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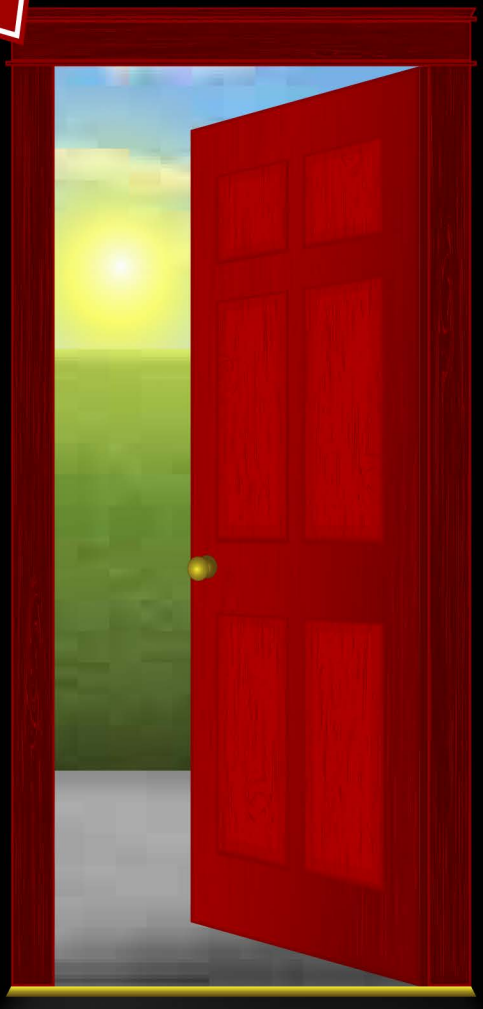
EXIT STRATEGY For

POST-TRAUMATIC STRESS DISORDER

NEW HOPE FOR WAR FIGHTERS & CIVILIANS ALIKE



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Exit Strategy for Post-Traumatic Stress Disorder

New Hope for War Fighters and Civilians Alike

With a forward by:

Doctor Philip A. De Fina PhD
Chief Executive and Scientific Officer at the not-for-profit
International Brain Research Foundation Inc.

Eugene Gregory Lipov, MD
Briana Marie Kelzenberg MS, PA-C

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FORWARD

Philip A. De Fina, PhD

I met Eugene via mutual acquaintance two years ago while searching for new approaches to treat traumatic brain injury (TBI) and PTSD. His energy and knowledge were compelling. It has been a pleasure to see his ideas flourish and demonstrate replicability by other teams. This work summarizes the current state of PTSD diagnosis and treatment, and is written in a form that is easy to understand. The novel PTSD treatments pioneered by Dr Lipov are understandable and the hope that is offered by his approach is almost palpable. Yet his results will still be considered a "fluke" by many. My own publications regarding waking people out of a coma were similarly labeled, and happily I continued to witness many such "flukes." Such contributions are nevertheless valuable, and Dr. Lipov's work in the field of PTSD will point researchers in new directions for many years to come.

Dr. Philip A. DeFina is Chief Executive and Scientific Officer at the not-for-profit International Brain Research Foundation Inc. His work in restoring consciousness to coma patients has been featured in

the lay press. His organization was recently awarded $6.4 million by the Department of Defense to explore treatment options for the thousands of war veterans who return home with traumatic brain injuries.

PREFACE

With so many PTSD books on the market, what makes this one noteworthy? We believe that paradigm shift in the diagnosis and treatment of PTSD is imminent, predicated on advances in our understanding of neurobiology and no longer based on a purely psychiatric notion of the condition. The goal of this book is to provide an introduction on contemporary understanding of PTSD as well as forecast where we believe diagnostic and treatment advances will be made.

The need for an effective approach to treating PTSD cannot be overstated. Today we are losing more soldiers to PTSD-related suicides than fatalities on the battlefield. In fact, the VA estimates that 1,000 veterans attempt suicide per month. The number of military members and civilians affected by this condition continues to climb at an exponential rate. Unfortunately, conventional approaches do not seem to offer significant relief. The Institute of Medicine made a grim pronouncement in 2007 stating “all current treatments have disappointing results” (Institute of Medicine, 2007).

