

Trauma Treatment after a Car Accident Can Aid in Physical and Mental Health Healing



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Trauma affects more than 25% of motor vehicle accident survivors. Sierra Tucson treats chronic pain and PTSD due to personal injury routinely overlooked by the traditional medical community.

For Derek Price, treating individuals who are suffering from chronic pain is personal. For years as a chiropractor, Derek treated what he believes was only 50% of their problem—the musculoskeletal side of their injury. He disregarded the mental health impacts—the trauma. Now, he is determined to make up for that. Today, Derek is CEO of Sierra Tucson, Acadia's flagship facility for residential care that has been treating patients since 1983. He comes to the facility with a passion to address the untreated trauma from personal injury. He brings decades of experience in holistic medicine and is fueled by his own personal determination to help heal others, a mission that started with his own life-altering



Hero worship is part of the American culture and for those at the very top of their game in professional sports, that adoration of an athlete's prowess and superhuman abilities manifests in many forms. Posters, baseball cards, cereal boxes, video game jacket photos, and "merch" that bears a player's likeness find their way onto shelves in a variety of retail stores including, grocery stores, sporting goods stores, and in countless other places, as well as online. Those "heroes" of American sports are placed on a very tall pedestal. Many know the more popular you are, the loftier that perch. And the harder you fall.

When Derek played professional football in the 1990s, he, like many of his NFL teammates, felt invincible. He had reached the pinnacle of American football and, like many athletes who rise to that stature, he knew it couldn't get much better than this.

Many players are encouraged by the idolization of fans around the world, motivated by a hefty paycheck, and the personal satisfaction of making family and friends proud. Yet there is a silent dread for players that this could all end with one life-altering injury. Feeling unconquerable is a natural consequence of hero worship and many players respond to those feelings of adoration with internal pressure that they can't let their fans, their teammates, their bosses, or their families down and admit failure—even if failure is an injury sustained in the quest for football stardom.

In 1996, Derek was a Detroit Lions tight end. When he got hurt during a play, fear rose in his gut as he wondered what this could mean for his future. He knew he had an immediate decision to make in that split second as he was picking himself up off the field. Does he go to the team doctor or the trainers and admit something doesn't feel right? Or is it best to just ignore it and keep going like nothing is wrong? He chose the latter. After all, admitting that you are broken is risky. His decision? He played out the rest of the season with an injury that he decided was best to overlook.



Yet, as he would soon find out, denial can only work for so long. After signing a contract to return the next season, Derek reported for training and trainers took one look and wondered what had happened to him. The muscles in his left arm had atrophied. Unbeknownst to him, he had sustained a broken neck that day on the field and just kept going. The surgery that followed ended his career.

The injury and his sudden exit from professional football set him on a different path—one that led him to earn his doctoral degree in chiropractic medicine. During his treatment the surgeon had commented that had he proactively received chiropractic treatment for a defect in his neck that had made him susceptible to the injury in the first place, he might have never suffered such serious consequences from the hit. That comment stuck with him. It eventually led Derek to pursue a career where he could help people through chiropractic means using holistic methods such as education, exercise, diet, nutrition, and stretching.



In 2020, there were approximately 5.2 million car crashes, resulting in 2.3 million people being injured. Over a quarter of individuals in motor vehicle accidents suffer from post-accident trauma.

After opening a clinic, he began treating thousands of patients suffering from various injuries—most of whom were victims of motor vehicle accidents (MVAs). While he was satisfied that he was helping them, there was something he didn't know then about those patients and his approach to treatment and why it fell short. Their musculoskeletal injuries were just one-half of their problem. Many were suffering from trauma from the accident. Yet that wasn't discussed, much less treated. After all, the standard procedure for treating these patients was to fix the mechanics of their injury—period. Assessing patients for PTSD was not routinely done.

Overlooked is the fact that motor vehicle accidents, according to the American Psychological Association, are one of the leading causes of post-traumatic stress disorder in the general population. Each year millions of people are seriously injured in motor vehicle accidents. In 2020, there were approximately 5.2 million car crashes, resulting in 2.3 million people being injured.¹ Data reveals that over a quarter of individuals in motor vehicle accidents suffer from post-accident trauma.² Yet, due to lack of trauma screening, most are not treated. Derek now believes that standard treatment for MVA victims needs to include PTSD screening along with treatment for physical injuries.

