

An Individual Case Study Using Neurofeedback to Treat TBI with Anxiety, Insomnia, and Balance

**Southeast Biofeedback and Clinical Neuroscience Association
Biofeedback and Neurofeedback:**

**Principles and Practices of Training Self-Regulation for Optimal Health
Saturday, November 4, 2017**

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APA Statement

"Materials that are included in this course may include interventions and modalities that are beyond the authorized practice of mental health professionals. As a licensed professional, you are responsible for reviewing the scope of practice, including activities that are defined in law as beyond the boundaries of practice in accordance with and in compliance with your professions standards."

- 1) Participants will understand the effects of head injury on the brain and body.
- 2) Participants will learn how TBI can impact changes in the brain.
- 3) Participants will learn how neurofeedback can effect changes in the brain through pre/post treatment measures using QEEG brain mapping.
- 4) Participants will learn neurofeedback treatment protocols to address TBI.
- 5) Participants will become familiar with some literature that address how neurofeedback can effect changes in the brain and physical health.

Patient is a 56 year old married white female diagnosed with Multiple head injuries resulting in mild traumatic brain injury. During NFB Treatment, patient fell on the ice and had a bicycle accident resulting in two additional head injuries.

Patient was treated with 36 sessions of neurofeedback for health related problems including:

- Anxiety / Depression / Mood Swings
- Poor Balance
- Insomnia
- Cognitive Deficits

- Brenda is a 56 old female with a history of multiple head injuries. She is a nurse practitioner who contracts her services to several organizations and companies. She presented for treatment due to symptoms that included, anxiety, insomnia, cognitive deficits. Brenda had an initial QEEG on 11/5/2014 and a subsequent remapping to determine progress on 3/2/15, and 3/16/15 after sustaining a head injury from falling on ice on or around February 17, 2015. And another head injury from a bicycle accident on 4/17/2015. Brenda received 36 sessions of neurofeedback over the course of 11 months. Sessions were 1-2 times per week. Brenda progressed well despite incurring 2 additional head injuries after NFB training started.

Patient has a history of multiple head injuries, sleep problems, high blood pressure, and thyroid problems and reports diagnosis of anxiety, depression, insomnia, seizure disorder, panic attack, migraine, TMJ and memory problems.

She was taking Tegretol, Lithium, and Gabapenton.

Physiology problems included but were not limited to, insomnia, depression, anxiety, headaches, dizziness, shaking & tremors, fainting spells, agitation, visual blurring, and nausea.

Patient encouraged to practice diaphragmatic breathing multiple times per day.

Patient was asked to track her progress weekly for the following symptoms: dysregulated sleep cycle, difficulty organizing personal time or space, reading difficulty, auditory hypersensitivity, trouble doing anything because felt bad, anxiety, depression, mood swings, panic attacks, suicidal thoughts, and poor balance.

Initial Map: November 5, 2014

Map #2: March 2, 2015 – After 15 sessions of Neurofeedback. 2 weeks post TBI.

Map #3: – 4 Weeks post TBI

Patient began neurofeedback on 11/7/2014. She began NM Protocol #3 (2-12d, 15-20u on the Left and 2-12down, 13-15u on the Right) at C3 & C4 E/C for 11 sessions.

1/30/15 began NM Protocol #17 (2-7d, 15-20u on the left and 2-7d, 9-11u on the right) at P3 & P4 E/C for 4 sessions.

After a subsequent fall and head injury on March 2, 2015 she began a squash protocol (2-30d) at Cz on 3/27/2015 for 15 sessions.

7/3/2015 began NM protocol #10 (2-12d, 15-20u on the left and 13-15u, 16-30d on the right) at Fp1 and Fp2 E/O for 2 sessions.

7/17/15 began NM Protocol #4 (2-7d, 15-20u on the left and 2-7d, 13-15u, on the right) at F3 & F4 E/O for 4 sessions.

Order of NFB session days:

11/7/14, 11/14, 12/8, 12/12, 12/17, 12/19, 1/5/2015, 1/19,
1/23, 1/26, 1/30, 2/2, 2/13, 2/16, 3/27, 3/30, 4/6, 4/10,
4/13, 5/1, 5/4, 5/8, 5/11, 5/15, 5/18, 5/22, 5/29, 6/19, 7/3,
7/10, 7/17, 7/31, 8/14, 9/11

- On February 17, 2015 Brenda slipped on the ice and sustained another head injury. Another QEEG was performed on March 2, 2015 to assess impact of injury.

Complications

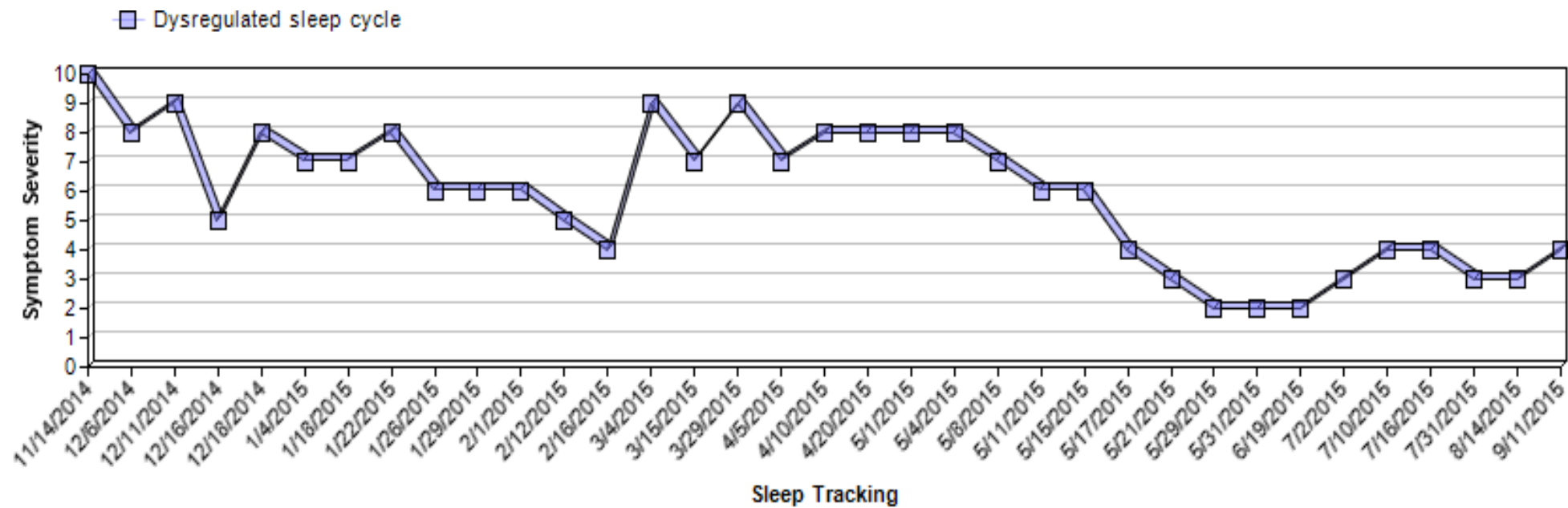
- On March 16, 2015, 4 weeks post injury, another map was done as patient requested to continue NFB

