Plexus Health & Wellness

SERVING AT THE POINT OF NEED

Do you need a "check up from the neck up?"

TBI Risks

- All contract sports
- Cheerleaders
- Car accidents
- Child abuse
- Military—PTSD
- Repetitive industrial noise (explosions)
- Low Vitamin D
- Spouse abuse
- Drug abuse

Inside This Issue:

"Researching the brain is like searching for the limits of our universe."

Unknown

Traumatic Brain Injury (TBI)

The brain is a complex part of an organ system that continues to humble the brightest minds.

Traumatic brain injury occurs when an external mechanical force causes brain dysfunction. Traumatic brain injury (TBI) usually results from a violent blow or jolt to the head or body. An object penetrating the skull, such as a bullet or shattered piece of skull, also can cause traumatic brain injury.

Mild TBI may cause temporary dysfunction of brain cells. More serious traumatic brain injury can result in bruising, torn tissues, bleeding and other physical damage to the brain that can result in long -term complications or death.

The movie *Concussion* was released in December 2015. The story line is about Bennett Omalu, MD, a pathologist who researched the result of repetitive trauma to the head. Initially, the NFL obstructed the release of the clinical condition known as Chronic Traumatic Encephalopathy (CTE). Many NFL players are suffering from this pathological state. Some suffering from CTE have committed suicide.

NFL players are not the only ones who are at risk for head injuries. Anyone who has participated in sports is at risk for a head injury. The sports most risky are those with repetitive head trauma, such as boxing, mixed martial arts, and football.

Cheerleaders often suffer head trauma while performing complicated airborne acts. Many of these head injuries are sustained during practice.

Wrestlers may suffer a mild concussion when thrown to the mat. Soccer players who frequently 'head' the ball suffer from this impact. Basketball players suffer many underreported head injuries.

Athletes are not the only ones to suffer head injuries. Those involved in car accidents, falling at home, hitting your head on a counter, and seemingly insignificant bumps to the head may cause a head injury.

In this issue, we will discuss some of the current imaging and diagnostic options for assessing brain health. Medicine continues to 'practice' while using scientific insights to unravel the mystery of TBI .

David MacDonald, DO
Medical Director
Plexus Clinic

Current Diagnostic Tools

A number of valuable tests of the brain are currently available: eg, PET scans, Functional MRI, SPECT Scans, and MEG. Unfortunately, these tests are costly and risk factors associated with the procedures. For example, consider the PET scan. A PET scan measures the metabolic activity of the brain and is a good test for localizing regions of altered activity within the brain. However, PET scans involve the injection of radioactive labels and are considered unsafe for repeated use over a short time period or with pregnant women and small children.

Importantly, recent studies have concluded that QEEG findings are highly correlated with other types of brain analysis. Moreover, with brain wave analysis, subtle brain dysfunction can be detected not discernible with other methods.

It is important to make a clear differentiation between QEEG tests of the brain and other commonly used, and perhaps more familiar, imaging techniques in medicine. For example, x-rays, CAT scans and MRIs are all used to measure brain anatomy, or structure.

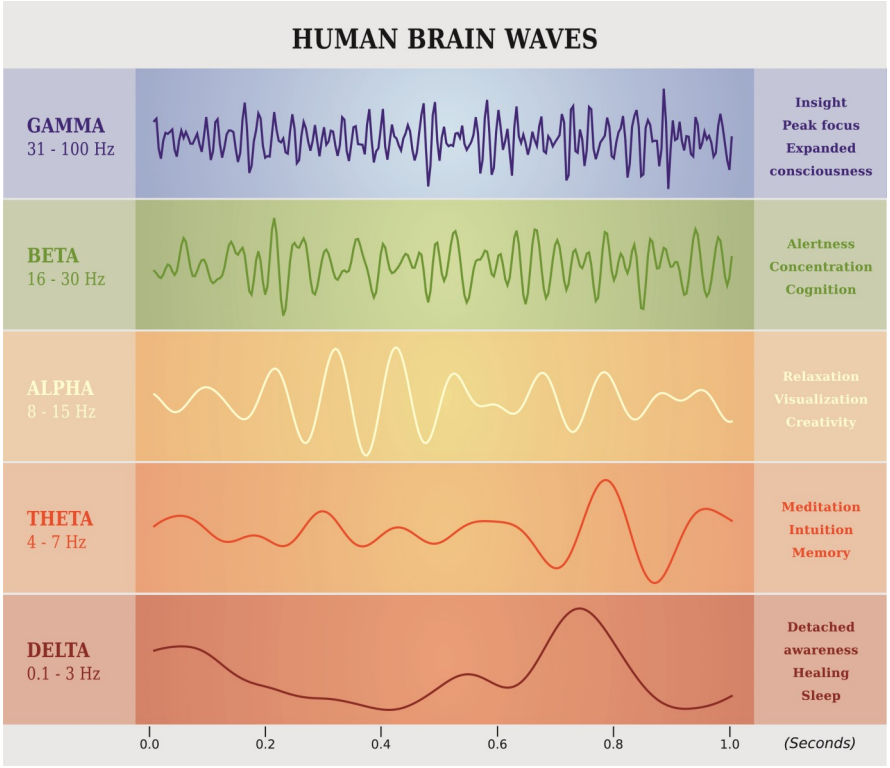
The QEEG, on the other hand, measures brain physiology, or function. the QEEG does not assess the structure of the brain, but rather, evaluates the manner in which a particular person's brain functions. It is not designed to diagnose tumors, epilepsy, or other structural medical conditions.

