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Research Article

The Medical Anatomy of a Tragedy Part II

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Treatment and Tools for Trauma in Southern California, USA

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Introduction

Over the weekend of July 25, 26, 27, & 28, 2025 a 27 young man drove his car (loaded with weapons) from Las Vegas to New York City arriving on Monday as planned. Upon arriving he had a carefully planned mission to shoot up the offices of the NFL (National Football League) located in an office building in Manhattan. There is video footage of him carrying his rifle into the building. When he reached the lobby of the office building he opened fire spraying bullet everywhere and killing 3 people. From there he took an elevator to what he thought was the floor where the NFL offices were located. He was wrong ending up one floor below the NFL offices he was looking for, and ended up shooting an unarmed security guard. He then very carefully shot himself in the chest and died. In the aftermath of this tragedy, investors found a note that explained his actions. He had diagnosed himself with CTE (chronic traumatic encephalopathy) from playing in the National Football League (which he did not, he played high school as a running back), and he had come to NYC to repay the League for their wrong doing. Five people died on that Monday for no reason that was not preventable. This article will focus on the cause of his brain trauma (which was self-identified), his subsequent tragic actions, and how we can prevent this kind of tragedy form happening in the future.

Let's start by understanding what CTE is all about.

Chronic Traumatic Encephalopathy is a progressive, neurodegenerative brain disease effecting individuals with repeated head injuries. These repeated head injuries cause a gradual deterioration of the brain that can lead to either atrophy (shrinking) in certain areas of the brain, and/or swelling and enlargement in other areas of the brain. This occurs primarily because of an increase in tau proteins in the brain. These proteins normally protect and stabilize the neurons in the brain. But with repeated injuries to the brain, thetau proteins become defective, collecting in clumps that interfere with normal brain functioning.

The signs and symptoms of CTE include:

- Memory impairment.
- A diminished ability to make decisions.
- Apathy and emotional detachment.
- Attention, focus, and concentration losses.
- Poor judgment and problems with impulse control.
- Frequent irritability, anger, and aggression.
- Difficulties with balance and coordination.
- Mood swings related to anxiety and depression.
- Changes in sleep patterns.

One of the paradigms created to help us understand CTE, looks at the development of CTE in 4 stages. Stage Four includes the following when the symptomatology of CTE becomes quite severe:

- Profound memory loss
- Language deficits
- Mood disorder with increasing aggression
- Psychotic symptoms (when the person has lost touch with reality)
- Personality changes
- Dementia

- Motor symptoms (problems with balance and movement)
- Can also include substance abuse
- Suicidal thoughts

Fast forward from July to October 2025 and we find that the shooter was correct in his diagnosis of CTE. This was confirmed by the New York City Chief Medical Examiner's Office. They found "unambiguous diagnostic evidence" of CTE in Mr. Shane Tamura's brain. I am both fascinated and deeply troubled by the fact that Mr. Tamura was both able to correctly diagnose his own serious condition, while at the same time he was able to plan and carry out a mass shooting. How does the brain create such contradictions? And do these kinds of contradictions when the brain is injured, imply that the brain begins working with a different kind of operating system? More about this below.

In a brief article from the Concussion Legacy Foundation in Boston, Dr. Chris Nowinski (Oct 3, 2025) asks what I believe is a very important question regarding trauma to the brain. He writes: "CTE is caused in part by repeated traumatic brain injuries (TBIs), and TBIs are linked to the development of mental health disorders. However, the presence of a brain disease will never fully explain a person's behaviour, and CTE shouldn't be seen as the sole cause of a tragedy." Ahead in this article I would like to weigh in on this question based on what I am learning from my clinical research project: "Listening to the Brain/Recovering the Brain/Mind." I believe Dr. Nowinski's question leads us to work at understanding the brain/mind connection, complicated as it is. Also ahead I will ask how many mass shootings might be related to neurodegenerative brain/mind problems. And can we prevent further such tragedies as this one in NYC, when we understand more about how trauma to the brain effects the brain/mind connection?

