U. , *LLLT Ameliorates Disease Progression in a Mouse Model of Alzheimer's Disease*, J mol Neuroscience 2014 July 4 ; George S. Wise Faculty of Life Sciences , Tel Aviv University , Israel [www.healinglightseminars.com/laser-research-library/alzheimer-disease](http://www.healinglightseminars.com/laser-research-library/alzheimer-disease)
10. Sivaraman Purushothuman, Daniel M Johnstone, Charith Nansdasena, John Mitofanis and Jonathan Stone, *Photobiomodulation with near infra-red light mitigates Alzheimer's disease-related pathology in cerebral cortex-evidence from two transgenic mouse models; Alzheimer's Res Ther*. 2014; 6 (1) :2, published on line Jan 3, 2014 [www.ncbi.nlm.nih.gov/pmc/articles/pmc3978916](http://www.ncbi.nlm.nih.gov/pmc/articles/pmc3978916)
11. Kazuyoshi Zenba, Vice president of Kanagawa Acupuncture Massage Association, Prof. Masayuki Inoue, Secretary of JLPLTPA, *The efficacy of 904nm Laser Therapy for Alzheimer's Disease*.
12. Yumi Moriyama DDS, Jacqueline Nguyen, Margarete Akens, Ph.D., Eduardo H. Moriyama, PhD., and Lothar Lilge PhD.; *In Vivo Effects of Low Level Laser Therapy on Inducible Nitric Oxide Synthase*, Lasers in Surgery and Medicine 41:227 – 231 (2009) [www.ncbi.nlm.nih.gov/pubmed/19291752](http://www.ncbi.nlm.nih.gov/pubmed/19291752)