1 Overview of Motor Vehicle Crashes in 2020 (dot.gov)

2 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2396820/>



According to studies that assess the psychiatric morbidity among motor vehicle accident survivors, it is common for individuals with MVA-related PTSD also to be struggling from other problems, including chronic pain, major depressive disorder, generalized anxiety disorder, and sleep issues.³ When compared to those suffering from chronic pain alone, experts agree that those who suffer comorbid chronic pain together with PTSD are at higher risk for turning to negative coping mechanisms such as substance use.⁴

The unfortunate fact is that motor vehicle accidents are so common that they are often shrugged off. They are readily accepted as an unfortunate and unavoidable fact of modern life. Yet, a study done in 1995, and still cited today, found that it isn't just those who are involved in the crashes who experience trauma, but also the victim's families, friends, and even the first responders and witnesses on the scene. The circle of trauma is broad.

The Trauma of Motor Vehicle Accidents

Motor vehicle accidents often result in victims who are harmed physically or emotionally. Some face potentially life-threatening injuries. Reviewing decades of research, the U.S. Substance Abuse and Mental Health Services Administration (SAMHSA) created a definition of trauma for use in mental healthcare and the legal system.⁵

This definition of trauma has three key parts:

- There is a triggering event.
- This event was experienced as physically or emotionally harmful, potentially life-threatening.
- The event has lasting negative effects on a person's functioning and well-being.

Motor vehicle accidents have all the ingredients of trauma as established by SAMHSA. It is common for accidents to render lasting negative effects on a person's mental health. After a car accident, people often experience anxiety, depression, and PTSD symptoms.

3 0605CP_Article1.pdf (mdedge.com)

4 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3609886/>

5 SAMHSA Report on Trauma



According to the American Psychological Association⁶, some common responses to trauma are:

- Intense, unpredictable feelings.
- Disruptions to your normal routines, like difficulty sleeping and eating.
- Difficulty concentrating.
- Being more reactive to “triggers” in the environment, like loud noises or the smell of burning.
- Problems in your close relationships, like increased conflict and arguments, or feeling disengaged and “shut down.”

With mental health issues arising in approximately a quarter of individuals involved in traffic accidents, the number of new PTSD victims adds up every year. With approximately 2.3 million injuries due to accidents each year, there is a potential for 575,000 people in the U.S. to fall victim to trauma as a result. Those who suffer from trauma find it difficult to participate in life as they normally did prior to the traumatizing event, which often leads to feelings of depression and increased anxiety. Those who suffer physical damage to the brain after an accident also find themselves at risk of depression and anxiety and have problems with sleep and concentration.

The Link Between Physical and Psychological Trauma

The connection between physical and psychological trauma can be explained by the scientific fact that the activation of the body’s stress response systems can alter brain structure and function. The brain’s executive function is responsible for an individual’s ability to plan, make decisions, and think strategically. Dysregulation of stress systems can impair brain circuits related to executive function as well as reduce the brain’s sensitivity to rewards, resulting in people receiving less pleasure participating in normal life activities.

These problems with executive function and sensitivity to reward are related to developing mood and anxiety disorders. Chronic pain or disability—both of which can be caused by a serious accident—cause chronic stress. Chronic stress can have similar effects on executive functioning and sensitivity to reward.

- *Injury can lead to chronic pain.*
- *Chronic pain can lead to chronic stress.*
- *Chronic stress can cause problems with how your brain functions.*

⁶ <https://www.apa.org/topics/disasters-response/recovering>



The search for normalcy and contentment can be nearly impossible for individuals suffering from post-traumatic stress after a motor vehicle accident. This is particularly true because trauma and brain injuries may change the way the brain processes rewards. Since addictive chemicals can still activate reward networks in the brain, even in brains of those suffering from PTSD, you have a recipe for potential addiction issues. Using substances can also suppress activity in brain regions related to pain and negative moods. That means for many people who experienced trauma, their normal lives aren't bringing them normal happiness; yet drinking and drugs can deliver some of those positive feelings they are missing. Unfortunately, as a result, many people suffering from trauma can become dependent on substances.

Sierra Tucson's Pain & Trauma Programs

Studies have found that individuals who suffer from chronic pain and PTSD together experience a higher severity of symptoms resulting in more significant functional impairment and disabilities than those without PTSD. Consequently, being treated for pain alone won't net the healing results as for individuals who are being treated for both conditions.

From a neuroscience perspective, trauma is a change in the nervous system—a rewiring that affects how individuals think about the world surrounding them. The self-preservation circuits that involve an individual's emotions, memory, and other brain connections teach an individual who has been traumatized by a motor vehicle crash that driving is unsafe. That self-preservation system has a job of keeping humans alive and when it takes over one's day-to-day functioning it can prove to be debilitating to everyday living. When the circuits are hyperfunctioning, the combination of chronic pain with fatigue, depression, and anxiety also taxes the immune system. Chronic stress leads the body to have consistently high levels of the stress hormone cortisol. The constantly high cortisol levels within an individual's system lead to chronic inflammation, which is at the heart of serious physical conditions such as cardiac arrest and stroke.