Since then, over two billion Federal dollars have been allocated to the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury to pursue effective treatments for PTSD. To date, the efficacy of these investigational treatments still remains disappointing. An equally sad commentary was made by a senior PTSD scientist from Harvard University who stated "most pharmaceuticals used for PTSD are not totally useless."

In addition to the human cost of disorder, the financial burden is staggering. In a recent book written in 2008, "The Three Trillion Dollar War: The True Cost of the Iraq Conflict," the estimated cost of disability payments with solders with PTSD was projected to be in excess of $650 billion over the next 20 years. This figure does not include the current annual treatment cost of PTSD at $6,000 to $30,000 dollars per patient.

So have we entered PTSD Hell? And should we, as in Dante's inferno, "abandon all hope, ye who enter here" as was written on the gates to Hell in that famous book? We must say NO!

I believe that hope exists for effective diagnosis and treatment of PTSD and we can win the PTSD battle. In the pages that follow we will review the history of PTSD, the cost of the problem, financial as well as human. New insights into the diagnosis and the neurological basis of the condition are reviewed. Then we turn to a novel treatment pioneered by the author—the new application of an old technique used in anesthesiology, called the stellate ganglion block (SGB). Our team developed this approach in 2007 and we have seen SGB successfully applied in four military institutions for the treatment of PTSD, institutions were: Walter Reed Army Medical Center (Mulvaney 2010), the San Diego Naval Hospital, Tripler Army Medical Center, Hawaii and North Carolina V.A. Included in the book are stories of real people, military and non-military, which have been reported in the press.

We conclude with a discussion of the future direction of diagnosis, treatment, and even prevention. We hope this book offers new hope for the silent suffering – those dealing with this debilitating condition.

Eugene Lipov, MD
Director of Pain Research
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2011

1: A BRIEF HISTORY OF PTSD

Stress and trauma are a part of the human condition. Trauma that is a catastrophic stressor, being defined as "outside the range of usual human experience" such as war, torture, rape, or natural disaster, commonly leads to PTSD. Stressors can be physical or emotional, or a combination of both. Experiencing severe trauma can clearly lead to post-traumatic stress disorder (PTSD). The prevalence of PTSD among the general population is commonly reported as being 4 percent for men and 10 percent for women. Rates appear much higher among veterans. Following the Vietnam conflict, approximately 30 percent of veterans reported symptoms of PTSD. Among Gulf War veterans, estimates range from 10 percent to 25 percent (1). Most likely those numbers are a significant underestimate due to the stigma of a mental disorder in general and PTSD specifically. The negative association with mental illness erects obstacles to necessary care and leads to suicides and other avoidable catastrophes such as domestic violence.

Today, a variety of factors make it hard to escape traumatic events. International terrorism triggered large scale military operations. These engagements span the globe and are likely to continue for years to come. Civilian populations are no longer sheltered from the horrors of war and disasters, natural and man-made. Media coverage of devastating earthquakes, tsunami, hurricanes and civil unrest is nearly instantaneous. This onslaught of information and graphic imagery may predispose modern man to psychiatric trauma in a way we are only beginning to understand.

Before turning to diagnosis and treatment, we put the condition in historical context.

The evolution of the PTSD label

Signs and symptoms of PTSD have long been described. Examples are found in mythological, historical and literary sources. Shakespeare's character, Hotspur, in Henry IV became melancholy and withdrawn after losing a kinsman in battle (2). Dating back to the Spartans, the symptoms of PTSD are described in "The Tremble" (private communication).

In more recent times, nostalgia was used in the 1600s to describe the deep despair among troops with little prospect of leave (2). The term wind contusion (1914-1918) referred to what is now known as traumatic brain injury (or TBI) (2). It described symptoms exhibited by a soldier who was close to a passing projectile or near an explosion but who had no wound.

During the early 1800s, military doctors began diagnosing soldiers with exhaustion following the stress of battle. During the same period, the terms railway spine and railway hysteria emerged. These were used to describe the trauma of surviving a catastrophic railway accident. Both terms bear a remarkable resemblance to what we now call PTSD.

Following the Civil War (1861–1865), veterans were described as having irritable heart or soldiers' heart by Dr. Mendez DaCosta (3). In his 1876 research paper, Dr. DaCosta described startle responses, hyper-vigilance, and heart arrhythmias.

