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The Complex Architecture of a Traumatic Brain Injury Part II

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Introduction

Our brains are capable of thinking and feeling, making memories and recovering them, making decisions and solving problems, and observing, finding, and processing new information (to name just a few of its important functions). Our brains are also capable of processing all this information determining what is essential, what's not essential, and what information is connected to what is already there. And when the brain does all of this, it increases our survival every step of the way. But what happens when the brain does not recognize or process information because of injury, illness, or disease? And what happens to the person who is not able to recognize and process the internal and external information around them? The subject matter of this article explores this question. When I began working with professional athletes 8 years ago, I was introduced to the number of head injuries suffered by athletes in all professional sports (particularly football, ice hockey, basketball, baseball, and soccer). I was not prepared for the brain damage these athletes were incurring, nor for the number of patients who began showing up in my office with unrecognized and untreated trauma to the brain/mind. In the beginning of this journey I was receiving referrals from a law firm that specialized in working with professional athletes and traumatic brain injuries through Workman's Compensation cases. At the that time, I began researching each of these cases to understand more about the impact on the brain of concussions, strokes, seizures, infections in the brain, illness and disease in the brain, and problems with major mental illness. Over the next few years, I began constructing a model (The Complex Architecture of a Traumatic Brain Injury) that would explain exactly what happens to the brain/mind when it is traumatized. [1] This model explains the neurodegeneration progression of trauma to the brain/mind in 4 Architectures:

Traumatic Shock

Damage to the Electrical and Chemical Functioning of the Neurons Resulting in the Brain losing Functionality. Disruptions to Homeostatic Balance, Allostasis, and the Development of Allostatic Load in Response. The Perfect Storm in the Brain (the intersection of a organic trauma in the brain with the psychological trauma of PTSD). These are opposing forces in the brain. Physical trauma slows down brain functioning, while PTSD speeds up the stress hormones in the brain. I use the term Architectures to describe the brain's response to being traumatized. And these Architectures are interlocking. What this model is addressing is the fact that all trauma to the brain is not a single event that will heal simply with several weeks of rest (the traditional wisdom of treating concussions). This is the beginning of a neurodegenerative disease process in the brain (described through these 4 Architectures) due to the unique response of the brain to being injured. Sadly, I do not see this perspective being practiced in most Western Medical Treatment Models. I came to this perspective through my background in Neuro-Psychoanalysis (the intersection of neuroscience with psychoanalytic practice). This is a very different perspective from Neuropsychology, because it goes much deeper than looking only at the cognitive decline that brain injured patients suffer from. The official definition of Neuro-Psychoanalysis is a new scientific discipline that seeks to synthesize psychoanalysis with neuroscience, exploring the interface between neurobiological knowledge and

psychoanalytic models of the human mind. Neuro-Psychoanalysis is interested in the neurobiological underpinnings of how we act, think, feel, and perceive [2].

Exploring Neuro-Psychoanalysis & Neuropsychology

I want to take a moment here to explore the differences between Neuro-Psychoanalysis and Neuropsychology, because I believe Neuro-Psychoanalysis holds a key to understanding and treating brain trauma that Neuropsychology does not. I note that with the case of "Mr. B" (describe in my book "The Complex Architecture and Healing of Traumatic Brain Injuries" [1]) that two Neuropsychologists correctly diagnosed his PCS (post-concussion syndrome) condition in 2014. Sadly, their diagnosis and recommendation were ignored. Three years later he showed up in my office unable to even sit in one of my very comfortable office chairs without sliding off from chronic fatigue. I share the history of his case to point out how unresponsive our medical system has been (and continues to be) in denial about the seriousness of these cases. This is a situation I have witnessed over and over again, that the impact of trauma to the brain is neither well recognized, nor well treated. Back to the differences between Neuro-Psychoanalysis and Neuropsychology. Neuropsychology is more interested in the testing procedures that work to uncover the effects of injury or certain conditions affecting an individual's cognition and behavior. This testing would include:

1. The State of General Intellect
2. Problems with Attention and Concentration
3. The State of Processing Speed in the Brain
4. Language Skills
5. Learning and Memory Abilities
6. Reasoning and Problem Solving
7. Visuospatial Abilities
8. Problems with Mood and Personality
9. (Cleveland Clinic) [3]

These are all relevant issues regarding injuries to the brain. In contrast, Neuro-Psychoanalysis is more interested in understanding the dynamics between neurobiological processes and how a person acts, thinks, feels, and perceives. In my experience this is worth noting because Neuropsychology does not appear to recognize how damaged the brain is underlying these dysfunctional abilities. So often I see concussion and post-concussion syndrome patients being sent for brain training when the brain needs healing first. At this point, all brain training does is place demands on a brain/mind that is not functioning and needs the space to heal first.