Research has found that QEEG has a high level of reliability that is equal or superior to routinely used clinical tests such as mammograms, cervical screenings, blood tests, MRI and CAT scans. A comprehensive literature review (Hughes & John, 1999) in the Journal of Neuropsychiatry and Clinical Neurosciences reported,

"Of all the imaging modalities, the greatest body of replicated evidence regarding pathophysiological concomitants of psychiatric and developmental disorders has been provided by EEG and QEEG studies."

What does the QEEG measure?

Quantitative EEG (QEEG) measures the electrical patterns present on the surface of the scalp. Accessed and analyzed through digital technology, these measurements primarily reflect cortical electrical activity or "brainwaves." Some brainwaves occur at faster frequencies, or wave speeds; some are quite slow.



The names of these EEG bands:

- ***Delta brain waves*** (1-3 Hz) are the slowest, highest amplitude brainwaves, and are present primarily during sleep or when in an empathetic state. Excess delta activity in the awake state is usually indicative of dysfunction.
- ***Theta waves*** (4-8 Hz) are present when daydreaming or fantasizing. At the same time, creativity and intuition are also associated with theta waves. This contrast occurs because theta waves occur at two levels: The lower range of theta (4-5 Hz) basically represents the twilight zone between waking and sleep. It is a profoundly calm, serene, floaty, drifty state. In this range, conscious intellectual activity is not occurring. It is also the range of frequencies produced in excess by children and adults with ADHD.
- ***Alpha waves*** (8-11 Hz) are slower and larger. They are associated with a state of relaxation and basically represent the brain shifting into idling gear, relaxed and disengaged, waiting to respond when needed. If one merely closes his or her eyes and begins picturing something peaceful, in less than half a minute there will be an increase in alpha brainwaves. Alpha is present typically when one feels at ease and calm or in a position to change one's mind efficiently and effectively in order to accomplish a task.
- ***Sensory Motor Rhythm*** (12-15 Hz) measured over the sensorimotor cortex are brain waves associated with mental alertness and readiness for action, combined with behavioral stillness.
- ***Beta waves*** (16 Hz and above) are small, faster brainwaves associated with a state of mental or intellectual activity and outwardly focused concentration. Beta waves are present when one is thinking, problem solving, processing information, or anxious.

Having made these differentiations among the various brain wave bands, it must also be pointed out that at any one time everyone has a mix of all those brainwave frequencies present in different parts of the brain. However research has shown that:

- **Awake state-** delta brainwaves also occur when areas of the brain go "off line" to take up nourishment.
- **Drowsy** - there are more delta and slow theta brainwaves present. If someone is inattentive to external events and daydreaming (internalizing), there is more low frequency 4-5 Hz theta present.
- **Anxious and tense-** excess high frequency beta activity is present.
- **ADHD, learning disabilities, and head injuries-** tend to have excess slow waves (usually delta, slow theta, and sometimes excess alpha). When excess slow wave activity is present in the executive (frontal) part of the brain, it is difficult to control attention, behavior, and emotions. Such persons may have serious problems with concentration, memory, controlling impulses and moods, or with hyperactivity. They can't focus well and exhibit diminished intellectual efficiency.

While all types of brain waves are always present regardless of the state of mind, the dominant frequency generally describes an individual's state of consciousness. No frequency is "better" or "worse" than any other. In fact, each is essential to healthy mental functioning. Problems arise when humans have the improper mix of frequencies for dealing with the task at hand.

The QEEG results are usually compared to a database of age-matched individuals. In addition the database may be detailed enough to compare those with similar medical histories. The benefit of comparing to a database is that suggestions for intervention are uniquely tailored according to the findings.

