Alzheimer's and Treatment Efficacy of Photobiomodulation for Moderate and Advanced Dementia

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Abstract

Extensive research is ongoing utilizing Photobiomodulation (often referred to as cold laser) for its efficacy in the treatment of Alzheimer's /dementia. The following case studies further demonstrate that this is the breakthrough that researchers are looking for to stop this insidious disease. There are two cases discussed here, one having moderate impairment and the other more serious advanced symptoms. A Harvard study published a study showed similar results; however, 12 weeks of daily treatments were necessary. These cases outline how moderate and advanced cases can be significantly reversed with three- eight-minute treatments over a 5-day (MWF) period.

Key words: Photobiomodulation, nitric oxide synthase, Adenosine Triphosphate (ATP), vasodilation, laser diode, LED, low level laser

Discussion

Extraordinary efforts are being made in an effort to find a remedy for Alzheimer's/ Dementia. Senior citizens, who are now in many cases living past normal life expectancy, are experiencing this disease. In many cases, it is usually a result of vascular insuffiency.

Presently, two noted research institutions continue to publish encouraging results regarding this technology. They are the University of Texas and Harvard University (in conjunction with Massachusetts General.) I was told by one researcher at Harvard that at one point 250 researchers were full-time or part-time devoting their attention to this breakthrough technology. In addition, research is also being conducted regarding Traumatic Brain Injury and PTSD at these institutions. One of the most dedicated and prolific researchers in this area is Michael Hamblin Ph.D. who has been prolific in reporting research in this area. Most notable was a controlled case series done in 2018 by the Harvard team entitled: **Significant Improvement in Cognition in Mild to Moderately Severe Dementia Cases Treated with Transcranial Plus Intranasal Photobiomodulation: Case Series Report**[1] Dr. Hamblin discusses the success that is achieved with the implementation of light therapy for even severe dementia cases. It involves the use of transcranial and intranasal devices, which are used daily at home for a 12-week period. We are obtaining the same results with three, eight - minute treatments over a five-day period.

In 2018, Dr. Hamblin published a 650-page compilation of scholarly works entitled: **Photobiomodulation in the Brain Low-Level Laser (Light) Therapy in Neurology and Neuroscience.** [2] In this publication, over 100 researchers detail the effects of Photobiomodulation on the brain. We were privileged to have our paper included as Chapter 42.

In 2019, Dr. Hamblin published another paper entitled **Photobiomodulation for Alzheimer's disease: Has the light Dawned.**[3] This paper goes into detail describing the biophysics involved in the process. Photobiomodulation dramatically increases the uptake of ATP (Adenosine Triphosphate). ATP is the energy essential for cellular health and it is generated in the mitochondria area of the cell.

In our practice, we utilize a high powered super pulsed laser using 905 and 630nm diodes. Most researchers at this time utilize LED's in their research. LED's have significantly less power and usually are placed in a helmet which the patient has to wear for half an hour every day for approximately 12 weeks before seeing a significant improvement in their cognitive abilities. Our patients in most cases see significant improvement in just 3-4 treatments as reported here. The 630 nm. diodes (four in number) are chiefly responsible for increase in ATP uptake i.e. Photobiomodulation. The 905 nm. diodes (five in number) are responsible for nitric oxide synthase, which increases blood circulation through dilation of vessels. We have utilized this device in our clinical practice for over 15 years and have had no adverse effects reported. This system was originally FDA cleared for pain management and we initially treated chronic pain, trauma, arthritis etc. However, after treating hundreds of patients with no adverse effects, we started treating simple headaches and migraines. After a short time, having great success, we realized that we were penetrating the skullcap with this system …therefore healing a bruised brain (most likely vascular deficient) by improving circulation and tissue regeneration.

Our first publication (of three) was entitled **Efficacy of Super Pulsed 905 nanometer Low Level Laser Therapy in the Management of Traumatic Brain Injury (TBI) Case Study** [4] was published in 2015. (Note: repeated efforts were undertaken to present our findings to the Department of Defense and NFL to no avail.) Our most recent paper entitled **Photobiomodulation Treatment for Brain Disorders: Post-traumatic Stress Disorder (PTSD**)[5] includes a pilot PTSD study as well as early dementia

Method

The laser heads we utilize contain 5-905 nm. diodes having the ability to put out 200 milwatts of power. The 4- 630 nm diodes have the ability to put out 100 watts of power. Patients are treated on a MWF schedule (i.e. three times) over a five-day period. Six areas are treated for three minutes each… four areas on the pre-frontal cortex and two mid-brain. Power settings are 100 miliwattts for the 905nm diodes and 75 miliwatts for the 630's. Moderate cases are given the mini cognitive test; advanced cases do not have the ability to respond.