The Architecture Model (Figure 1)

I developed the Architecture Model to help us understand how the brain responds to being injured, ill, or diseased. [4] In my experience the damage follows the pattern addressed earlier. This also gives us an opportunity to know where to intervene with treatment. Neuropsychology can help us understand what is not working, where the deficits are, but not why or how these deficits are occurring. Neuro-Psychoanalysis works to do just this. We can begin understanding the Complex Architecture Model by looking at:

- **Architecture One: Traumatic Shock (Shock Trauma)**: When there is an initial shock to the brain/mind from trauma, the brain/mind automatically goes into survival mode. It shuts down systems the brain operates (the networks) and "shoots" energy into keep the person alive. Persons in this state are dazed, confused, weak, dizzy, enveloped in brain fog, and feel very disoriented. In general, their vital organs are functional (minus bleeding, cuts, wounds, fractures and breaks) in the interest of survival, but little else. What amazes me about Shock Trauma is how long it can last. Days to weeks to months to years before homeostatic balance can be fully restored. Why is this? This depends on a multitude of factors including the patient's physical and psychological histories. What was the patient "carrying with them at the time of the injury, illnesses, or disease. This is crucial information to understand and implement into the patient's treatment. And this will help us better understand the course of their traumatic shock.
- Architecture two addresses the breakdown in communication within the brain. Those amazing neurons in the brain communicate through electrical and chemical processes. But because of the trauma, the neurons themselves are twisted, sheared, and broken to the point where communication within the brain is disrupted. And sometimes severely so. Outwardly, the traumatized person begins to lose functionality, because the fascinating electrical and chemical communication system in the brain has been damaged. However, the cause of these losses is seldom recognized.
- Architecture three addresses what happens to homeostatic balance as a result of trauma to the brain/mind. It is not always recognized that the brain is one incredibly interconnected unit and that trauma to the brain/mind is pervasive in the brain. When I was working to understand the large numbers of symptoms that come with trauma to the brain/mind (see Mrs. A's symptomatology above), I realized that since the brain controls homeostatic balance, this explained the large number of symptoms that accompany brain injuries. With the stress of injury, illness, or disease the brain/mind homeostatic balance (run by the brain/mind) becomes increasingly dysfunctional. The result is a large

group of symptoms that often overwhelm the patient and result in further losses of functionality.

- Architecture four addresses the "perfect storm" in the brain/mind. Trauma to the brain slows down brain functioning such that the brain begins to function like a slow computer. At the same time, all brain injuries are also a traumatic event for the patient resulting in PTSD. These two opposing forces then clash in the brain, and this makes many patients feel crazy. Now, what do we do with all of this? Can the model help us create interventions that halt the neurodegenerative progression of trauma to the brain? I will add here that this is not an easy process because every injury to the brain also includes a person, who brings with them their history, values, disappointments, goals, and their stages in life (see Erik Erikson's Psycho-Social Stages of Development) [5].