Crimean War (1853-1856) veterans were similarly affected. Their Crimean Fever was described as clammy sweats, irritable heart and being "utterly

unnerved and violently agitated." During the 20th century, two world wars and the ongoing war on terrorism introduced many more descriptions of PTSD-like symptoms. In World War I (1914-1918) the terms combat fatigue and shell shock were introduced; in World War II (1939-1945) the term battle fatigue was coined.

The wide variety of mental health conditions were codified in 1952 when the first edition of Diagnostic and Statistical Manual of Mental Disorders (DSM-I) was published. This first edition used the term stress reaction. Following the Vietnam conflict (1961-1975), the term Vietnam Syndrome emerged. In the 1980s, the term PTSD was finally introduced in the DSM-III (4).

Role of the Diagnostic and Statistical Manual (DSM)

When the first edition was published in 1952, about 60 different disorders were included. The second

edition was released in 1968. Both were guided by the "psychodynamic approach." In this model there is no clear line between "normal" and "abnormal." Mental disorders exist on a continuum of behavior. They are all responses to environmental stimuli. In this context, everyone is a touch abnormal.

When the DSM-III was released in 1980, the psychodynamic view had fallen out of favor. The new "medical model" provided more stringent guidelines. It was in the DSM-III that the term "post-traumatic stress disorder" was introduced under a sub-category of "anxiety disorders." In 1994, the DSM-IV was released, and it remains the standard today.

In today's DSM definition, PTSD is a psychological condition brought on by experiencing a traumatic event. The event is caused by a catastrophic stressor outside the range of usual human experience (such as war, torture, rape, or natural disaster).

Because trauma and stress are universal, other cultures continue to recognize PTSD-like symptoms. Following the war in Chechnya, "Chechnya Syndrome" was described among Russian soldiers. As is true

among US soldiers today, the condition is linked to an increased risk of suicide. Regardless of the culture or label, the condition presents as numbness, avoidance, hypervigilance, or hyperarousal. We describe the details of diagnosis in Chapter 5.

2: COST OF PTSD

The definition of PTSD has evolved, making it difficult to pinpoint a precise estimate of prevalence. Today, 10 percent to 30 percent of veterans return home from deployment with PTSD. Rates increase with extended and repeat deployments, among other factors. Over 400,000 veterans currently receive disability benefits for PTSD, the most common reason for disability claims. (1)

Because living with PTSD affects so many aspects of daily life, the impact on quality of life is tremendous. This ripple effect is broad: it's hard to hold down a job, relationships fail, and reservists might not be able to respond to domestic disasters, such as a hurricane or tornado. Long term mental disability also leads to poor physical health. The Veterans Disability Benefits Commission reported that veterans have the poorest overall health care and quality of life. In fact, one in three veterans is not able to work at all. Unfortunately, many veterans wait years to seek treatment.

The cost of treatment is a burden, both to the patient and the health care system. Counseling is roughly $6,000 per year. Add in medication and treatment for one veteran will cost between $6,000 and $30,000 per year (2). The total projected cost of PTSD disability claims alone (excluding cost of treatment) for veterans was estimated to be $650 billion over the next 20 years. This was more than the entire cost of war by that time. (3) However, lack of treatment carries an unfathomable price tag. Not counting the social and emotional costs, a RAND study found that losing soldiers to PTSD and suicide costs between $4 and $6 billion over a two-year period (2).

Treatments for PTSD are as complex as the condition. They have similarly evolved with time and enhanced understanding. Successful treatment helps the patient respond appropriately to stressful stimuli. The “gold standard” today is counseling and medication, but a wide range of experimental approaches have been studied. Unfortunately, none seem likely to have near-term impact (for details, please see Chapter 9).