Sierra Tucson uses a trauma-informed care approach that begins with screening all individuals for trauma when they start any of Sierra Tucson's residential treatment programs. With trauma treatment at its core, individuals who enter any of Sierra Tucson's programs will be assessed thoroughly for trauma to customize their care, regardless of whether they are working on addiction, pain, mood disorders, or other behavioral health concerns. Individuals at Sierra Tucson benefit from



trauma treatment, as evidenced by the fact that often physical pain and other physiological symptoms significantly recede once the trauma is treated. There is a large body of published evidence to support this as well.⁷

Sierra Tucson professionals have successfully treated individuals for 40 years with a combination of physical rehab, therapy, and medication starting with an individualized treatment approach. As a result, there are thousands of success stories from Sierra Tucson alumni who have overcome their trauma, releasing themselves from the power trauma once had over their lives.

PTSD after MVAs

Over 25% of individuals who are involved in a motor vehicle accident (MVA) suffer from PTSD. Given that millions are injured in MVAs each year, the number of individuals who suffer from PTSD after crashes annually is actually higher than soldiers who suffer from trauma after involvement in military conflict.

Post-traumatic stress symptoms can become chronic. MVA victims can suffer from disabling memories and anxiety related to the traumatic event. They can also suffer from other symptoms typical of PTSD that can progress and become debilitating. Acknowledging and treating these individuals early on is crucial to preventing greater disruption of their lives, as trauma creates difficulty in resumption of daily activities.

Risk factors of developing PTSD after a MVA vary with every individual. Some risk factors include:

- Dissociation during the traumatic event.
- Family history or prior psychological problems.
- Feelings of fear, helplessness, shame, or guilt during the traumatic event.
- Prior history of trauma.
- Lack of social support.
- A perceived life threat to self or others.

If an individual perceived strongly that their life was in danger during the accident there is a strong likelihood that they will exhibit avoidance behaviors (fear of driving, getting into a car, etc.) or suffer from intrusive memories in addition to other negative changes in mood. Individuals who find that their symptoms are not subsiding over time should seek treatment.

⁷ Gerhardt A e al. Eye Movement Desensitization and reprocessing vs. treatment-as-usual for non-specific chronic back pain patients with psychological trauma: a randomized controlled pilot study. *Front.*



Modalities and Individualized Care at Sierra Tucson

Trauma-informed care at Sierra Tucson begins in a supportive, caring, and nurturing setting where safety and compassionate care is a top priority. Treatment is provided through an integrated model of care designed to treat the whole person—mind, body, and soul, known as the Sierra Tucson Model®. In the Sierra Tucson Model, residents are surrounded by a trauma-trained staff that understands that everyone comes to Sierra Tucson with their own story.

If a motor vehicle accident has changed their life and chronic stress has become the centerpiece of their story, that experience, along with any past traumas, is taken into consideration as they begin their treatment journey at Sierra Tucson. Psychiatric evaluation and psychological assessment are standard care for all admitted Sierra Tucson residents. This provides an opportunity for each resident to explore deeper understanding and insight into their self-exploration, as well as offer key feedback to enhance and tailor Sierra Tucson treatment planning.

“Expect A Miracle” are the words on the sign at the gates when individuals enter Sierra Tucson. Yet, to achieve that miracle it is recognized that residents need to first feel a sense of safety. The goal of trauma-informed care at Sierra Tucson is to identify the trauma without creating re-traumatization. The Sierra Tucson team is trained to use a variety of resources and tools to help them recognize the signs and symptoms of trauma and the patterns of trauma created in an individual’s life.

Through the experience of residential care, residents are with other individuals who have had similar experiences. The expertise of the staff guided by the Sierra Tucson Model helps individuals uncover the wounds of trauma that have impacted them in multitudes of areas of their life. An environment that is safe helps residents do the kind of self-exploration that is necessary.