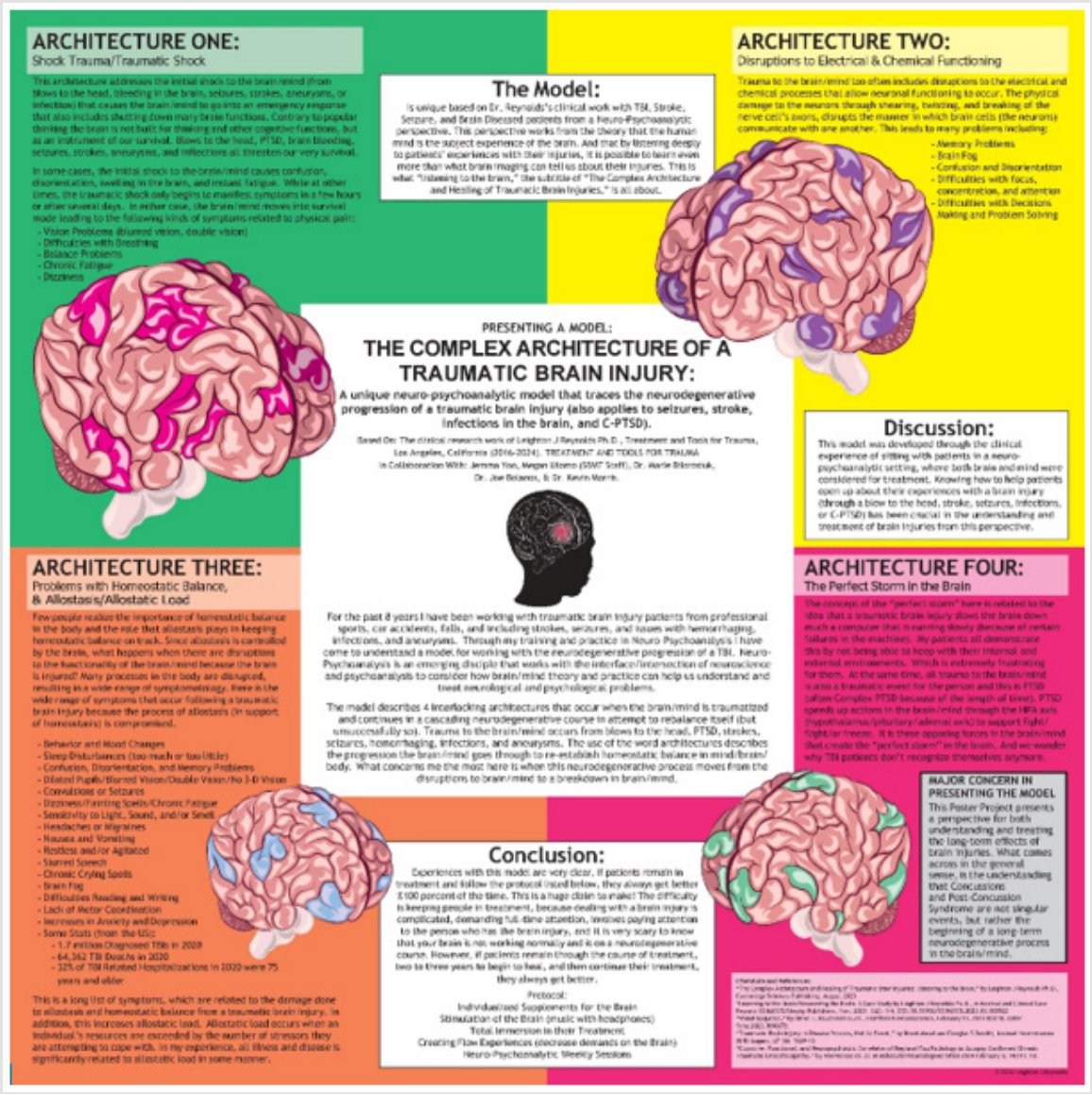

Figure 1.

Let's Look at a Case

Mrs. A was in her 70s and falling apart quickly when she arrived in my office. She had seen me 3 years earlier following a car accident, wasn't impressed with what I was suggesting, and didn't come back. Three years later, and two more car accidents, she returned and decided to stay in treatment with me. Was she worse off when she came back, yes! Why? Because her case is clear evidence of the neurodegenerative progression of trauma to the brain (in this case the 3 concussions she had suffered from the 3 car accidents). And how exactly do we halt this neurodegenerative progression in the brain/mind. When patients come in for treatment, I take a very through history and consider the 4 baskets of symptoms [6]. They are:

1. Physical Symptoms
2. Cognitive Decline
3. Social and Emotional Problems
4. Sleep Disturbances

Mrs. A registered symptoms in all 4 Baskets. As you will see, this is a very extensive list of crippling symptoms:

1. Her Physical Symptoms

- Chronic Fatigue
- Chronic Pain
- Daily Headaches
- Difficulty Breathing
- Visual Disturbances (blurred vision)