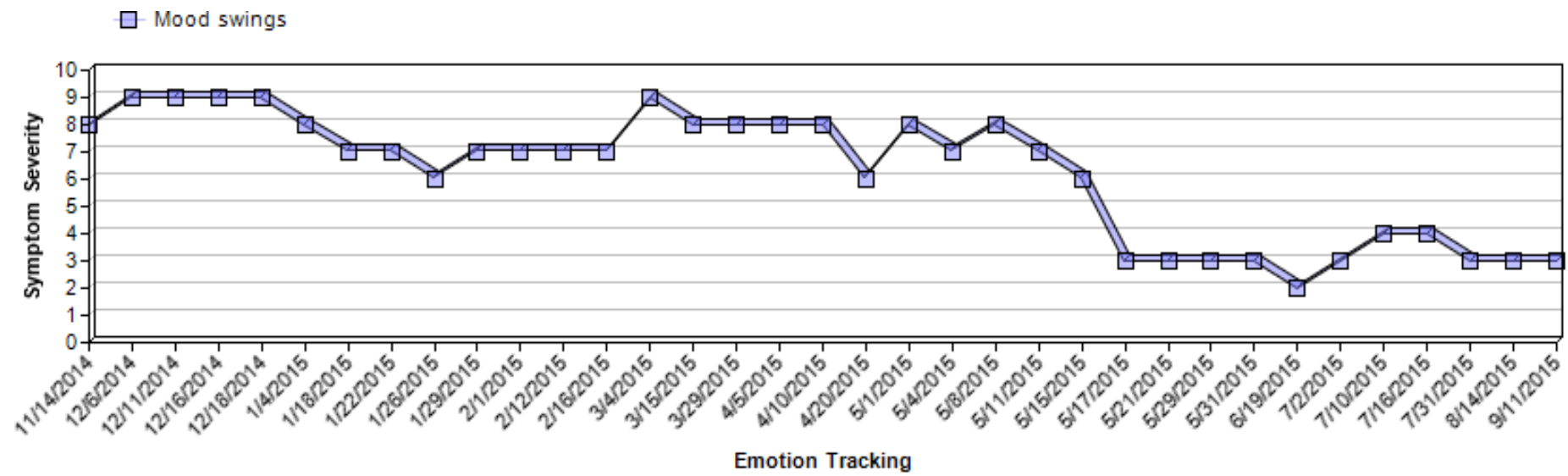
- 03/04/2015 Unsure if information from yesterday was saved. When I fell I fell I have no memory surrounding the time. Still having HA, was very dizzy, balance still off not good. Concentration terrible, vision fuzzy at times. Tired too easy. So too depressed
- 03/15/2015 I have managed to work, but with great difficulty. When working on projects it takes me an extended period to get myself settled and focused. ,Similarly at outset a great amount of error and correction. I have truly been quite depressed, and have had rushes of desperation. Once I get myself settled I can do quite well until I make a mistake, then I spiral into confusion.

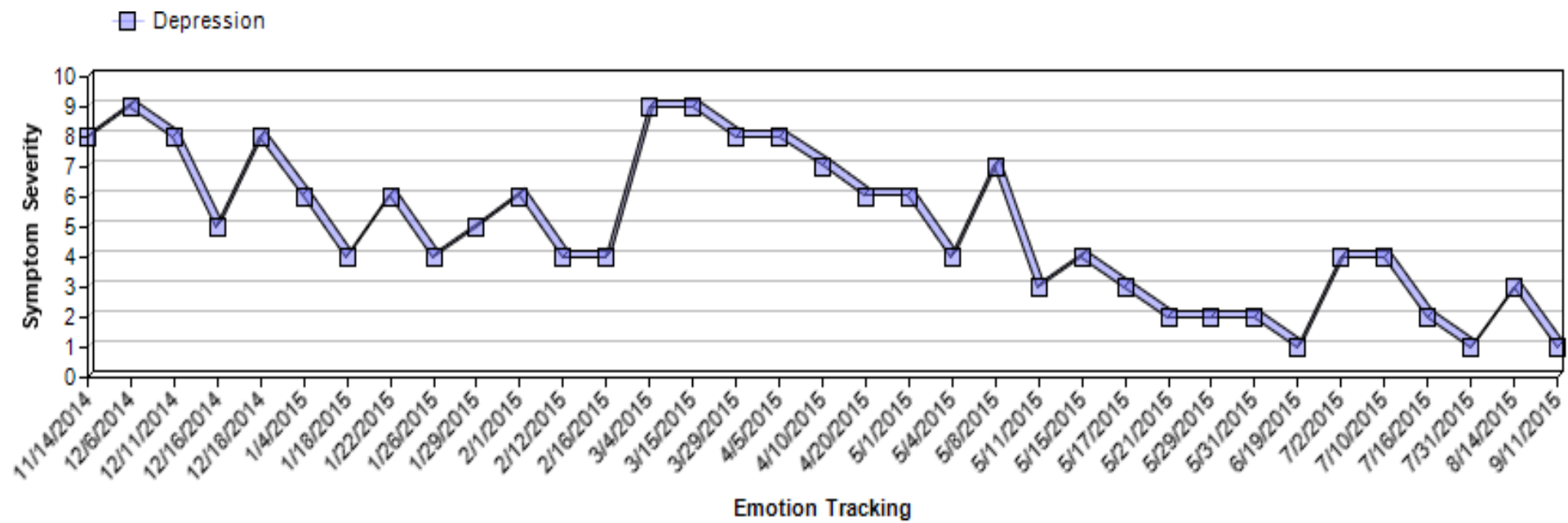
- On 3/27/2015 Brenda signed the following:
- I, _____, acknowledge that approximately 6 weeks ago, I slipped on the ice and sustained a head injury. My subsequent QEEG brain maps reveal that my EEG has changed; and those indicated changes are likely from that injury; and are signs indicative of brain injury. I understand that neurofeedback is not recommended until at least three months after a head injury. I understand that participating in Neurofeedback before then may result in negative symptoms or side effects; and that I will inform Robert Longo immediately if I experience any negative effects from my neurofeedback over the next 2 months.