Experts think that the reported 400,000 soldiers returning with PTSD in the last decade is only the tip

of the iceberg. The sky-rocketing suicide rates (addressed in the next chapter) and increasing crime rates among veterans are just sentinel warnings of PTSD. As discussed in War Crimes by Kaj Larsen, Colorado Springs has become ground zero in what may be an approaching tsunami: the alarming rise in soldiers arrested for violent crimes. Traumatized by war, a growing number of these vets are now bringing the violence home. (4)

Consider the graphic on the next page. We are about to rendezvous with a PTSD iceberg. It is imperative that the ship alter course. A key component of this course correction is addressing the PTSD epidemic. As the graphic illustrates, crime and suicides are the most visible signs of the massive problems below the surface. Those with PTSD must be offered relief before the impact of crime and suicides devastates more families.


U.S.A.
PTSD

3: LOSING THE BATTLE — SUICIDE AMONG SOLDIERS

From the invasion of Afghanistan in 2002 until summer of 2010, the U.S. military lost 761 soldiers in combat. Yet, astoundingly, we lost more soldiers (817) to an inner enemy—suicide—during that same period.

A recent document filed in the 9th Federal Circuit Court of Appeals cited the following statistics: 18 veterans per day take their lives and 1 in 4 of them is enrolled in the VA medical system. Among all veterans in the VA system, 1,000 attempt suicide each month. (1)

The suicide rate among service members had historically been lower than a comparable sample from the general population (i.e., similar age, gender and racial makeup as service members). But that gap is closing. The overall rate across the Department of Defense has risen approximately 50% between 2001 and 2008 (10.3 per 100,000 to 15.8 per 100,000). Much of the jump is due to a doubling in the number of Army suicides. The Marine Corps and the Army have the highest rates (19.5 and 18.5, respectively)

followed by the Air Force and the Navy (12.1 and 11.6, respectively). Suicides among females are increasing as well. Military service stateside can be very stressful—a third of suicides occur among those who have never deployed.

With the number of suicides increasing year after year, there is now widespread concern in Congress, the Department of Defense, and the general public. We know that the stress of repeated deployments to theaters around the world affects our service members and their families. Experts have been reviewing suicide prevention programs in each branch of the service. Resiliency training is provided for service members and their families pre-deployment. Surveillance is also in place when units return home to identify those at risk. The stigma of seeking or being referred to behavioral health professionals is gradually easing. But access to high quality care remains an issue. And the suicide rate keeps climbing.

We briefly review who is at risk, and introduce a new treatment option which may address one of the root causes: PTSD.

Who is at risk?

Anecdotal evidence suggests that repeated deployments lead to fractured relationships, increasing suicide risk. But the data is hard to dissect. Statistically speaking, the numbers are very small. This makes it hard to distinguish differences in suicide rates by demographic characteristics. Researchers are importing findings from community studies, coupling this knowledge with intuition to serve the military community better.

The top brass has committed resources to address risk factors for suicide. Chaplains receive training, specialists are embedded in deployed units, and behavioral health specialists are being placed in non-traditional settings (such as in a primary care clinic). But are there specific risk factors service buddies may identify first?

Yes. We know that depression is a major risk factor—approximately 4% of those with depression will die by suicide. We also know that past attempts or ideations (expressing a desire to commit suicide) are key indicators of risk. Those with PTSD are also at higher risk for suicidal thoughts and previous attempts. And finally, substance abuse leads to impulsivity. While

drugs are not typically involved (due to random testing), one in five service members reports heavy alcohol use (more than 5 drinks at a time during a typical drinking occasion at least once a week). Having one or more of these characteristics may elevate the risk of suicide.

> Mark has just returned from an 8-month tour in Afghanistan, his third. His wife just delivered their second child. He is tired but trying to juggle many competing demands at work and home. He tends to be emotionally distant to keep the battlefield from creeping into his consciousness. But his new "little man" is disrupting his sleep, eroding his coping mechanisms. And glancing around the dry, rocky terrain where they live can cause a flashback.
>
> He is drinking more than he used to and is tired. He just wants to be alone much of the time. Mark's wife just wants her husband back, the way he was on shore duty when they conceived. Shouldn't he

be thrilled to be a new dad again, home safe with his family?

Is this the early stages of depression? PTSD? Possibly. It is not hard to envision where this could go without some help: The survivor may continue to withdraw from family, thinking it's the best strategy to avoid conflict. He may avoid triggers by driving a different route to work, and may continue to use alcohol to numb all the conflicting emotions. Avoidance may cause troubled relationships, leading to further withdrawal. Fractured relationships may, in turn, lead to full blown depression, and more drinking. Hopelessness, availability of a fire arm, stress at work, and the perceived stigma of seeking out treatment doesn't help matters…it's easy to see this ending in tragedy.