2. Her Cognitive Decline

- Severe Memory Loss
- Brain Fog and Daily Confusion
- Inability to Concentrate or focus with very little Attention Span
- Couldn't read, watch TV or movies

3. Her Social and Emotional Problems

- Anxiety was through the roof
- Struggles with Major Depression
- Easily Irritated and Agitated
- Frequently Angry and Aggressive
- Couldn't stand to be alone or be in quiet spaces

4. **Sleep Disturbances**

- Had Extreme Difficulty Sleeping
- Again, this is an extensive list of symptoms. How can a clinician intervene in all this? In my experience, the clinician needs to treat the patient, not just the injury, illness, or disease. And yes, this is a tall order requiring a lot of effort on the part of both the doctor and the patient.

Doctor/Patient Dialogue

- (P) "Dr. R, I can't do that. I'm simply not going to take more than one Epsom Salt bath a day, if I even take one."
- (D) "Epsom Salt baths are not helpful?"
- (P) "Well, I can't stand to be in the bathtub for more than a few minutes. If I stay in for 5 to 6 minutes that's a lot for me!"
- (D) "So once a day is your limit for an Epsom Salt bath, maybe?"
- (P) "I get that the Epsom Salt baths help to reduce inflammation in the body. And I usually do feel more relaxed, and I sleep a little better after I take an Epsom Salt bath. But it's hard for me to slow enough to get in the bathtub. Even once a day is too much for me."

On numerous occasions, I would suggest that reducing demands on the brain/mind was a key to her recovery. But she just couldn't slow herself down and reduce the demands on her brain, because of her constant need to be doing something.

- (P) "I don't want to be alone. I've been alone all my life. My parents didn't even pay attention to me when I was growing up. So, I have suffered my whole life because of this. And now I really need someone in my life because I'm such a mess. I can't remember anything anymore!" After working with Mrs. for several months, she received a diagnosis of Alzheimer's and was told that her life would be over in 10 years. Since she had already been feeling like a "total mess" the diagnosis collaborated what she had been feeling: that she was hopeless.
- (P) "So, why should I try anymore? It's all hopeless anyway.'
- (D) "I don't agree that you're hopeless. People do recover from Alzheimer's."
- (P) "Well, I don't believe that's possible, but I will listen to what you are suggesting and do my best to follow through."- Following this session, Mrs. A disappeared. She wasn't keeping her appointments (we had set them up for M-F and she was making all her appointments up to that point), and she wouldn't return the phone calls. Now what?
- Then about a week later she re-surfaced, still skeptical about ever improving her life. But she was willing to continue working with me. I had already set up a protocol for her as a specific structure to work with. Now I was adding to it (see below).

Was she able to follow this new protocol, not very well. Her Cognitive Decline (see her 4 Baskets of Symptoms above) was racing toward terrible, as was her depression and hopelessness. Below is the expanded protocol I set up for her: Supplements in addition to medication that was designed to slow down the progression toward full blown Alzheimer's Disease. Stimulation to the brain. I recommended a specific kind of music with noise cancelling headphones designed to realign brain waves. See Total immersion in the healing process by setting up a daily schedule that included rest periods at least 2 hours to reduce the demands on her brain. Weekly Chiropractic Adjustments to work on keeping her nervous system healthy.

- Creating daily flow experiences that help to dramatically reduce demands on the brain for work. See "Flow: The Psychology of Optimal Experience" by Miha'ly Csikszentmiha'ly. [7] Neuro-Psychoanalytic sessions M-F to process the neurodegenerative progression of her disease. And to address the psychological issues that come with knowing that you are losing your mind! I designed this type of protocol because of my observation that standard medical practice doesn't engage the person and their personhood enough in the process of healing. I believe this is the critical key to recovery. My patients who have gotten involved in the process of healing through the doctor-patient relationship are the ones who are getting better! (See the "Importance of Mr. B" chapters in "The Complex Architecture and Healing of Traumatic Brain Injuries.") (#)1 Which patients can and which patients are not able to attach/connect to their treatment, by getting involved directly through the doctor-patient relationship, is an interesting and complex question. I will be exploring this aspect of the model in a future article.