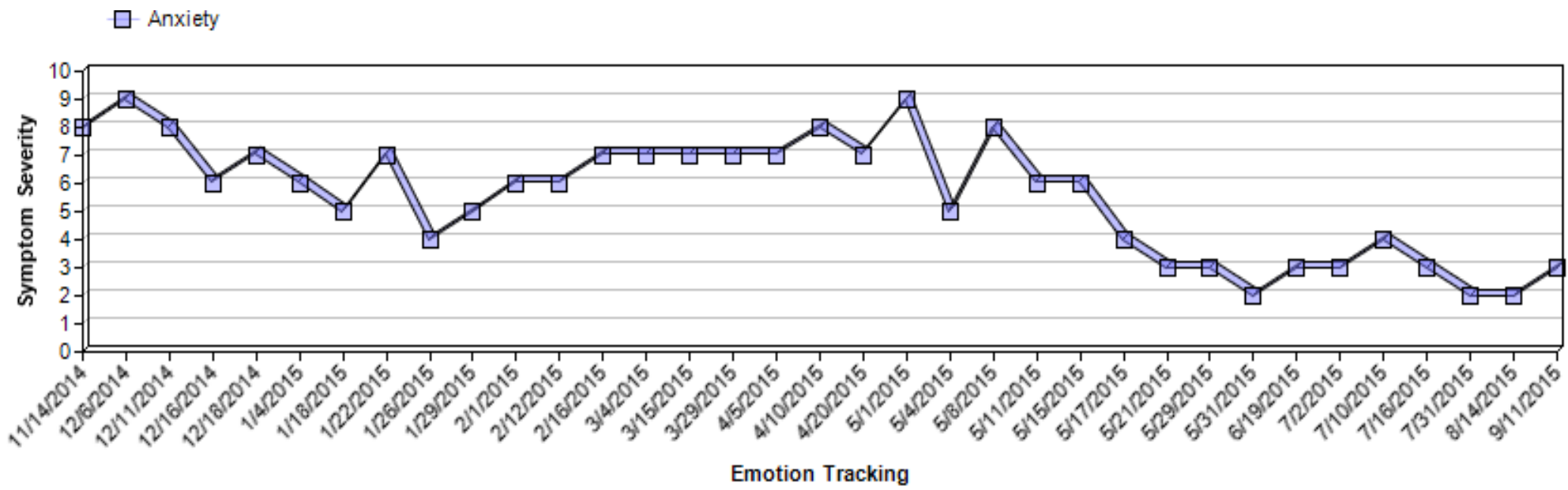
04/20/2015

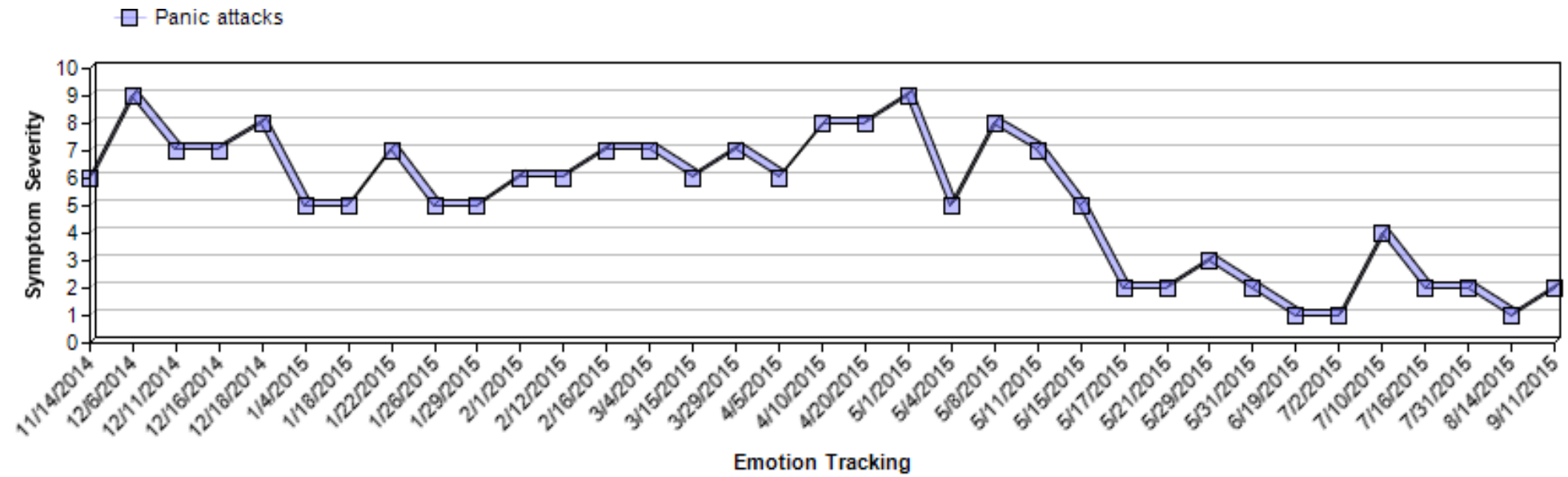
My issues stem primarily from a fall I had on my bike on 4/17/2015. If I stay very still and keep myself calm with easy, rhythmic breathing, I am ok. When I get in crowds, move my head quickly, get too hot or cold, it collapses around me. I still have a HA but it is improving. Also a bit dizzy. Also just stiff and sore from a fall, road rash and whiplashed a bit. Improving because I am staying still and quiet as much as possible.

