# Brain Injury Problems

There are many issues Dr. Thomas has encountered in his 35 years of dealing with brain injured patients. Some are perplexing, some are maddening, and most are challenging to many clinical assumptions. No one is going to have all of these problems, but many may have several.

**Anosognosia**. Anosognosia refers to a condition in which the patient denies the deficits, which have occurred as a result of a brain injury. This is true for other kinds of brain dysfunction, and a whole book has been compiled on this subject entitled The Study of Anosognosia by George Prigatano (2010), with a chapter on traumatic brain injury. For example, a person with memory problems might say when confronted, "Oh, someone distracted me," or "I was in a hurry." If the person has a memory problem, they might use the same excuse many times.

Mild head injury is often mistaken for other disorders, particularly psychiatric. It is sometimes hard for other healthcare professionals to appreciate that mild head injury symptoms are not due to some other psychiatric disorder such as depression or a psychosomatic disorder. Many medical tests, including magnetic resonance imaging (MRI), computed tomography (CT) scans, the standard neurological exam, and Mini-Mental Status Exam do not show findings, thus resulting in a conclusion of “no findings.” Several times in my practice, the MTBI patients have told me that right after the first session that they have said to themselves: "Thank God I have brain damage." This is because their symptoms were very perplexing to them, and they thought they were going crazy. Now they know there is a comprehensible explanation. With mild brain injury, many people look and act the same as most people — but internally they know they are not quite right, and that they have changed and are less capable than before. For many people, this is maddening. New technologies such as single-photon emission computed tomography (SPECT) scans, diffuse tensor imaging (DTI) and quantitative electroencephalograms (QEEG) can show that mild brain injuries are real and that the symptoms a patient experiences have a physiological basis.

**Clouded Consciousness.** After a brain injury many patients describe that they are in a fog or something that has been called “clouded consciousness.” Another way of looking at this is to imagine a cloud or gauze over your consciousness. One of the consequences might be poor working memory (e.g., doing mental calculations or remembering directions or doing novel reasoning tasks). In some patients this problem can go on for years. It is my belief that neurofeedback and sophisticated nutritional supplements could help clear up clouded consciousness.

S/**He is the same but different.** It is common for relatives of a person with a brain injury to say that s/he is the same person but different. Indeed, the brain injured patient is the same person, with many of the same characteristics of personality. But there are differences, most commonly with regards to behavior (being more impulsive, or more irritable), as well as cognition (more forgetful, word finding problems, weaker problem solving ability), and there may be more sensitivity to sound, lighting, criticism, and getting sick.

**Realistic paranoia**. Consider if a brain injured person is interacting with others, but s/he is not processing the interactions fully or accurately (poor input). Also consider that the same brain injured person is not expressing him/her self well in interacting with others (poor output). This frustrating situation can result in the person feeling as if the world is working against them, and to some extent this is true. Add to this mix the denial of symptoms (anosognosia), and you can have the TBI patient becoming quite frustrated: the world is not treating him/her fairly, or people are even out to get the patient. In a sense, this is true.

**Returning to former activities.** In the beginning stages of recovery from a brain injury, a person may feel like their life is returning to normal. Some people jump back into former activities, or even work duties full time, with more gusto than they should. Some aspects of their cognition may not be working so well, but this is either not recognized or denied (see anosognosia, above). If the demands of that former activity are high level, the person may experience failure, and the patient can be crestfallen, and very discouraged regarding their recovery. The remedy is to predict this in advance and explain to the patient that small steps should be taken in returning to former activities, especially if the activities are demanding either in intellectual processing or in the amount of time spent on the activity. It is important to keep seeing the therapist who is experienced in brain injury so the patient has a support system.

**Afternoon fatigue and extra sleep.** A common symptom in brain injury is extreme fatigue, especially in the afternoon. This is a fatigue that is so strong, the patient might describe it as "if a truck ran over me." It is not the usual fatigue that many of us have towards the end of the day; it is a fatigue that is qualitatively different. I have successfully helped patients deal with this fatigue by teaching them the Benson Relaxation Response (Benson, 2000), which is a very simple way to meditate 20 minutes, twice per day. This can effectively combat this very common problem. Extra sleep, even up to 12 hours per day, can be common in the first several years of recovery.