Case: 1 Moderate Dementia

A 92-year-old female was having memory loss, low energy and was becoming very argumentative a trait not previously displayed. The first treatment was preceded by a short interview. She was very lucid and even had a sense of humor. After the treatment, I spoke to the daughter she lives with and said "I don't think she is my guy there seems to be nothing wrong with her." The daughter of course asked me to come back to which I readily agreed. Upon arriving for the second treatment I asked her if anything's noticeably had changed certainly not expecting to have any kind of positive response. The daughter informed me that she had asked for her hot fudge sundae, her favorite dessert that she had not asked for in three months! We continued with three more treatments and a testimonial letter was written 3 months after her last treatment it is presented here:

Mr. Banas provided 4 treatments for my 94-year-old mother to assist her with beginning stage dementia. After the first treatment, I noticed she was not sleeping as much during the day. As the treatment progressed, I also noted she requested a hot fudge sundae, her favorite, which she has not done in more than a year. She also became more alert during the day; previously had been sleeping most of the day, getting up at my urging to drink ensure, water, and have a light meal of eggs, or toast, soup. While her memory short term is not different, she has more alertness, and interacts more with me as she had previous to her decline. Also noted, she wanted to go out to lunch, a favorite past time which she had been loathe to do lately. We prepared to go to lunch, as she is on oxygen 24/7 and use a cane or walker to get around. I came to help her get her coat on and she had her lipstick out and was putting it on her lips. I asked about it and she said, since we're going out I thought I should put some make up on but couldn't find anything but lipstick. My mother had for years worn lipstick and would reapply it after having anything to eat or drink. Her lips were 'addicted' to lipstick! I was quite surprised and pleased to see her using it as this was something she stopped several years ago. She has also started to watch some of her old favorite television shows, another thing she had stopped. She is napping during the day, but more like long ago when she would get up and watch the news and have her coffee and breakfast, watch another show and then nap after lunch.

Mr. Banas felt that the changes were a result of the increased blood flow from the light therapy treatments to her brain. I can't argue with that as it was the only thing that changed and I did note several improvements. My mom is not argumentative at all and has always had a positive outlook to life, but these changes have improved her quality of life. Thank you!

Case 2: Advanced dementia

This advanced case involves a 72-year-old man presented to me by his wife as a last resort. He had bathroom issues and really could not follow directions. Using the standard protocols, we started to see remarkable results after the third treatment. For instance, when I told him to get up on the table he was able to do this properly without direction. In addition, I would ask him to open the goggle case and put the glasses on which he did with little effort he was not able to do previously. His bathroom issues were no longer a problem. Most encouraging after arriving for a treatment I walked out to greet them at the car to see how he would respond. He saw me coming turned to his wife and informed her I was on my way to greet, I found this most gratifying.

Side effects. Unfortunately, after the 4th treatment we observed some adverse effects. He displayed excessive energy and some aggressive tendencies. He no longer would sleep through the night. At one point, in the middle of the night he got up and was rearranging furniture in the living room. His wife asked him what he was doing and he told her to mind her own business! We had to temporarily cut back on the treatments and in addition, I stopped treating the prefrontal cortex. As of this writing, he is still doing well and he has not had a maintenance treatment for 6 weeks. The wife is getting the sleep she needed. He controls his urinary issues but is wearing depends for his defecation. He is apologetic to the wife for this issue.

Conclusion.

Further research is being done and in our opinion we don't believe pharmaceuticals will be the answer. One controlled study has been completed and another is ongoing. The University of Texas most recently published a controlled study with the Quietmind Foundation of Philadelphia entitled **Transcranial Near Infrared Light Stimulations Improve Cognition in Patients with Dementia**[6] . It details the efficacy of this breakthrough technology.

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Photomedicine and Laser Surgery Volume XX, Number XX, 2017 Mary Ann Liebert, Inc. Pp. 1–10 DOI: 10.1089/pho.2016.4227

2. Photobiomodulation in the Brain Low-Level Laser (Light) Therapy in Neurology and Neuroscience

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6.Photobiomodulation treatment for brain disorders: posttraumatic stress disorder (PTSD) and dementia Randy Lamartiniere[1], Rhett Bergeron[2], Ronald Aung-Din[3], Matthew Bennett[4], William Stephan[5] and Louis Banas[6] [1]Photo medicine Clinic, Baton Rouge, LA, United States, [2]Real Health Medical, Roswell, GA, United States, [3]Sarasota, FL, United States,[4]Patterson, CA, United States, [5]Buffalo, New York, United States, [6]Laser Innovations, Amherst, New York, United States

7.Transcranial Near Infrared Light Stimulations Improve Cognition in Patients with Dementia
Damir Nizamutdinov[1,2], Xiaoming Qi[1], Marvin H. Berman[3], Gordon Dougal[4], Samantha Dayawansa[1,2], Erxi Wu[1,2,5,6], S. Stephen Yi[6], Alan B. Stevens[1], Jason H. Huang[1,2]*
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