All care at Sierra Tucson is individualized, but certain treatments are widely used due to their effectiveness in treating trauma including:

- **Cognitive behavioral therapy (CBT):** CBT is a form of psychotherapy in which clients are encouraged to overcome mental health issues by changing unhealthy or counter-productive thought processes, emotions, and behavior patterns. According to the National Association of Cognitive-Behavioral Therapists, CBT “is based on the idea that our thoughts cause our feelings and behaviors, not external things, like people, situations, and events.” CBT is an active, goal-based technique that has proved to be effective with individuals who are struggling with issues as disparate as substance abuse and addiction, anxiety disorders, panic attacks, mood disorders and eating disorders.
- **Dialectical behavioral therapy (DBT):** DBT, combines cognitive and behavioral therapies to provide residents with positive and healthy mechanisms to handle painful emotions. Residents learn how to increase self-awareness, control self-defeating thoughts, modify thinking, and handle conflict and stress through the process of DBT. By focusing on facts rather than emotions or value judgments such as good/bad or fair/unfair, residents enhance their abilities to respond positively and productively, without descending into self-blame or other destructive thoughts and behaviors.
- **Eye Movement Desensitization and Reprocessing (EMDR):** EMDR is useful in assisting residents in resolving traumatic experiences. EMDR is utilized to change an individual’s emotional response from dysfunctional to healthy by allowing access to adult coping skills and resources to use later in life. The technique utilizes bilateral auditory, visual, and tactile stimulation (also known as Dual Attention Stimulation, or DAS) while thinking about a traumatic memory. As the individual remembers the event and associated memories while continuing with DAS, he or she can resolve troubling emotions and cognitively reframe negative belief systems associated with the trauma.



■ **Somatic Treatments:** For people who have experienced trauma, it is easy to dissociate or disconnect from their bodies, which leads many down the path of emotional dysregulation. While physical trauma allows individuals to shake off the fear once the danger has passed, with emotional trauma the brain gets stuck in believing that danger still threatens. One type of Somatic treatment is Somatic Experiencing® Therapy, which works on the principle that trauma gets trapped in the body. Somatic treatments guided by a trained practitioner work on releasing this stress from the body.

■ **Equine Therapy:** For individuals who have felt unsafe their entire life, equine therapy is extremely effective. Therapy horses help many feel emotionally safe and calm. Horses are intuitive creatures that have the same emotions as human beings. They have many of the same brain structures as humans that allow for complex emotions. Additionally, their hearts are much larger than human hearts and put forth electromagnetic energy and an emotional field that calms people. Equine therapy is one of the most important ways to help individuals with a history of trauma feel safe, sometimes for the first time in their lives. Working with horses can help residents to practice mindfulness. Through staying in the present moment, bringing attention to their emotional state in the here and now, and engaging in activities that cultivate a sense of “flow,” residents can achieve a quiet mind, promoting brain and nervous system health.

Sierra Tucson Also Offers Applied Neuroscience Treatments

■ **TMS (transcranial magnetic stimulation) and tDCS (transcranial direct current stimulation)** treatments that directly stimulate the brain to improve functioning. In 2016, Sierra Tucson became the first residential treatment center in the nation to offer TMS.

TMS is a non-invasive treatment that uses large magnetic devices to change the brain’s electromagnetic environment to reduce the symptoms of depression without the need for medication or other invasive treatments. As a patient sits comfortably in a chair during a TMS session, a device containing an electromagnetic coil is placed against a patient’s scalp and painlessly delivers a magnetic pulse that stimulates nerve cells in a region of the brain involved in mood control. tDCS treatment is similar to TMS, except it uses electrical stimulation instead of magnetic pulses. Like TMS, patients sit quietly in a chair for a limited period of time (typically 20 minutes) while the brain is being stimulated. This brain stimulation is thought to induce neuroplasticity, making the brain better able to change its patterns of activity.



- **EEG Brain Mapping** helps to identify patterns of brain activity related to problems in mental health.

Brain mapping at Sierra Tucson uses a Swingle's QuickQ, a mini qEEG, (a quantitative electroencephalograph) evaluation and a psychophysiological stress evaluation. Through applied electrodes located on specific coordinates on the scalp, brain waves are recorded, and the result is an interpretation specific to each individual.

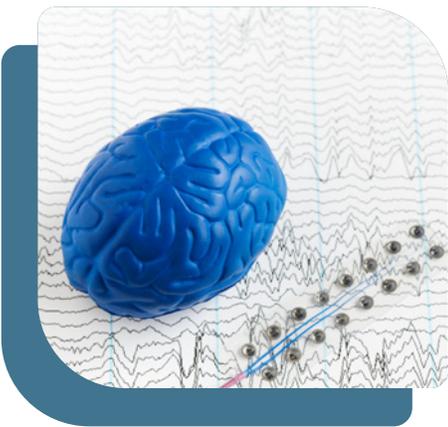
The qEEG assessment is interpreted by a Ph.D. Neurofeedback Practitioner. Additionally, the stress evaluation helps to determine what type of biofeedback or neurofeedback the patient will benefit from—whether it be training heart rate variability or training a particular type of brain activity.

- **Biofeedback and neurofeedback treatment** at Sierra Tucson helps individuals have better control over their mental and emotional states to address imbalances in brainwave activity.