Background

Over the past 9 years I have been working with brain injured patients (TBI, strokes, seizures, infections in the brain, brain illnesses and diseases of which CTE is one, major mental illness, and PTSD. And from my work I developed the Complex Architecture Model (See "The Complex Architecture and Healing of Traumatic Brain Injuries," from Cambridge Scholars Publishing 2023). This model (which I have found to be very accurate) describes 4 interlocking architectures the brain creates in response to being traumatized both physically and psychologically. The 4 architectures include:

- **Architecture One:** Trauma to the Brain, Mind, Body from the Point of Injury.
- **Architecture Two:** Disruptions to the Brain's Ability to Function Normally (damage to the neurons).
- **Architecture Three:** A Breakdown in the Brain's Ability to Function Normally (damage to homeostatic balance).
- **Architecture Four:** The Perfect Storm in the Brain.

In my experience, the NYC shooter's actions were a direct result of the neurodegenerative disease progression in his brain as described in this model, that probably began for him when he suffered concussions playing high school football (as a running back). This neurodegenerative disease progression in the brain was described clearly in Dr. Brent E Masel's 2010 article[1]. At this point I do not know if Mr. Tamura was/had received any treatment for his brain injury. But the severity of his actions indicates to me that his condition was probably never recognized, and never treated. Over the past 9 years I have worked with a number of persons suffering from brain trauma including professional athletes, victims of car crashes, those suffering from long-term mental illness, and PTSD. Unfortunately, the scenario is almost always the same. Persons suffer head trauma, which is not recognized well enough (that long-term treatment is needed). Then the neurodegenerative disease progression I describe in my model takes hold, and it is downhill from there. Persons begin to suffer from symptoms, cognitive decline, social and emotional problems, and sleep disturbances. It is my hope that through this article, we can begin to better recognize and treat this neurodegenerative disease progression, and prevent future tragedies such as the one that recently occurred in NYC. Lastly, it is my observation and experience that high school, college, and professional athletes are at a much greater risk for concussions and post-concussion syndrome that the general population. And that this fact is something American Society needs to take much more seriously.

The Four Architectures Model

At this point, I do not know the details of the shooter's head injuries (other than that his high school teammates confirmed he suffered several concussions while playing high school football). I am aware from persons who went to high school with him that he was a good kid. The question is: what changed for him that he had the ability to plan a mission and then carry it out leading to the death of 5 people including himself. One of the progressive symptoms I have seen with head trauma is psychosis, when a person has lost touch with reality. Note above that under Stage IV symptoms psychosis is listed as a severe symptom of CTE (which the shooter had). This may have been the case for the shooter because in his note he described playing in the NFL (which he did not). And speaking of losing touch with reality, how rational is it to bring a high-powered rifle in a high-rise office building and begin shooting innocent people on your way to the office of the NFL.

One thing I am clear about is that trauma to the brain/mind (in this case at least several probable concussions from high school football) creates a different operating system in the brain/mind. I believe this is also true for person's struggling with psychosis, ADHD, autism, major mental illness, brain illnesses and diseases and PTST (especially Complex-PTSD). In my understanding, the NYC shooter's actions were the result of his damaged brain/mind running on a different operating system, which can describe and understood through the 4 architectures model.

From here I will describe another case where I am familiar with the details of the individual's progressive symptomatology, to give readers an. idea of how this model works, and how it could apply to the NYC shooter. Although everyone's brain/mind is unique, my research demonstrates that all head trauma (both physical and psychological) follows this progressive neurodegenerative pattern[2]. And this is the neurodegenerative course I believe Mr. Tamura was tragically struggling with when he arrived in New York City on that Monday.

Exploring Another Case

On a particularly warm fall evening in Southern California, a young woman was traveling through an intersection with a

green light in her favor at around 40 mph. Suddenly she was broad sided by another vehicle making a left turn through the same intersection. He explained that he never saw her, even though she had already turned her headlights on. The impact knocked my patient's vehicle out of the intersection and into a metal streetlight pole. So this was a double impact on her brain. First, the other car broadsided her (an impact on her brain), and then her car hit the metal pole. Her brain was literally bouncing around inside her skull twice as a result of the double impact.

Architecture One

She was initially able to get out of her vehicle, but within 10-15 minutes her shock trauma set in rapidly. She began to feel dizzy, disoriented, confused, physically weak, slightly nauseous, and felt a severe headache coming on rapidly. An ambulance arrived and she was taken to a nearby emergency room where an MRI was done that revealed nothing, and then she was sent home. But look at the symptoms she was experiencing, where were they coming from? An MRI can reveal structural damage to the brain, skull fractures hemorrhaging, and aneurysms. While this is very important information to know about a head injury, it does not help us understand the functional damage to the brain. For this kind of damage to the brain, subtle but certainly life altering, we need an fMRI (a functional MRI). As you will see below, in my patient's own words, there was a lot of functional damage she was experiencing that was not followed up on.

