The author describes the clinical challenges in treating individuals with traumatic brain injury, typical patterns in patient behavior and symptoms, and pragmatic treatment strategies. Neurofeedback retraining of brain activation patterns can mitigate many of the cognitive deficits in traumatic brain injury. A broad understanding of brain function and knowledge of specific behavior therapy and cognitive remediation strategies is recommended for practitioners providing treatment to individuals with brain injury.

As I was preparing the Thomas and Smith article in this issue (Thomas & Smith, 2015), I thought it would be valuable to share some of my experience in my 35 years of dealing with brain-injured patients. Some are perplexing, some are maddening, and most are challenging to many of our clinical assumptions about the usual patients we see with psychological problems.

These issues can influence the progress of the rehabilitation of patients with traumatic brain injury (TBI), and are described briefly below. I do not have great solutions to some of the more vexing clinical issues, but it might be helpful to articulate the problems and pool our thoughts. Even if neurofeedback is successful in improving cognitive and behavioral symptoms, some of these issues may remain a challenge to our therapeutic work.

**Anosognosia.** Anosognosia refers to a condition in which patients deny the deficits that have occurred as a result of brain injury. This is true for other kinds of brain dysfunction, and a book has been compiled on this subject entitled *The Study of Anosognosia* by George Prigatano (2010), with a chapter on TBI. For example, people with memory problems might say when confronted, “Oh, someone distracted me,” or “I was in a hurry.” Those with a memory problem might use the same excuse many times. I am sure those who have dealt with TBI patients can add many such stories.

Mild head injury is often mistaken for other disorders, particularly psychiatric. It is sometimes hard for other healthcare professionals to appreciate that the mild head injury symptoms are not due to some other psychiatric disorder such as depression or a psychosomatic disorder. Many medical tests, including the MRI, CT scans, the standard neurological exam, and Mini-Mental Status frequently do not show findings, thus resulting in a conclusion of “no findings.” Several times in my practice, the mild TBI 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 other people in most ways—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.

They are the same, but different. It is common for relatives to say that the brain-injured person 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). In addition, these individuals are often more sensitive to sound, lighting, criticism, and getting sick.

**Realistic paranoia.** Consider situations in which individuals with brain-injury are interacting with others, but are not processing the interactions fully or accurately (poor input). Also consider that the same brain injured individuals are not expressing themselves well in interacting with others (poor output). This frustrating situation can result in the individuals 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 TBI patients can become
quite frustrated: The world is not treating them fairly, or
people are even out to get them. In a sense, this is true.

Returning to former activities. In the beginning stages of
recovery from a brain injury, individuals with TBI may feel
like their lives are 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, they may
experience failure; the patients can then be crestfallen and
very discouraged regarding recovery. The remedy is to
predict this in advance to the patients and explain 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. It
is important to keep seeing the therapist who is experienced
in brain injury so the patients have a support system. And,
the worse the injury, the more slowly one should return to
demanding activity, with the caution that the patients may
never return to the former level of functioning.

Afternoon fatigue and extra sleep. A common symptom in
brain injury is extreme fatigue, especially in the afternoon.
This is a fatigue so strong that patients can describe it as
“like a truck had run 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 min, twice per day. This
exercise can effectively combat this very common problem.
Extra sleep, even up to 12 hr 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 misinterpreta-
tions. In addition, Diffuse Tensor Imaging or a quanti-
tative electroencephalography (QEEG) evaluation with a
mild TBI discriminant function indicator (as in Neuro-
Guide) may at least give the patient some validation and
understanding of his or her condition. NeuroGuide,
developed by Applied Neuroscience, Inc. (www.
appliedneuroscience.com), provides a methodology for the
computerized analysis of quantitative electroencephalogra-
phy, allowing any patient’s electroencephalogram (EEG) or
QEEG data to be analyzed in comparison to patterns present
in a database of EEG data on normal and clinical
populations. Also, if a thorough neuropsychological eval-
uation is done, it is rare that mild brain injury patients will
have a totally normal profile. One must choose a
psychiatrist carefully who is working with the patient with
mild TBI; hopefully the doctor will have some experience in
this area.

Shifting the goal posts. As improvement happens, patients
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, Isquith, & Gioia, 2005) and the Frontal Systems
Behavior Scale (Grace & Malloy, 2001). By using such
rating scales, progress can be documented; this can be useful
for clinical purposes as well as demonstrating progress to
third parties (e.g., insurance companies).

High-level premorbid patients. If individuals with TBI had
a high level of premorbid intelligence, they are more likely
to sense the seemingly small changes in the higher level
cognitive abilities that result from the mild TBI. So if a very
smart person scores in the average range in frontal lobe
tests (e.g., Tower of London, Stroop, Wisconsin Card
Sorting tests), this probably indicates a decline in function-
ing, and can help explain the individual’s disappointment in
the 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 Oddy and 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. Individuals with TBI may know they must do
something such as take out the trash, and the trash is right
there, all ready to go. However, the patients 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 patients need to borrow the frontal lobe of the therapist (or relative) as a jumper cable to get started. This phenomenon can help explain why TBI patients frequently have a hard time getting things done, and why they often develop clutter in their homes.

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

**Cognitive remediation can be helpful.** This area of treatment is usually done by neuropsychologists and sometimes by other professions such as occupational therapists and 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. 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 nonverbal learning disability wanted to become better at noticing visual details because he was covering foreign political leaders; he wanted to understand their gestures. His nonverbal learning disability was diagnosed by me, and his right parietal area needed neurofeedback training (this recommendation was supported by QEEG findings). So while I used neurofeedback to retrain the P4 and T6 areas of the cortex (P4 and T6 are parietal and temporal areas of the cortex, as localized using the international 10–20 system of electrode placement), I had him solve visual puzzles involving noticing visual details (using Fort, 2008). His abilities improved a great deal, and his goal of meeting his job demands was met. Interestingly, he came in one session and reported that he could now arrange his closet, which had eluded him his whole life. Another time he reported enjoying the emotions of classical music much more than previously. 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 benefits of training and generalizing them to other functions. Generalization has always been problematic in psychotherapy and in any form of mental health growth. Thus 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 it will help generalize their brain functioning into their lives.

**Implications of Clinical Issues in the Treatment of TBI**

It is likely that many neurofeedback practitioners should develop clinical awareness and treatment methods for the unique issues pertaining to patients with TBI. A few of these have been sketched out above. Cognitive remediation sources have been mentioned. A few recent books on the issues of mild TBI from neurofeedback-friendly clinicians can also be helpful (Esty & Shifflett, 2014; Stoler & Hill, 2013); these books can also provide many resources for patients. Implicit in this article is that the neurofeedback professional should have a broad understanding of TBI patients—they can be some of the most difficult patients in the world of healthcare. Despite the likelihood that neurofeedback may benefit the TBI patient more than has been previously available, other treatment modalities may be very helpful and some symptoms may remain. We should equip ourselves with as many relevant skills as possible to help our TBI patients.

**References**


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