The ability for the brain to recover from a traumatic insult is called ***neuroplasticity.***

What is involved in obtaining a QEEG?

The data collection procedure begins with a simple, non-invasive procedure in which a clinician or qualified technician captures a sample of the raw electrical activity of the patient's brain, using an "electrode cap" with 10/20 electrode placement (see picture).

Sensors in the cap are electrically connected to the scalp by means of a gel that can be simply washed off with water after the data recording. The cap is connected to specialized medical equipment that amplifies the microscopic electrical signals that the patient's brain produces and sends those signals to a computer. A syringe with a blunt needle is used to squirt conductive gel into the sensors.

How long does it take?
There are two aspects to this test, one with the eyes closed and the other with the eyes open. There are six, one-minute segments to each test.

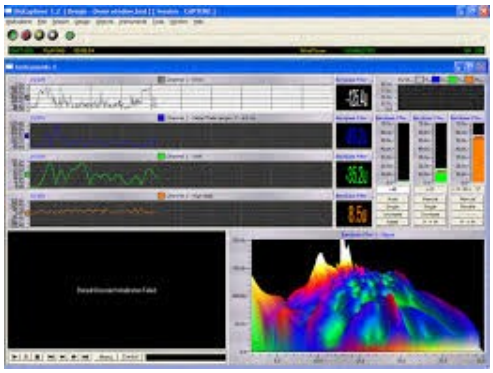
Is it painful?
No, it is not painful. However, it is important to sit still and avoid talking, chewing gum, and excessive blinking. *For some, sitting still can be painful :)*

May I go back to work/school?
Yes, you should be able to return to work or school. You will have to wash the water soluble gel out of your hair. We provide a hair dryer and towels in our clinic.

When will I know the results?
It takes approximately one week to review your results and write a report.

Online questionnaire -
It is important to complete the online questionnaire. We compare your perceptions with the computer findings.

Follow up visit -
During the follow up visit, we can discuss options to consider for maximizing your brain health. This usually includes nutritional support and at least 20 neuro-integration sessions.



What does a preliminary report look like?

"It always seems impossible, until it gets done." Nelson Mandela

False hope can be very disappointing. But real hope is invigorating. Regardless of where you are in life, or the extent of the brain injury, there is real hope that your brain may be able to improve dramatically.

Perhaps you are one who is curious about your brain health and would like to have a preliminary QEEG map. The picture to the right is what a preliminary reading may look like.

This map is an example of someone with learning challenges. The colors on the map indicate the level of activity. Green is the normal activity expected for the location represented. Red and yellow indicate too much activity. Blue indicates inadequate activity.

The information gained from a preliminary map may be useful in determining which supplements or brain exercises may be beneficial.

We will include a preliminary brain map with your initial visit at a discount, if you are interested. The example below is what you would receive with a brief report.

This brain map is from someone with learning challenges. You are looking down on the top of the head. The person is looking forward. The nose is in front and the ears are on each side.

The red circles point out too much activity on the left and front portion of the brain. This could be the result of an old injury. Based upon the findings from the more complete report, and a nutritional assessment, our goal would be to train this brain to achieve the appropriate balance between the delta, theta, alpha and beta waves throughout the brain.

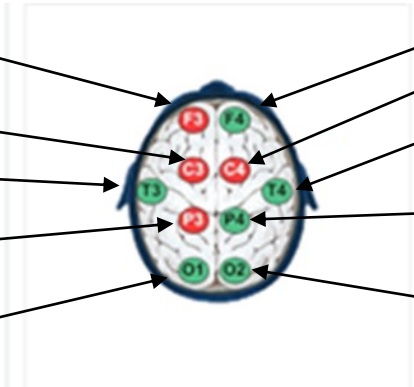
F3 – Working memory; facial recognition; planning/problem solving.

C3 – Sensory and motor function

T3- Language comprehension; long term memory; Amygdala area

P3- short term memory; self-boundaries

O1- Visual processing; Procedural memory; Dreaming



F4 – Short term memory; vigilance.

C4 – Sensory and motor function

T4 – Personality (emotional tone); Organization; Visualization; Auditory.

P4 – Visual processing; Personality (excessive self-concern; victim); Agnosia; apraxia; rumination.

O2 - Visual processing; Procedural memory; Dreaming

What can be expected if I pursue a QEEG and treatment?