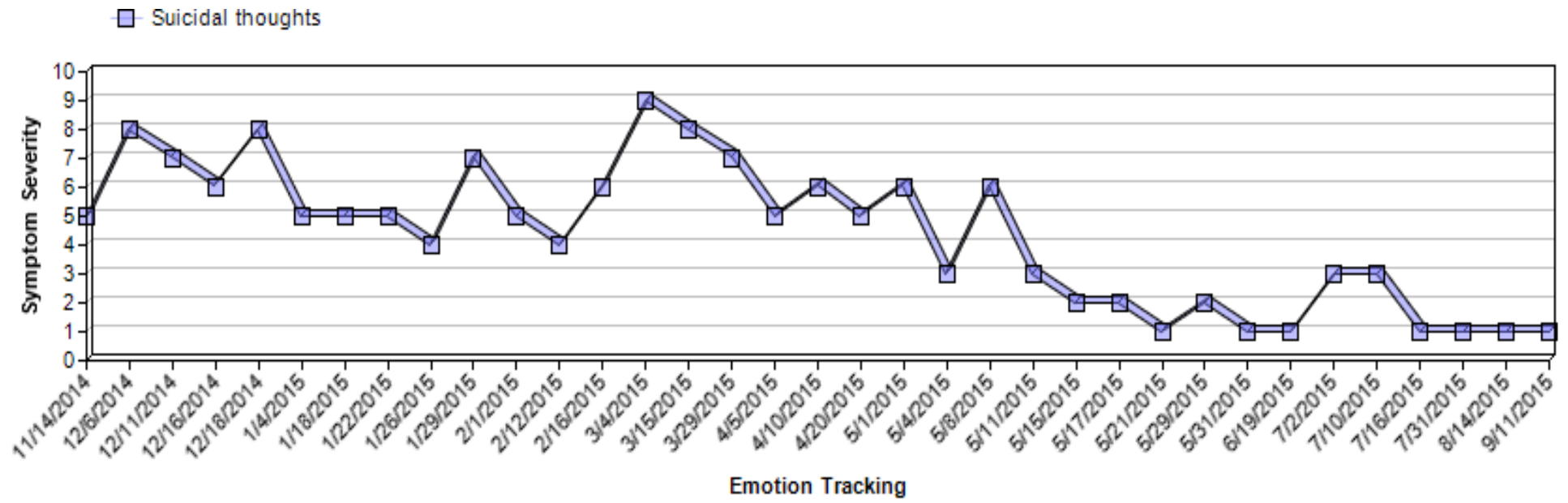


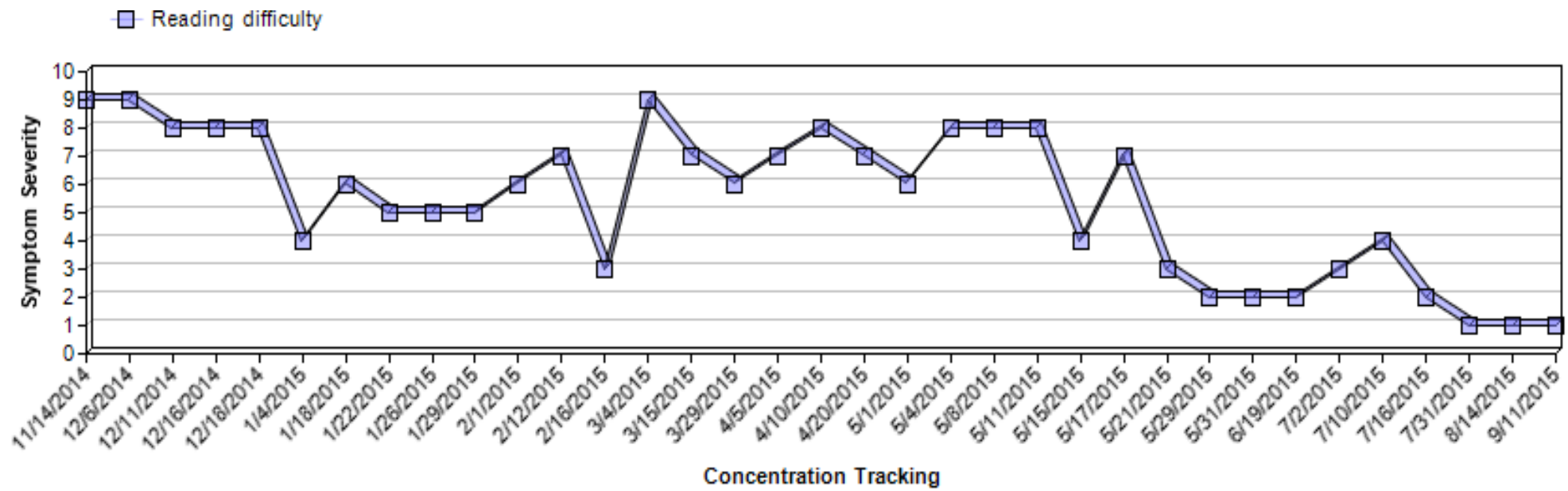


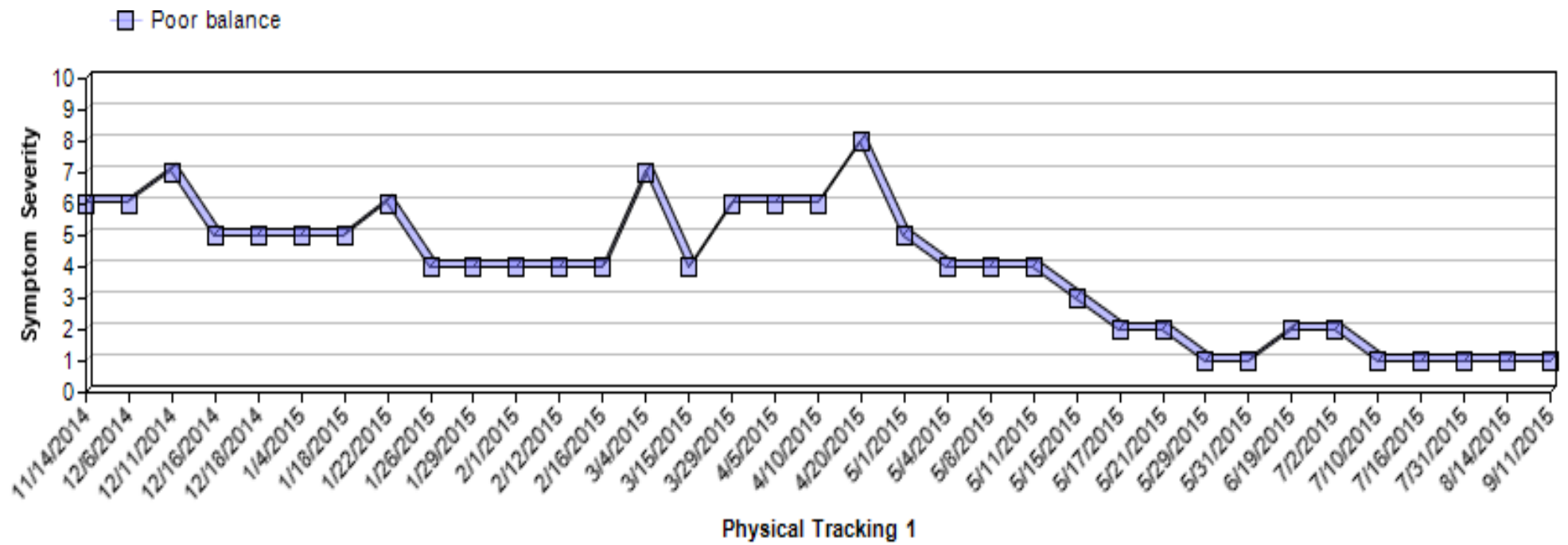












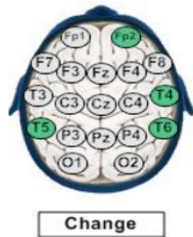
BRAIN MAP COMPARE TOOL

Download Report



40% Overall Change

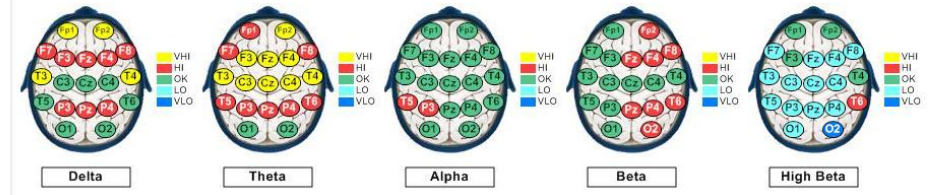
Top 4 - locations with highest change towards normalization



Magnitude - BBG 1 Dis (Eyes Closed) : 11/5/2014

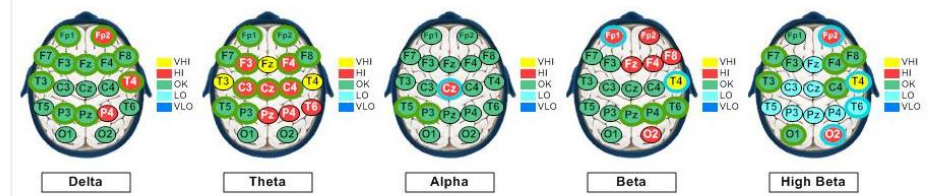
Change

Magnitude - BBG 1 Dis (Eyes Closed) : 11/5/2014



Magnitude Contrast
Down [-2] [-1] [0] [+1] [+2] Up
Click an adjustment level

Magnitude - BBG 2 Dis (Eyes Closed) : 3/4/2015



Magnitude Contrast
Down [-2] [-1] [0] [+1] [+2] Up
Click an adjustment level

Dominant Frequency - BBG 1 Dis (Eyes Closed) : 11/5/2014

BBG Compare 1 & 2 EC Dis 15 Sessions.pdf - Adobe Reader

File Edit View Window Help

Open [Icons] 3 / 4 125% [Icons] Tools Fill & Sign Comment

Dominant Frequency – BBG 1 Dis (Eyes Closed) : 11/5/2014

Delta Theta Alpha Beta High Beta

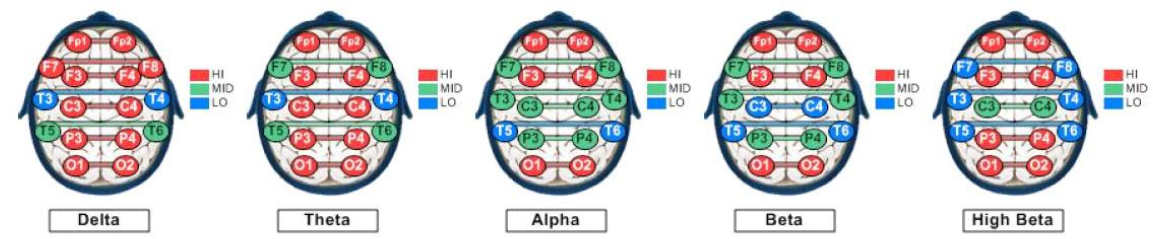
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Delta Theta Alpha Beta High Beta

Inter-Connectivity – BBG 1 Dis (Eyes Closed) : 11/5/2014

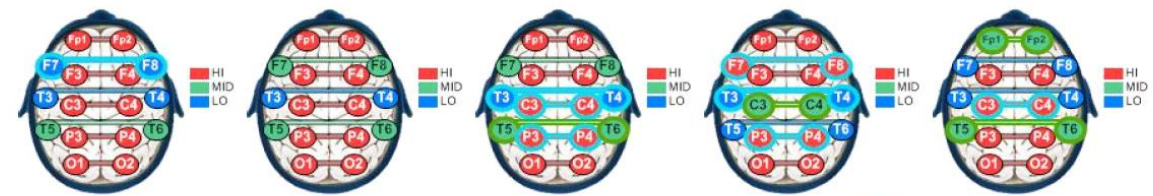
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Inter-Connectivity - BBG 1 Dis (Eyes Closed) : 11/5/2014