Biofeedback and neurofeedback are the terms used to refer to therapeutic procedures that use electronic instruments to record and display biorhythmic and brainwave information. By watching and consciously learning to change these biorhythms, people can gain relief from anxiety, stress, and other mental health symptoms. These evidenced-based practices have been shown to reduce problematic symptoms and promote optimal performance. Sierra Tucson has pioneered a format using evidenced-based practices and proprietary protocols to help residents learn how to become more self-aware and empowered to achieve a state of regulation and resiliency.

Sierra Tucson's Predictive Modeling protocol has offered a groundbreaking progression in the tracking of treatment efficacy and continues to undergo improvements. By using predictive models to forecast changes in symptoms two weeks out, residents can more easily track their progress and feel confident in their perceived improvements. For therapists and medical providers, data from an individual's baseline mental health symptoms and positive indicators of their functioning, such as their coping skills, can help in the creation of more customized treatment plans.

Whether trauma stems from a previous motor vehicle accident, from adverse childhood experiences, is a response to military service, or occurs as a result of another life-altering event, Sierra Tucson is continuing to innovate treatment approaches based on Predictive Modeling data to help track therapy efficacy.





Staying Connected to Care after Residential Treatment



The Connect365 app helps to guide individuals on their recovery journey by promoting responsibility, accountability, and connection.

Sierra Tucson believes that the first year of recovery sets the stage for long-term success. Innovated by Sierra Tucson as an effective and engaging support tool, Connect365 is a yearlong support program provided to individuals once they leave treatment. Offered at no charge to Sierra Tucson alumni, it bridges the gap between residential treatment and life in recovery.

The Connect365 program offers participants the tools they need to enjoy a strong recovery while maintaining daily contact with their team for guidance and support with a proprietary Connect365 app and personal Recovery Coach. The user-friendly app is an easy and effective way to promote responsibility and accountability and helps participants stay connected and engaged with a variety of content.

In addition to the app, a Recovery Coach is available to communicate with the individual on a weekly basis via phone, email, and/or secure chat. Recovery Coaches deliver personalized support and relapse prevention assistance with the understanding that detailed information and other confidential information shared is HIPAA compliant.

Creating the Future of Trauma Care from a Foundation of Treatment Success

Sierra Tucson is embarking on the creation of a Research Institute designed to create partnerships with academic institutions, device manufacturers, trainers in therapeutic techniques, and others who are innovating cutting edge treatments for trauma, anxiety, depression, addiction, and other mental health concerns. With a team of physicians, psychologists, psychiatrists, neuroscientists, and therapists, the Sierra Tucson Research Institute (STRI) represents an evolution in Sierra Tucson's legacy of care that follows a successful track record in treating patients regardless of which treatment programs they enroll in.

Additional future innovations include:

- **Vagal nerve stimulation treatment.** Using a low-amplitude electrical stimulation of the vagus nerve through the neck, this treatment was recently granted breakthrough FDA approval for treating PTSD.
- **A new TMS protocol specialized for PTSD.** More recent research has found that stimulating different regions of the brain may be better for specifically decreasing trauma symptoms.



- **Broadening availability of Somatic Experiencing.** Somatic Experiencing has been found to be effective for trauma, anxiety, depression, chronic pain, and substance use disorders. It can help individuals release stored tension and bring a new awareness to the body by helping individuals reset their nervous system. The Somatic Experiencing Institute, the leading authority on the SE™ method is collaborating with the STRI to provide research and additional training for Sierra Tucson providers. With additional trained practitioners available more residents will be able to take advantage of this treatment modality.

Tracking Treatment Outcomes at Sierra Tucson

Tracking resident treatment outcomes is standard practice at Sierra Tucson. Sierra Tucson assesses the outcomes of its patients via the Measurement-Based Care (MBC) program, which records their outcomes while they are being treated at Sierra Tucson, and through the Connect365 program, which records outcomes for the first year after patients have left residential care. By taking in-facility tracking one step further and providing outcomes tracking for the first year of discharge from treatment (at no additional charge) the additional information will potentially build a better data profile as research continues to be gathered for future care improvements.

Treatment Outcomes in 2022:

- Within the first 2 weeks of treatment, PTSD symptoms declined by an average of 1/3.
- Within the first 2 weeks of treatment, patients' average rating of their Quality of Life has increased by 49%.
- After discharge, patients report 91% compliance with their continuing care recommendations.
- After discharge, patients report using substances (including alcohol) less than 2 days a month, down from 10 days a month before treatment.
- After discharge, patients report a 36% improvement in their satisfaction with their close relationships.