I note here that with all the patients who have come to my office over the past 9 years, no has ever to my knowledge, been checked for shock trauma following head trauma. I equate shock trauma to the brain as the brain going into survival mode. **(Figure 1)** A blow to the brain/mind be it physical or psychological causes the brain/mind to exhibit the following types of symptoms:

More physical:

- The chills
- Dizziness
- Lightheadedness
- Possible seizures
- Becoming unconscious
- Nausea and vomiting
- Stomach pain
- Rapid heartbeat
- Severe headache
- Muscle tension
- Increase in blood pressure
- Rapid shallow breathing

More psychological:

- Mild to intense fear
- In a panic
- Being in denial about what just happened
- Increased anxiety
- Anger
- Irritability
- Helplessness and hopelessness (why did this have to happen to me)
- Brain fog
- Confusion and disorientation
- Numbness (partial and overall)
- Withdrawal
- Emotional outburst
- Difficulty making decisions
- Decreased awareness of one's surroundings
- Suddenly feeling unsafe
- In a dissociated state

In my experience it is important to follow up on the above possible symptoms for at least 2 weeks following the original injury to gain a sense of how serious the injury is. And it is important to recognize that Architecture. One can last for many months following the original trauma, and can be the beginning of a neurodegenerative disease progression in the brain.

Architecture two

Architecture Two represents the next interlocking architecture that began with the experience of a Shock Trauma. The individual begins to lose functionality, because there are disruptions to the communication pathways in the brain, the neurons. The neurons are literally damaged, torn, twisted, or broken completely, and the result is disruptions to the electrical and chemical processes that allow the neurons to communicate with one another.

We now understand that the various forms of trauma to the brain/mind including tbi, stroke, seizures, infections, brain illnesses and diseases, major mental illness and PTSD can significantly damage the electrical and chemical processes within the brain. Electrical transmissions in the brain are primarily mediated by the electrical synapses, which allow for the rapid passage of action potentials between nerve cells. Chemical transmissions in the brain involve neurotransmitters such as dopamine, noradrenaline, and serotonin that play a crucial role in the communications processes between nerve cells. And here is one of the crucial points of this article, damage to the electrical and chemical systems in the brain can (and in my experience always does) lead to various neurological consequences including physical problems, cognitive decline, social and emotional issues, and sleep disturbances. I believe this is a very important fact to keep in mind with all trauma to the brain/mind.

I also note that brain metabolism, the process that allows the brain/mind to work effectively, is an energy intensive phenomenon involving a wide range/spectrum of biochemical intermediaries. And that the brain/mind is one of the most energy intensive organs in the body utilizing approximately 60% of available energy for the fulfillment of electro-physiological functioning, while the remaining 40% is expended in the homeostatic functions supporting the internal mileu of brain cells so these cells can function effectively.

In terms of how these processes in the brain directly affect an individual's behavior, note the following comments from the patient whose injury I have been describing.

"Since my accident in August, my life has changed as I feel that I am not the same person either mentally or physically anymore. I have been dreading driving now especially on the freeways since the accident. What used to be an automatic task has now become a hassle and a source of extreme anxiety and fear for me."

"Each time I get flashbacks of the accident when passing that intersection, I become super hypervigilant worried about cars just appearing in front of me. This constant fear, anxiety, and occasional panic attacks have all negatively affected my daily functioning and have led to a lot of psychological distress including overwhelming anxiety, frustration, anger and depression."

"Besides the psychological challenges, I have noticed a cognitive decline as I feel not as sharp as before, and that there is a delay in my mental processing. It seems like my brain has been operating with very little energy and resources."

The key word for Architecture Two is disruptions in brain/mind functioning. And as you can see from the above statements, this patient has already lost significant functionality in her daily life, because of electrical and chemical disruptions.