Inter-Connectivity - BBG 2 Dis (Eyes Closed) : 3/4/2015

Page 2 of 3



BBG Compare 1 & 2 EC Dis 15 Sessions.pdf - Adobe Reader

File Edit View Window Help

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Tools Fill & Sign Comment

Asymmetry – BBG 1 Dis (Eyes Closed) : 11/5/2014

Delta Theta Alpha Beta High Beta

Asymmetry – BBG 2 Dis (Eyes Closed) : 3/4/2015

Delta Theta Alpha Beta High Beta


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BBG Compare 1 & 2 EO Dis 15 Sessions.pdf - Adobe Reader

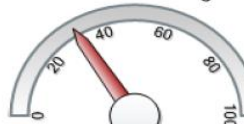
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% Reorganization



Overall % Change




% Normalization



32% Overall Change

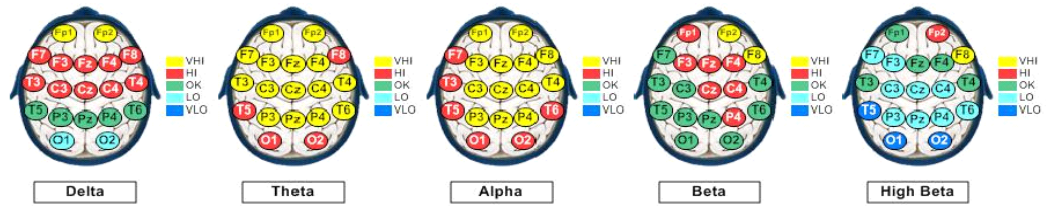
Top 4 – locations with highest change towards normalization



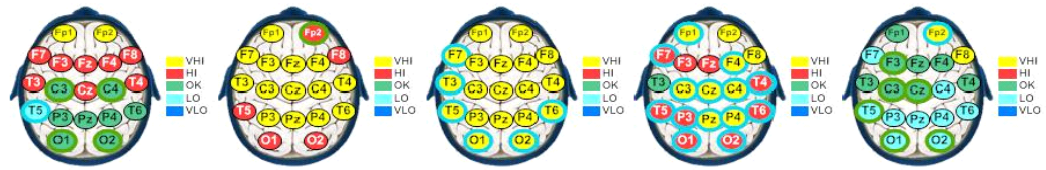
Change

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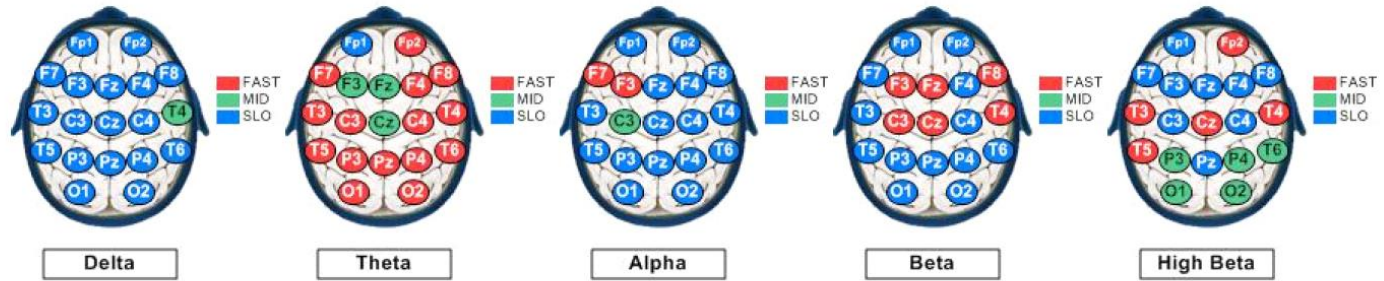
Magnitude - BBG 1 Dis (Eyes Open) : 11/5/2014



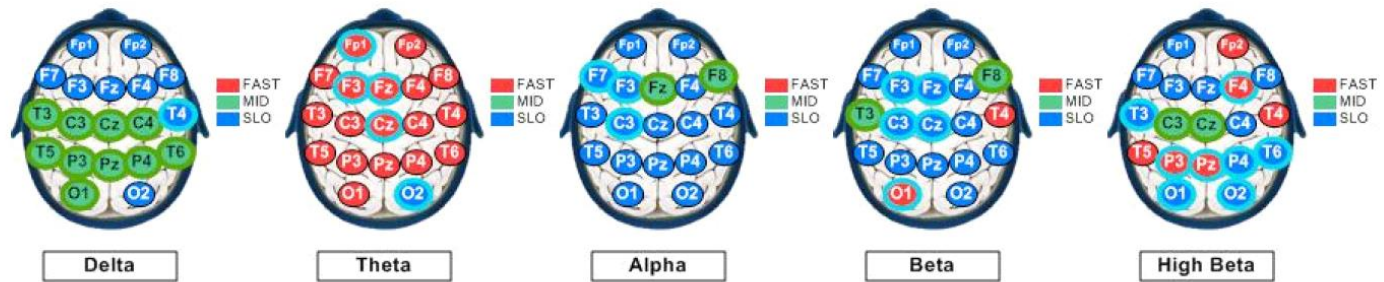
Magnitude - BBG 2 Dis (Eyes Open) : 3/4/2015



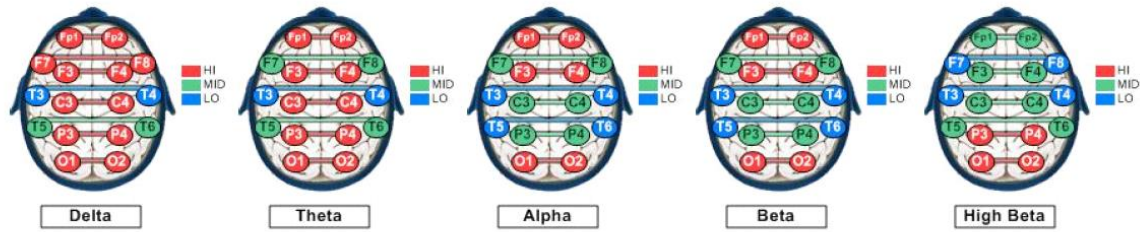
Dominant Frequency - BBG 1 Dis (Eyes Open) : 11/5/2014