The mild brain injuries can be the most maddening. Mild brain injuries will often result in negative findings with regard to almost all brain imaging tests, neurological evaluations, and even detailed neuropsychological batteries ("We found nothing wrong"). When there are no physiological findings from these supposedly authoritative medical sources, the default conclusion in these cases is that it must be psychiatric, emotional, and/or psychosomatic — "it's in your head," an ironic phrase. It has been discussed above that new technologies may allay these misinterpretations. In addition, Diffuse Tensor Imaging (DTI) or a QEEG evaluation with a mild traumatic brain injury discriminant function indicator (as in NeuroGuide) may at least give the patient some validation and understanding of their condition. Also, if a thorough neuropsychological evaluation is done, it is rare that the mild brain injury patient will have a totally normal profile.

**Shifting the goal posts.** As improvement happens, the patient may shift their standard of improvement to a higher goal than when they started. This could also be termed Not Recognizing Getting Better. Sometimes asking a close relative is one way to point this out. "Ask your wife if you are better." Another solution is to use rating scales in which the spouse or significant other can rate the person every few weeks or month. Two rating scales in which a significant other can rate the patient are the Behavior Rating Inventory of Executive Function-Adult Version (Roth et al, 2006), or Frontal Systems Behavior Scale (Grace & Malloy, 2001).

High level pre-morbid patients. If a person has had a high level of pre-morbid intelligence, they are more likely to sense the seemingly small changes in their higher level cognitive abilities. So if a very smart person scores in the average range on measures of executive function (e.g., Tower of London, Stroop, Wisconsin Card Sorting tests), this probably indicates a decline in functioning, and can help explain their disappointment in their perceived decline in cognitive functioning. Designing executive functioning exercises can be a focus of treatment. One source is the text The Rehabilitation of Executive Disorders by Michael Oddy and Andrew Worthington (2009).

Initiative problems. One of the strange aspects of many TBI patients is frontal lobe damage, which has several common symptoms, one of which is the inability to “start” themselves. A patient can know they must take out the trash. And the trash is in front of them, all ready to go. They cannot start themselves. Someone says, "You can take out the trash now," and the job gets

done. It is as if the starter wires of the car are broken. The patient needs to borrow the frontal lobe of the therapist (or relative) as a jumper cable to get started.

**Become skilled at behavioral management/behavior therapy.** To whatever extent the field of neurofeedback can repair brain damage, it does not necessarily help the patient to develop new skills. I conceptualize neurofeedback as helping enhance the capacity of the brain. What is often needed is for patients to bring that new capacity into their lives. The therapist who knows about behavior therapy can be very helpful to many TBI patients utilizing their growing capacity of functioning. Behavior therapy is often helpful in providing specific steps, often small steps, in an overall plan of goal achievement.

**Cognitive remediation can helpful.** This area of treatment is usually done by neuropsychologists, and sometimes by other professionals such as occupational therapists or speech pathologists. Even though many in the field of neurofeedback have pointed out that the benefits of cognitive remediation are modest, some exercises to help improve the deficits found in detailed neuropsychological assessments can be helpful to the brain injured patient. Some introductory texts of cognitive remediation include Sohlberg and Mateer (2001), Raskin and Mateer (2000), and Sohlberg and Turkstra (2011). However, Thornton’s model of doing neurofeedback while doing a cognitive task in order to improve specific cognitive abilities has been shown to be effective (Thornton, 2000, 2014; Thornton & Carmody, 2009, 2010). The Tinius and Tinius (2001) method is another method of doing cognitive remediation while doing neurofeedback.

Now go do something challenging. A journalist patient with a non-verbal learning disability wanted to become better at noticing visual details because he was covering political leaders and he wanted to understand their gestures. His non-verbal learning disability was diagnosed by me and his right parietal area needed training (supported by QEEG findings). So while training P4 and T6, I had him solve visual puzzles of noticing visual details (Fort, 2008). His abilities improved a great deal; he came in one session and reported that he could arrange his closet, which had eluded him his whole life. Another time he reported enjoying the emotions of classical music. Both of these areas involve right parietal functioning. It occurred to me that I was increasing the capacity of the right parietal area of his brain, and he was bringing that capacity into other areas of his life. He was taking the training and generalizing to other functions. Generalization has always been problematic in psychotherapy and in any form of mental health growth. And so I often say to neurofeedback patients with cognitive problems, "As soon after this session as possible, do something that has been challenging for you." They can often do it better, and this can help with generalization.

**You may not come back to your previous level of functioning.** Many, if not most patients, want to return to their previous level of functioning, i.e., total recovery. With very mild traumatic brain injuries, this is a possibility but unlikely. With most TBI patients they will have to adjust to their situation or plan to be on a long-term campaign of learning what was once easy. This campaign would include making improvements of behaviors and emotional management in several areas, and with a ruthless honesty about what is needed to recover.