But this battle isn't over.

A new front

As will be detailed later, a new treatment option can provide nearly immediate relief (30 minutes) from PTSD. The stellate ganglion block (SGB), long used to treat chronic pain, is showing promise as a treatment

for PTSD. Treating PTSD may be a significant factor in reducing the steady rise in suicides. Marines, soldiers, sailors and airmen can help each other by showing solidarity, providing moral support, and helping each other take the courageous step of seeking professional help. There are numerous ways to get help winning these personal battles.

Back to Mark's situation…

Until the SBG is approved for PTSD treatment, he can look for local options. He could start with the base or unit chaplain—his conversation will be completely confidential. He can also see his primary care manager or deployment health clinic. They'll provide a referral to behavioral health if needed. Mark should also keep an eye out for anonymous hotlines set up specifically for military members, such as the DSTRESS line (877-476-7734 available 24/7; or www.dstressline.com for live chat). If he is encouraged to seek help soon, Mark might win his personal battles quickly and quietly.

4: PTSD AMONG WOMEN IN THE MILITARY

Role of Women in the Military

As far back as the Revolutionary War (1775-1783) women have been serving vital roles in the United States military. Initially, a woman's role was strictly supportive, such as nurses, cooks, clerks, typists, and telephone operators. Today, women are integrated into almost every aspect of the military. Their roles have broadened to include fighter pilots and the submarine service.

In Iraq and Afghanistan, women stood side-by-side with their male peers in bomb disposal and conducting raids. According to a 2009 New York Times article, manpower shortages were filled by women being "attached" to combat units, rather than formally assigned. (1) Women of the armed forces are now seeing and experiencing the same trauma as men in the military.

As of 2010, there were nearly 214,000 women actively serving in the US military. Another 190,000 women serve in the Guard and Reserves. Together they

comprise approximately 15 percent of the military. As their number continues to rise and roles diversify, they merit special attention regarding the occurrence and treatment of PTSD.

The Cold, Hard Facts

There is some debate about the gender-specific prevalence of PTSD in the armed forces. (2) Most of the published studies have found that women are twice as likely to have PTSD.

There are a number of possible explanations for this discrepancy between the sexes. Pre-existing psychiatric conditions increase the risk. For instance, women tend to have higher rates of anxiety and depression. Other risk factors that affect women more than men include sexual trauma, poverty and domestic violence. These factors point to an environmental, rather than biological, predisposition for PTSD.

The genders also differ in how their PTSD symptoms are expressed. Women tend to resort to avoidance and numbing. Men tend to be angry and irritable. This disparity in presentation may mean that the number

of women with PTSD is underestimated. A woman may suffer her symptoms in silence, while a husband or son with noticeable anger outbursts is encouraged to seek help.

Military Sexual Trauma

Sexual assault is the leading risk factor for PTSD in both civilian and military environments. Military sexual trauma (MST) promotes an even greater risk of developing PTSD than civilian sexual trauma. (3) Female veterans with MST are nine times more likely to develop PTSD than female veterans without MST. The emotional trauma caused by violation from another human appears to surpass that of bombs.

The overall risk of MST is approximately 28-41 percent. Military experience seems to double the lifetime risk of a sexual assault compared to women without military experience. However, the assault is more likely to happen outside of military service. Thus, military service may be a proxy for an unmeasured risk factor. The majority of victims report that at least one assault was by a military peer or superior (4,5).

These women are reluctant to file reports due to the impact on the perpetrator's career. The military medical-legal system may also pose barriers to reporting. The victims of MST reported statistically significant increased feelings of depression, anxiety, guilt/blame, distrust, and reluctance to seek further help, compared to victims of sexual assault outside of the military. This brings us to the next topic of "secondary victimization," otherwise known as the "second rape."

Sexual assault victims are at increased risk of developing PTSD if they experience additional emotional trauma during reporting. Their PTSD may also be more severe due to the additional emotional distress. Research shows a correlation between the amount of secondary victimization, and the amount of distress a victim suffers. The more guilt, blame, depression, anxiety, and distrust experienced, the higher the PTSD score.