Dominant Frequency - BBG 2 Dis (Eyes Open) : 3/4/2015

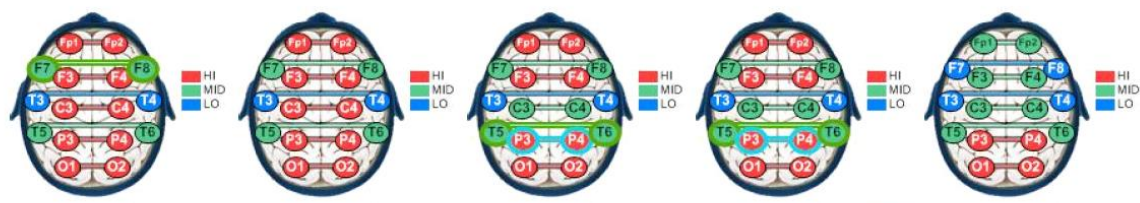


Inter-Connectivity - BBG 1 Dis (Eyes Open) : 11/5/2014

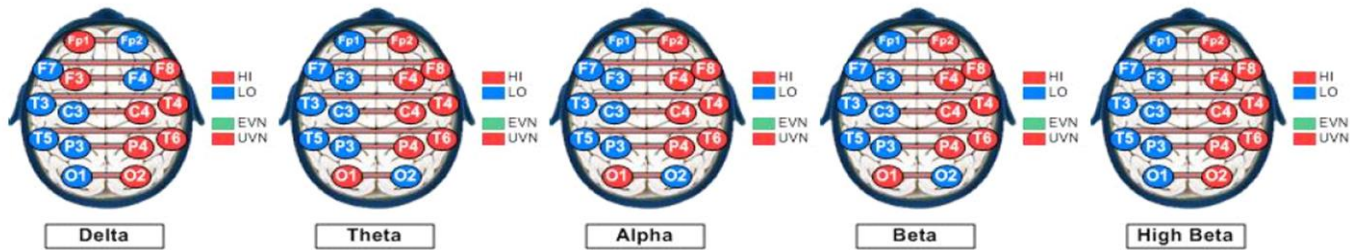


Inter-Connectivity - BBG 2 Dis (Eyes Open) : 3/4/2015

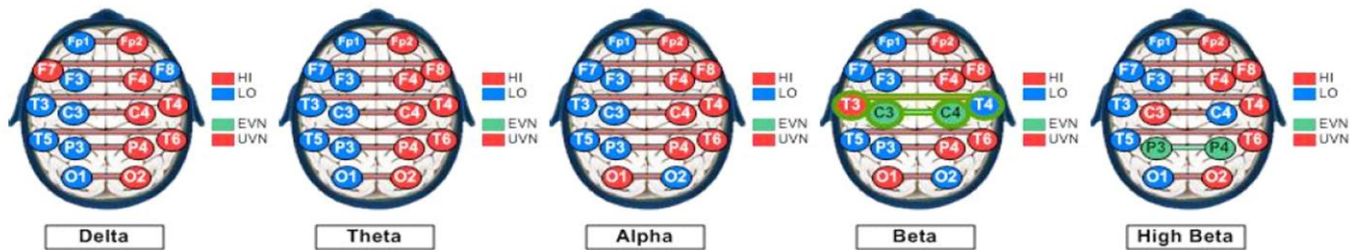
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Asymmetry - BBG 1 Dis (Eyes Open) : 11/5/2014



Asymmetry - BBG 2 Dis (Eyes Open) : 3/4/2015



American Red Cross Scheduling
Don't let this happen
Give blood this week. Help ensure immediate care for patients in need. It's 6 am. You sit with Mom in the



36% Overall Change

Top 4 - locations with highest change towards normalization



Change

BBG Compare 2 & 3 EC Dis 15 Sessions.pdf - Adobe Reader

File Edit View Window Help

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Delta Theta Alpha Beta High Beta

Dominant Frequency - BBG 2 Dis (Eyes Closed) : 3/4/2015

Delta Theta Alpha Beta High Beta

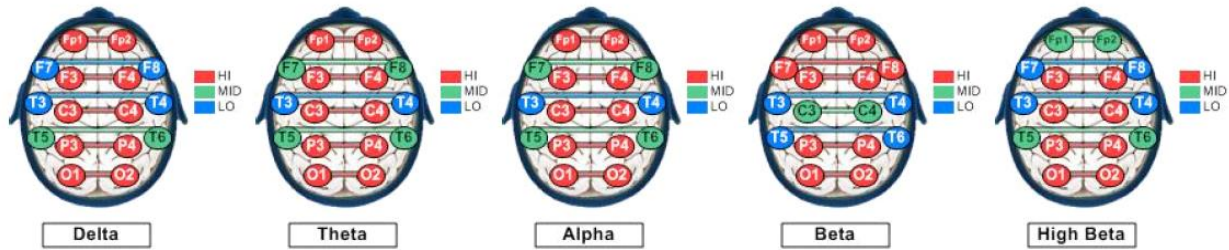
Dominant Frequency - BBG 3 Dis (Eyes Closed) : 3/16/2015

Delta Theta Alpha Beta High Beta

Inter-Connectivity - BBG 2 Dis (Eyes Closed) : 3/4/2015

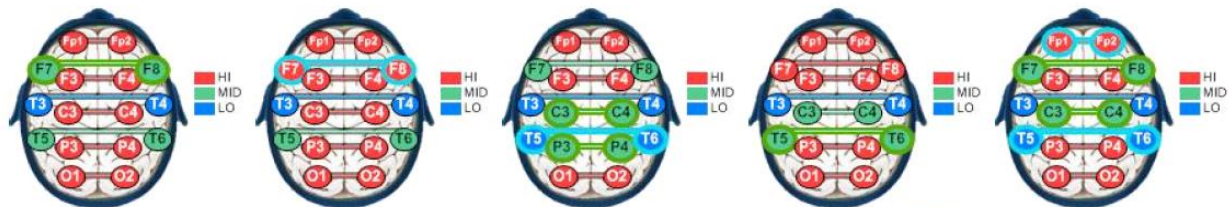
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11/3/2016