- **Back with Mrs. A.**

- How did she respond to the expanded protocol? At first, I wasn't sure she could follow any type of protocol I set up, although I know she wanted to. And she certainly made the effort to do so. But she was becoming increasingly too disorganized to accomplish much of anything. This, then, is where the "doctor as organizing agent" comes into play. I quickly learned that any response or intervention attempt was only adding to her disorganization. There was so much damage to her brain's ability to function (her loss of functionality), that anything I attempted to suggest to her was experienced as intrusive and she would quickly shut down or get angry. Intrusion is one of the symptoms she was already experiencing as a result of the PTSD that is an automatic aspect of any trauma to the brain. (See Architecture 4 above). No matter how much effort Mrs. A was willing to put out, she couldn't follow much if any of the protocol at this point, because she couldn't slow her life down long enough to follow any kind of structure. Why couldn't she slow her life down? She was in an almost constant state of panic that she was losing her mind and would soon die! This is where Neuro-Psychoanalytic work can be most effective. That is, paying attention to the intersection of her psychological state with her neurological status.

- Mrs. A was not capable of following the protocol that I believed would have helped her neurological state, because her psychological state was constantly panicking. And panic "hijacks" the person's ability to think rationally and be organized to cope. In my experience, modern medicine does not often enough go to the intersection of the biological with the psychological. I believe this is entirely workable, because the human mind is the subjective experience of the brain. This is my concept of "listening to the brain." We can learn so much about how our patients are doing, what is happening in the brain, by listening carefully to what they are telling us about their experiences. With all traumas to the brain, we have to recognize that along with injury, illness or disease, there is a person. And we must pay attention to their personhood, because it affects how they experience and process their injury, illness, or disease. Moreover, and this is quite startling, the doctor-relationship in itself works to drive the healing process forward. When so many in medicine believe that these injuries, illnesses and diseases are not treatable, this is a startling fact. In my experience, relationships are more powerful than technology (stimulating the brain) or medication. I believe this is so because the doctor-patient relationship fully engages the patient in the treatment. Rather than that the patient is simply the recipient of the treatment (stimulation to the brain or medication). I do not mean to imply that stimulation to the brain, or certain drugs, cannot be helpful. They absolutely can, but they are not the total answer. Stimulating and healing the brain/mind through a consistent relationship is our most powerful tool.

- (D) "You sound better today."

- (P) "You know, I am feeling a little bit better today. I've been getting out more often over the past few days." She paused for short while, which I have come to understand is the result of brain/mind "running like a slow computer." And it takes longer than normal for her to process what is being said, or asked, and respond.

- (P) "I'm taking my supplements pretty regularly now, and I am trying to create rest periods for myself throughout the day as you suggested. Although as you know this is very difficult for me."

- (D) "Nice work on your part."

My thought about why she was doing/feeling a bit better, has to do with the trust was beginning to have in her treatment. That someone would be there for her who understood how to help her get better. And with this new confidence she was beginning to feel more hopeful, and therefore better.

In Conclusion

My experiences with brain/mind injured patients have overwhelmingly pointed me in the direction of the crucial importance being with a patient as their organizing agent. And this is my response to the question of how this Architecture Model can help patients recover. It shows us exactly what is happening through this neurodegenerative disease progress. And it gives us a road map as to exactly what needs to be repaired in the context of a strong attachment to the doctor-patient relationship: The aftereffects of traumatic shock to the brain. Disruptions to the neurons ability to facilitate electrical and chemical communication channels in the brain. The loss of homeostatic balance in the body and the advent of allostatic load. The "perfect storm" in the brain. The clash of TBI (slowing the brain/mind down), and PTSD (that speeds up the hormone stress response in the brain). It is now better understood that the brain/mind get increasingly disorganized as a result of the neurodegenerative progression of trauma. This trauma can be a TBI, a stroke, seizure activity, an infection in the brain, illness and disease, PTSD, or major mental illness (bipolar and schizophrenia). All of this requires an outside organizing agent, on a consistent basis, to assist the patient in their recovery process. Trauma to the brain/mind can be very subtle, so the person appears to be quite normal. But as you can see with this case, the patient has lost a lot of her functionality, as do many other patients, and they cannot function without a consistent organizing agent with them in their recovery. Finally, in Part III I will explore the specifics of working with each of these interlocking Architectures. As you can see from the patient presented above, this is not easy work. But the rewards are amazing when we witness a patient's recovery of their brain/mind!

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