**With recovery, depression may emerge.** As mild TBI patients recover, they may become acutely aware of what they have lost, thus leading to symptoms of depression. They will become aware of what they cannot do, and this is very frustrating, especially for bright people. It is here that cognitive remediation can play a role, as well as the behavior therapy concept of graduated steps in learning new tasks (which may have been easy before the accident). The link between improvement and the depression symptoms may not be clear, so the therapist needs to supply this insight, which might help alleviate the demoralization of the mild TBI patient.

**Bright people notice their deficits more than average levels of intelligence.** When bright people have a mild brain injury, they notice the decrements much more than the average person. Because of this, it is likely that bright people will tend to search harder than most in trying to find solutions to their problems, thus a biased sample may appear for neurofeedback treatment. They also know that the so-called research criteria of randomized, double-blind, placebo controlled studies independently replicated may not yet be available, even though many good studies exist supporting the science of neurofeedback.

**The Next Developments in the Neurofeedback Treatment of Traumatic Brain Injury**

The progression of the field of neurofeedback went from training single sites, then pairs of sites, then the connectivity variables between two sites (e.g., coherence), then many sites (Z-score training), and finally reaching into the subcortical areas of the brain (LORETA). Added to training multiple sites is Thornton’s model of doing neurofeedback while doing a cognitive task in order to improve specific cognitive abilities (Thornton, 2000, 2014; Thornton & Carmody, 2009, 2010) and the Tinius and Tinius (2001) method of doing actual cognitive remediation while doing neurofeedback. The complexity of providing neurofeedback has increased, in the number of sites, and in other ways. We have an interesting future in this field, one that can benefit people who have never before had such an opportunity.

**References**

Benson, H. (2000). The relaxation response. NY: HarperTorch.

Fort, H. (2008). Brain games #2 picture puzzles. Lincolnwood, Ill: Publications International.

Grace, J., & Malloy, P. (2001). Frontal systems behavior scale. Lutz, FL: PAR, Inc.

Powell, J., Ferraro, J., Dikman, S., Temkin, N., & Bell, K. (2008). Accuracy of mild traumatic brain injury diagnosis. Archive of Physical Medicine and Rehabilitation, 89(8), 1550-1555.

Prigatano, G (Ed.) (2010) The study of anosognosia. New York, NY: Oxford University Press.

Prodan, C., Vincent, A., & Dale, G. (2014). Coated-platelet levels are persistently elevated in patients with mild traumatic brain injury. Journal of Head Trauma Rehabilitation, 29(6), 522-526.

Raskin, S & Mateer, C. (2000) Neuropsychological management of mild traumatic brain injury. New York, NY: Oxford University Press.

Roth, R., Isquith, P., & Gioia, G.(2005). Behavior rating inventory of executive function—adult version. Lutz, FL: PAR, Inc.

Sohlberg, M., & Mateer, C. (2001) Cognitive rehabilitation. New York, NY: Guilford.

Sohlberg, M., & Turkstra, L. (2011). Optimizing cognitive rehabilitation. New York, NY: Guilford.

Thomas, J & Smith, M (in press). Neurofeedback for traumatic brain injury: Current trends. .

Thornton, K. (2000). Improvement/rehabilitation of memory functioning with neurotherapy/QEEG biofeedback. Journal of Head Trauma Rehabilitation, 15(6), 1285-1296.

Thornton, K. (2014) The role of the quantitative EEG in the diagnosis and rehabilitation of the traumatic brain injured patient. In S. Slobounov & W. Sebastianelli (Eds.), Concussions in athletics: From brain to behavior (pp. 345-362). New York, NY: Springer.

Thornton, K., & Carmody, D. (2008). Efficacy of traumatic brain injury rehabilitation: Interventions of QEEG-guided biofeedback, computers, strategies, and medications. Applied Psychophysiology and Biofeedback, 33(2), 101-124.

Thornton, K., & Carmody, D. (2009). Traumatic brain injury rehabilitation: QEEG biofeedback treatment protocols. Applied Psychophysiology and Biofeedback, 34(1), 59-68.

Thornton, K., & Carmody, D. (2010). Quantitative electroencephalography in the assessment and rehabilitation of traumatic brain injury. In R. Carlstadt (Ed.), Handbook of integrative clinical psychology, psychiatry and behavioral medicine: Perspectives, practices, and research (pp. 463-508). New York, NY: Springer.

Tinius, T., & Tinius, K. (2001). Changes after EEG biofeedback and cognitive retraining in adults with mild traumatic brain injury

and attention deficit disorder. Journal of Neurotherapy, 4(2), 27–44.

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