Inter-Connectivity - BBG 2 Dis (Eyes Closed) : 3/4/2015

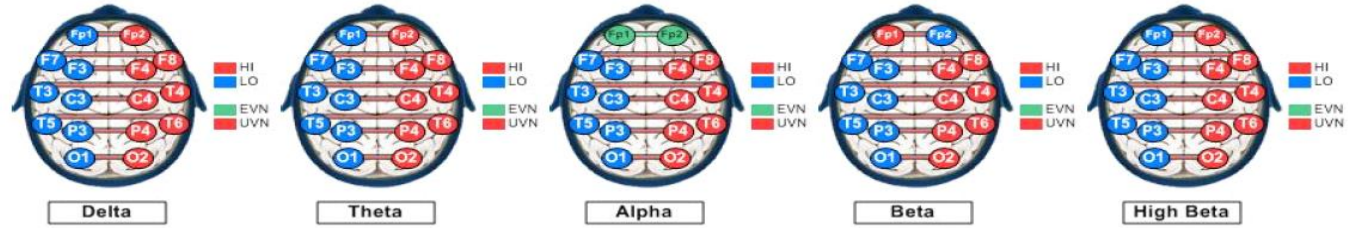


Inter-Connectivity - BBG 3 Dis (Eyes Closed) : 3/16/2015

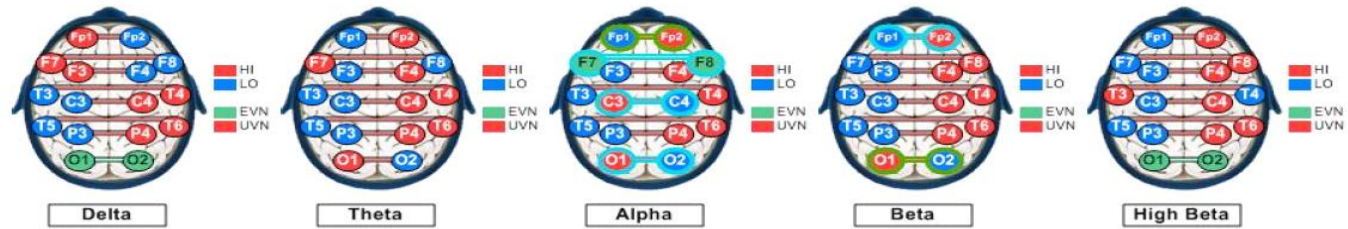
Page 2 of 3



Asymmetry - BBG 2 Dis (Eyes Closed) : 3/4/2015



Asymmetry - BBG 3 Dis (Eyes Closed) : 3/16/2015



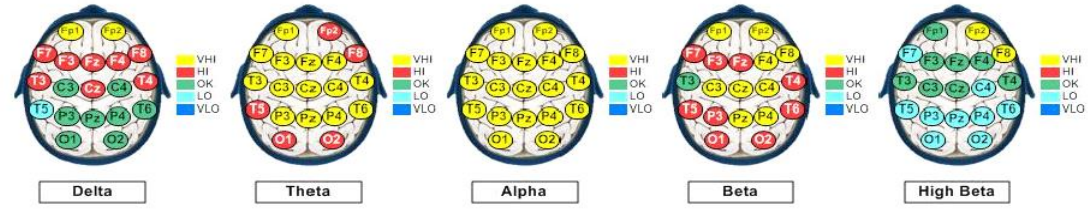


35% Overall Change

Top 4 – locations with highest change towards normalization

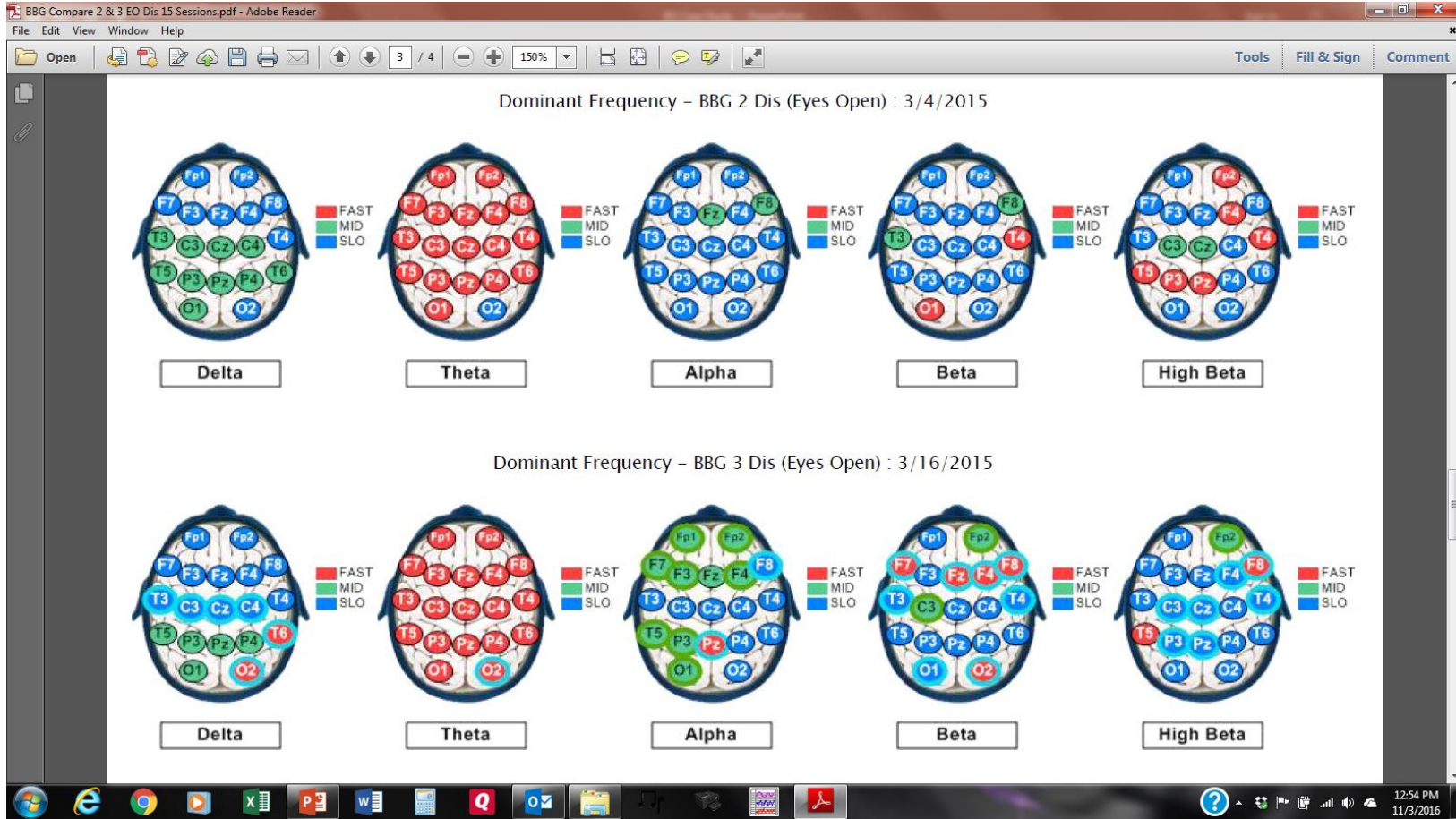


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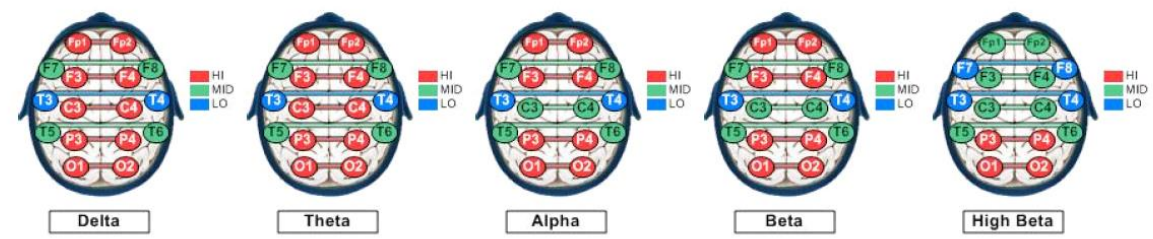


Magnitude - BBG 3 Dis (Eyes Open) : 3/16/2015

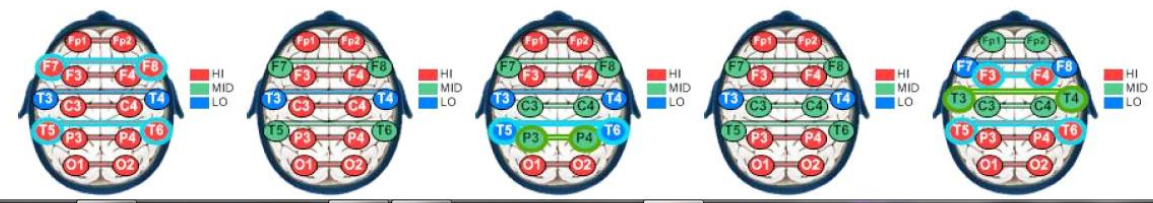




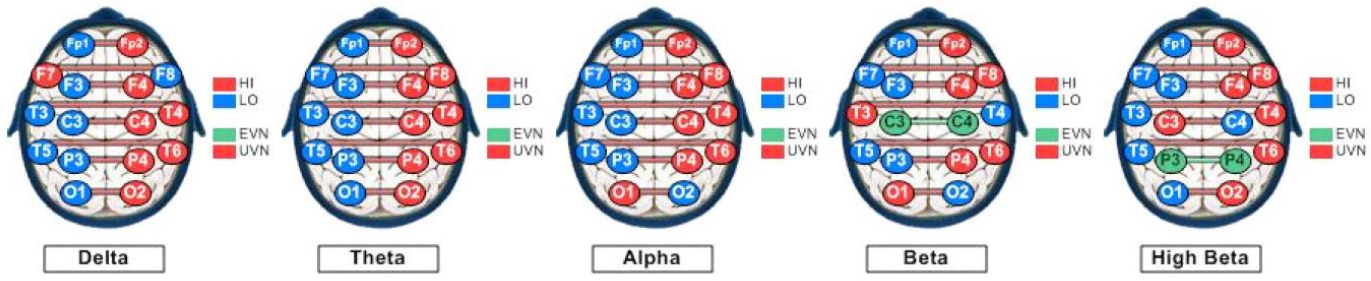
Inter-Connectivity – BBG 2 Dis (Eyes Open) : 3/4/2015