The Aftermath

In addition to the PTSD symptoms, the survivor's life becomes consumed by medical visits. The physical

symptoms often reported by women with PTSD include pelvic pain, menstrual problems, back pain, gastrointestinal problems, headaches, and chronic fatigue. Like men with PTSD, female veterans with PTSD also tend to be depressed, smoke, and abuse alcohol (6). Having PTSD increases the odds that the woman will have a variety of non-specific complaints. These "somatization" disorders lead to office visits with no solid outcome and sometimes disability. This frustrating pursuit of relief continues as the woman's quality of life deteriorates. In fact, women who have survived a sexual assault in addition to violence report an extremely low quality of life.

Compounding the issue, female MST survivors also report a lower quality of social life. Their economic and educational achievements fall far below non-sexually assaulted female veterans. They are less likely to finish college and their annual incomes are less than $25,000(7).

As the number of females joining the armed forces continues to rise, there needs to be an increased awareness of the frequency of MST and PTSD. Both military and civilian communities need to be educated

on the risk factors, presenting symptoms, consequences, and treatment options (discussed in other chapters) of PTSD in women. The more supportive measures we can provide for these brave women, the greater the chance we have for winning their PTSD battle.

5: CONVENTIONAL APPROACH TO DIAGNOSING PTSD

After a traumatic event, it is normal to have strong feelings of anxiety, sadness, stress, nightmares, memories about the event, and even problems sleeping at night. While these are all symptoms of PTSD, it does not necessarily mean the person has PTSD. Think of it this way: headaches can be a symptom of a bigger problem, such as the flu. However, having a headache does not necessarily mean that you have the flu. The same is true for PTSD. Many of the symptoms of PTSD are part of the body's normal response to stress. For this reason, mental health professionals refer to the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV). The six criteria of PTSD are described below (1).

Criterion A: stressor

The person has been exposed to a traumatic event in which both of the following have been present:

1. The person has experienced, witnessed, or been confronted with an event or events that involve actual or threatened death or serious injury, or a threat to the physical integrity of oneself or others.
2. The person's response involved intense fear, helplessness, or horror. Note: in children, it may be expressed instead by disorganized or agitated behavior.

Criterion B: intrusive recollection

The traumatic event is persistently re-experienced in at least one of the following ways:

1. Recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. Note: in

young children, repetitive play may occur in which themes or aspects of the trauma are expressed.

2. Recurrent distressing dreams of the event. Note: in children, there may be frightening dreams without recognizable content.
3. Acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur upon awakening or when intoxicated). Note: in children, trauma-specific reenactment may occur.
4. Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
5. Physiologic reactivity upon exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.

Criterion C: avoidant/numbing

Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by at least three of the following:

1. Efforts to avoid thoughts, feelings, or conversations associated with the trauma
2. Efforts to avoid activities, places, or people that arouse recollections of the trauma
3. Inability to recall an important aspect of the trauma
4. Markedly diminished interest or participation in significant activities
5. Feeling of detachment or estrangement from others
6. Restricted range of affect (e.g., unable to have loving feelings)
7. Sense of foreshortened future (e.g., does

not expect to have a career, marriage, children, or a normal life span)

Criterion D: hyper-arousal

Persistent symptoms of increasing arousal (not present before the trauma), indicated by at least two of the following:

1. Difficulty falling or staying asleep
2. Irritability or outbursts of anger
3. Difficulty concentrating
4. Hyper-vigilance
5. Exaggerated startle response

Criterion E: duration

Duration of the disturbance (symptoms in B, C, and D) is more than one month.

Criterion F: functional significance

The disturbance causes clinically significant distress or impairment in social,

occupational, or other important areas of functioning.

Specify if Acute vs Chronic:

1. Acute: if duration of symptoms is less than three months
2. Chronic: if duration of symptoms is three months or more

Specify if Delayed Onset: Onset of symptoms at least six months after the stressor.

The diagnosis is currently made by using validated surveys such as the PTSD Check List (PCL). The PCL is a 17-item self-assessment via questionnaire. Another survey used is the Clinician-Administered PTSD Scale (CAPS). The gold standard in PTSD assessment, CAPS is a 30-item structured interview that corresponds to the DSM-IV criteria for PTSD.