Architecture three

Architecture Three represents a breakdown in homeostatic processes within the mind/brain/body. Homeostasis is defined as the tendency within our mind/brain/body toward a relatively stable equilibrium between all the interdependent elements of the mind/brain/body, especially as maintained and regulated by physiological processes. This is a two-fold process as the mind/brain/body works to maintain its own internal stability, while constantly adjusting to external conditions at the same time. This is no easy feat, yet homeostatic processes accomplish this feat constantly and unconsciously in the background of our daily lives. Basic examples of homeostatic processes include:

- Blood pressure regulation
- Body temperature regulation
- Fluid balance in the body
- Oxygen levels in the blood stream
- The complicated process of labor and delivery
- Blood clotting
- Immune responses and inflammation
- Energy levels
- Acid levels
- Hormone levels
- Protein production
- Electrolyte balance

And when there is a malfunction of homeostatic balance we can find issues like allergic reactions, autoimmune diseases, and the occurrence of sepsis (CRS, cytokine release syndrome). But what about how trauma to the brain/mind might affect homeostatic balance? I find that there is very little recognition of how trauma to the brain/mind effects homeostatic balance. The main regulator of homeostasis is the hypothalamus located in the midbrain region. Since I understand trauma to the brain to be pervasive in the brain/mind/body, then it is impossible for the hypothalamus not be affected on some if not many levels. Hence, the negative effect on homeostatic balance, which is why I believe there are so many symptoms and problems with brain injuries. Yet, again, this is seldom recognized and factored into the patient's treatment.

Within Architecture Three there are 2 additional issues to consider. One, the concept of allostasis. Allostasis is an extension of the concept of homeostasis representing the adaptation process going on between the body's complex internal physiology (maintaining a balance here), and the physical, psycho-social, and environmental challenges that are constantly stressing this internal balancing system. The key word here is adaptation (constantly). The second issue concerns "allostatic load," which is the long-term result of the failure of allostasis, of adapting to life's stressors. This failure can (sadly) easily lead to pathology and chronic illnesses and diseases. In summary, allostasis is the process through which the body maintains stability via internal and external changes (allows homeostasis to work well). While allostatic load is the cumulative burden of chronic stress on the brain/mind/body leading to wear and tear on the individual's physical and mental health. In other words, when allostasis is not working. It is my strong experience that trauma to the brain/mind derails homeostatic and allostatic processes leading to allostatic load and the resulting severe pathology, including death.

Finally, note that homeostasis, allostasis, and allostatic load are all automatic, unconscious, and need to be finely tuned for our survival. But as the cascading motion of neurodegeneration continues its downward spiral through the brain, and as the process of allostatic load takes over then individual will be experiencing more and more symptoms and the loss of functionality on many levels. Here is what my patient expressed regarding her loss of functionality as a direct result of allostatic load setting in.

"In addition, I was even getting panic attacks in sessions with (my patients) and had to either cut the sessions short or take a break in the middle of my sessions. I even noticed getting slurred speech and blurry vision in the middle of my sessions at times. As a result of all this, I had missed many days of work especially during the first 6 months following the accident."

At this time, I don't see that there is enough attention paid to the fact that initial damage to the brain is always followed by a long-lasting range/spectrum of secondary pathogenic events. One of the key issues in these cascading neurodegenerative events is that both primary and secondary damage drastically compromise mitochondrial functioning in the nerve cells and promote energy depreciation throughout the brain. New research is telling us that these are most pivotal events determining the cascading course of a brain injury. This new research is also suggesting that rather than paying attention to the primary insult, we need to pay more attention to the secondary insults, which over time are the most damaging[3-5].

We also need to recognize, as part of Architecture Three, that primary and secondary insults to the brain/mind are associated with the breakdown of tissue homeostasis due to:

- Impairments of the blood brain barrier
- Osmotic imbalance in nerve cells
- Neuro-inflammatory processes
- Excitotoxicity
- Apoptosis

Once again, all of the above processes result in the loss of tissue functionality and ultimately the loss of the individual's ability to be fully functional in their everyday lives. For example, the process of excitotoxicity is a damaging process that kills nerve cells. This occurs when the necessary and safe levels of the neurotransmitter glutamate, become pathologically high resulting in excessive stimulation of nerve cell receptors, which

then leads to damage and the death of nerve cells. Here is further evidence of the neurodegenerative damage occurring in the brain/mind as a result of trauma and its effects on homeostatic balance. As a sister process here, apoptosis is programed cell death. It is this mechanism by cells intentionally die for the greater good of the organism. But apoptosis also occurs in response to damaged DNA and/or other cellular stressors. Again, this is all part of the process of homeostasis getting out of balance, causing an increased symptomatology and impairments for the individual. And ultimately making their day-to-lives one hardship after another.