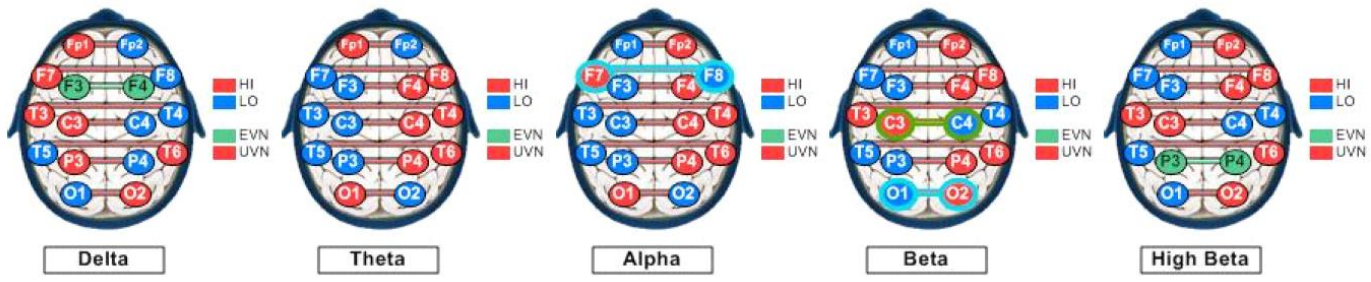
Inter-Connectivity – BBG 3 Dis (Eyes Open) : 3/16/2015



Asymmetry - BBG 2 Dis (Eyes Open) : 3/4/2015



Asymmetry - BBG 3 Dis (Eyes Open) : 3/16/2015



- 12/11/2014 13 hour day at work, able to complete work on time, did have 4 no show patients. Increased Lithium to 600 mg bid and added turmeric 500 mg bid
- 12/16/2014
- Friday was very good, Saturday was also decent with about an hour meltdown, Sunday I worked through a lot of stress and ended up with a good day, Monday was quite good, major meltdown Tuesday. Overall more good
- 12/18/2014
- I got over tired yesterday. Today was a 5:45 AM work day and things did not go well. Then I got a disturbing call from my MD, apparently I had left her a message that I completely do not remember. And I could not remember my meds as we spoke. Very upsetting.
- 01/04/2015 Managed well over holidays, able to breathe my way through rough periods. Usually able to regroup after difficult time and get back on track.
- 01/18/2015 Traveling a lot for work with a lot of stress, handling well. On days not working have very difficult time functioning

- 01/22/2015 Did well at work. Some intermittent periods of panic. Exhaustion at close of day. 01/26/2015 Stress from work and death in family
- 01/29/2015 Worked 3 shifts yesterday
- 02/01/2015
- Still very tired and irritable. Had a party and this made me very anxious and uneasy.. My son had friends over and they trashed my house after I had cleaned it up for my guests. This also threw me off. Still very unhappy about the medication change, adding Latuda.
- 02/12/2015
- Work was exhausting and overwhelming. I did pretty well there, but after the fact I was toast. In my defense, the other 2 people were also adversely affected. In fact one resigned. I am so exhausted, and next week looms much the same.
- 02/16/2015 Overextended between work and personal life. Worry regarding needed paperwork for insurance and work, concern with traveling into inclement weather.

- 03/04/2015 Unsure if information from yesterday was saved. When I fell I fell I have no memory surrounding the time. Still having HAs was very dizzy balance still off not good. Concentration terrible vision fuzzy at times. Tired too easy. So too depressed
- 03/15/2015
- I have managed to work, but with great difficulty. When working on projects it takes me an extended period to get myself settled and focused. Similarly at outset a great amount of error and correction. I have truly been quite depressed, and have had rushes of desperation. Once I get myself settled I can do quite well until I make a mistake, then I spiral into confusion
- 03/29/2015 I'm second week of night shifts, this destroys my focus and mood stability
- 04/05/2015 Focusing better at work, once it is over my thought process collapses. A good deal of fatigue. Able to keep going longer and more tolerant of situations that are stressful
- 04/10/2015 Definite improvement in voices, very shaky and had difficulty on computer. For example passwords, clicking on areas, staying focused on projects. A lot of anxiety

- 04/20/2015 My issues stem primarily from a fall I had on my bike on 4/17/2015. If I stay very still and keep myself calm with easy, rhythmic breathing, I am ok. When I get in crowds, move my head quickly, get too hot or cold, it collapses around me. I still have a HAcbut it is improving.?also a bit dizzy. Also just stiff and sore from a fall, road rash and whiplashed a bit. Improving because I am staying still and quiet as much as possible.
- 05/01/2015
- Been very busy, involved in stressful events. Usually vet anxious before and at the outset, then pull together, afterwards I collapse and/or am extremely anxious . Voices have diminished, periods of a few days between episodes. The panic attacks are new and extreme. However there are concrete things that initiate them, such as unplanned work assignments, stress helping my son in law, trying to locate and then help my BO brother in law, we are guardians, and in past month he has been evicted, in 2 psych wards, and low has left AMA and we cannot find him.

- 05/04/2015 Overall a good weekend. Accomplished a lot of non thinking chores and paddled for 3 hours. That was lovely. Could not get my work for my assignments done, no one available to help me with my printer. That is starting to build anxiety. I just used breathing techniques over the weekend , but now I am facing the assignment.
- 05/08/2015 Most issues stem from forgetting a job assignment. Ruled my life.
- 05/11/2015
- Over the past 3 days I have primarily enjoyed the activities in which I took part. Kayaking, hiking, family dinners, even tolerated shopping. There was an issue about work that threw me, and I did panic and started to swing. I think I have been mildly manic, two nights of restless sleep, a lot of activities. At this point I am let down, exhausted.
- 05/15/2015 Working very hard to stay centered and in the present. It is helping

- 05/17/2015 5 Managed to stay relatively calm despite being on Elon's campus. Since this is an extraordinarily stressful situation for me, this was an accomplishment.
- 05/21/2015 Excellent day at work. Sleeping a bit better. After work very fatigued
- 05/29/2015
- Wednesday and Thursday were stressful. Work issues primarily. I struggled, but got through. A little bit of voices/seeing things. That has been absent for a couple weeks. I did however just step back, and eventually they subsided. That is a positive step, that was the etiology of the other increases in symptoms.
- 05/31/2015 Reading for short periods of time. Very easily tired, this effects how I function. A lot of dread about work and upcoming events.
- 06/19/2015 Overall excellent

- 07/02/2015 I am struggling a bit, primarily as a result of a health issue. Monday I found out that I was in early kidney failure due to my lithium. This meant I have had to cutback the lithium. That could be making me depressed, or the concern over my kidney health, or more likely it is a combination. Regardless my mood has been more depressed and I have had more mood swings. All told I am holding my own.
- 07/10/2015
- Rough week. Lithium is at 40% of dose 10 days ago. A lot of mood swings with intense feelings. Have been able to reign them back in. I gave a lot of 4s to reflect that intensity, there was no place to reflect my ability to get back to a steady state. Used Alpha Stim daily except one day. I definitely feel it had a positive effect. My thought is in the next week that my moods will begin to stabilize, I expect the next decrease will come at my next MD appt on 7/29.
- 07/16/2015 All round the week was better. Some difficulty sleeping almost nightly. Definite mood issues and swings. Did well at work.

- 07/31/2015 Long , stressful trip in crowded conditions. Managed to maintain my composure by isolating myself as needed and breathing. Had 2 day severe migraine the past two days. Likely from pent up stress.
- 09/11/2015
- I worked a lot in a very stressful situation, hence the anxiety. Repeated difficulty falling asleep, this of course makes the subsequent day difficult. Overall good energy and able to function well, despite prolonged periods of anxiety.

Contact Information

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