If you decide to pursue with further evaluation and treatment of your brain, you can expect the following:

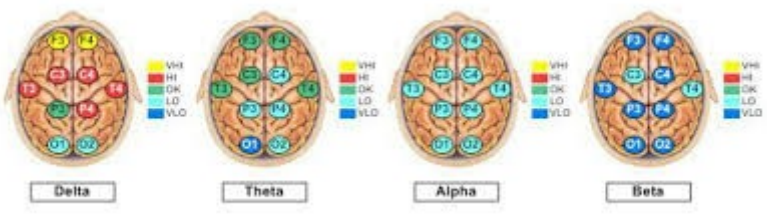
- Analysis of your QEEG (eyes closed and eyes open)
- Compare your perceptions to the QEEG findings.
- Complete a nutritional assessment and physical examination.
- Schedule you for 20 sessions. Each sessions lasts @ 20-30 minutes, but allow an hour to prepare and clean up afterwards.
- We will set the computer to monitor the activity of your brain by placing leads with gel on areas determined by your results.
- You will wear glasses that have either yellow, green , or blue lights. These lights will flicker at a frequency determined by the QEEG findings.
- You are monitored while watching a DVD, Netflix movie, or listening to music. We monitor your activity on a separate screen.
- You will probably have 5-10 sessions in one location and then another location is chosen, based upon the QEEG findings.

What are we monitoring?

The brain functions the best when the various brain waves are appropriately coordinated. We monitor the major brain waves (delta, theta, alpha, beta) and compare ratios between some of these brain wave frequencies.

Will I feel anything?

We use the lights from the glasses as the energy to train the brain. Some people are more sensitive than others to the different colors. We adjust the colors of the glasses and location, according to tolerance and progress.



Is this process painful?

No, it is not painful. In fact, because you may be enthralled in a movie, it is often challenging to pull people away when they are in the middle of an exciting movie.

What are my chances of seeing improvement?

The data base we use has more than 20,000 QEEG results. The average improvement is 30%. When we compare subsequent QEEG results, the ultimate goal is to achieve an improvement in learning, memory, mood adjustment, and help the brain to recover from traumatic injuries.

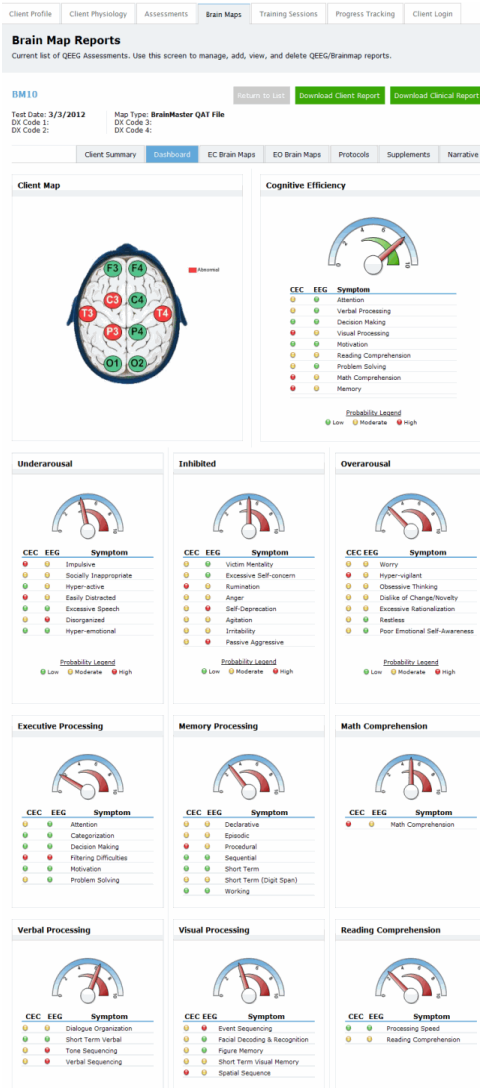
Will the changes persist?

It is impossible to guarantee permanent changes. However, in our experience, the progress we see is not lost in future QEEG recordings. In essence, the changes 'stick.'

How many sessions are needed?

Most people need at least 20 sessions. Because of the progress noted, you may decide to continue with more sessions.

Note: We tailor supplements that help the brain to recover. The combination of supplements and neuro-integration enhance the effectiveness of each other.



Plexus Clinic focuses on getting the root cause of illness. Each person is an individual with individual needs. Carolyn Hoffman,ND and I enjoy helping people get healthier. QEEG and neuro-integration is one of the tools we use to improve health. It is not surprising to see those suffering from depression, anxiety, PTSD, and ADHD improve without medication. We look forward to the opportunity to serve you.

David C. MacDonald, D.O.
Medical Director, Plexus Clinic