Note the following experience my patient described.

".....it felt like I had a brain fog and was unable to focus, comprehend, and later remember the conversations. This was unprecedented as I used to be very sharp and had a good memory, something I was very proud of and always got compliments about."

Architecture four

Finally, there is the interlocking Architecture Four: The Perfect Storm in the brain/mind. The predominant feature of this architecture is the clash of physical trauma to the brain/mind and PTSD, because all brain injuries are also psychologically traumatic to an individual. Physical trauma to the brain (including tbi, stroke, seizures, infections, illnesses, diseases major mental illness, and PTSD) slows down brain functioning such that the brain is now "running" like a slow computer. I always know when my patients are struggling with a brain injury because they are very slow to respond to everything. At the same time, PTSD speeds up the processes in the brain/mind through the release of stress hormones. This clash of "opposing forces" is literally crazy making for many patients. At the same time there is a third variable to deal with, the patient's social context, their family, friends, and work environment, all social interactions requiring energy they have very little of.

Note my patient's experience with her family.

"My mental health symptoms have also been negatively affecting my relationship with my family and friends as I feel that I am running on a thin line, not having the mental energy and tolerance to deal with them."

Discussion

Based on this model, the perfect storm in the brain is what I believe the shooter was struggling with when he entered the office building in Manhattan on that fateful Monday afternoon. What kind of "brain state" and "feeling state" does it take to shoot innocent people and then turn a gun on yourself and end your life. I have often wondered that at this point in a mass shooting the person's brain has been hijacked by rage. And that rage at this point is blinding for the individual. They are going through the motions with no direct connection to that part of the brain/mind that is in touch with what they are actually doing, killing innocent people. I also wonder now what role his post-concussion syndrome, the organic damage, played in warping his problem solving and decision-making abilities. There is so much we don't know yet about the possible relationship between brain trauma and mass shooting. And I am also led back to Dr Nowinski's comment (in the Introduction) that "the presence of brain disease will never fully explain a person's behavior, and CTE shouldn't see as the sole cause of the tragedy." So where can we find answers to preventing these kinds of tragic situations?

Is it possible that Mr. Tamara was delusional from the time he left Las Vegas (and perhaps before this date) for NYC? And that his delusions came from psychosis (a symptom that a person has lost serious touch with reality). But where did the psychosis come from?[6] Psychosis is listed (see page - above) as a symptom of Stage IV CTE, and there is substantial research to indicate head trauma is linked to major mental illnesses like Bipolar I & II and Schizophrenia[7]. I am hoping that we can learn a lot more about the shooter's life and medical history so that we can more accurately understand the origins of this heart-breaking tragedy.

Lastly, I use the term brain/mind to indicate that the human mind is the subjective experience of what is taking place in the brain. Following this perspective, if the brain is damaged (and we know that the shooter was suffering with CTE), then the mind will also be damaged. And the individual's brain/mind will be "running" on a different operating system, which could help us understand how the shooter could be delusional (he did not play in the NFL) and still be able to organize and plan a shooting rampage. We need much more research around trauma to the brain/mind and the long-term consequences of not treating these injuries.

Conclusion

In answer to Dr. Nowinski's question above, how do we understand behavior when we know there is a brain injury, especially one that is as serious as CTE. How much is organic and how much is explained/caused psychologically? I am suggesting that our best answer at this point is our understanding of the brain/mind connection. That our minds are the subjective experience of what is in the brain. Then where does the brain come from, and what exactly is mind anyway? The brain comes from an individual's experiences through their genetics, their biology, and their environment. This is a "rich mixture" unique to each of us, while the mind is busy downloading the individual's life structure provided by the brain. It is this "rich mixture" that will define an individual's behavior, and in order understand this I believe the individual needs to be in neuro-psychoanalytic treatment as was/is the patient presented above. In this kind of treatment, an individual is encouraged to grasp, understand and work with the complexity of factors that accompany all trauma to the brain/mind[8,9].

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