As with most mental health diagnostic tools which have been used for decades, they are inherently subjective. An objective diagnosis, in contrast, relies on data, such as an x-ray to identify a broken bone.

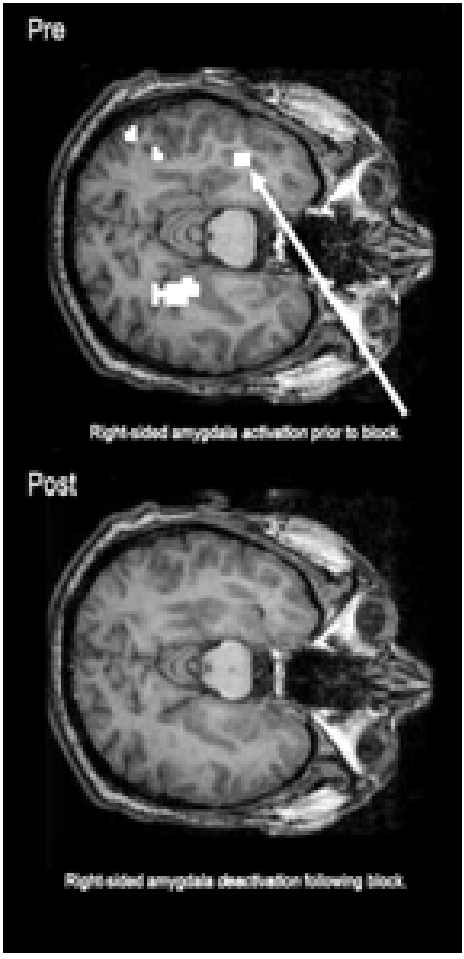
Our team believes that developing a more objective, validated diagnostic approach would increase the likelihood of patients seeking help for PTSD. Treatments would also have more solid evidence of success. The next chapter summarizes the advances in diagnostic imaging technology which are opening new doors to the diagnosis of PTSD.

6: NEW FRONTIERS IN THE DIAGNOSIS OF PTSD

Usually, PTSD is diagnosed using a patient questionnaire and observation by a doctor. Recently, researchers have turned to advanced imaging technology. These brain scans can provide objective data on brain function to diagnose PTSD. Two such tests are functional MRI and magnetoencephalography. Both of these tools are described here briefly because they show which brain areas are affected by PTSD.

Functional MRI (fMRI) is a special type of MRI scan. It measures the change in blood flow during brain activity. The fMRI has been used for a decade and is now being used to help those with PTSD. On the next page, data from an fMRI test show the brain in a patient with active PTSD prior to treatment in my clinic (Figure 1, top). In the bottom picture of Figure 1, the scan shows deactivation of this region in the brain after the SGB.

Figure 1. Pre- and post-treatment fMRI scans of a patient with PTSD.

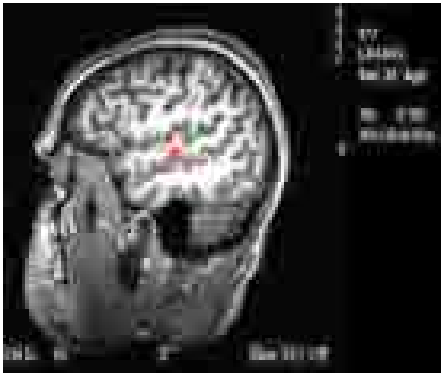


The MEG approach seems to have a significant advantage over fMRI due to the speed and accuracy of the scan. Dr. Apostolos Georgopoulos, a VA neuroscientist, has shown that MEG alone can correctly distinguish among patients with PTSD and without PTSD (the “controls”) more than 90 percent of the time. This paper was published in January 2010 in the Journal of Neural Engineering (1).

The MEG test measures magnetic fluctuations as groups of neurons fire together far faster than other scanners can capture (such as CT scans and MRIs). While MEG is considered cutting edge, it is by no means new technology and has been under development since the1960s. The scan below demonstrates PTSD on MEG scan.

Figure 2. MEG scan of a patient with PTSD.

Figure 2. MEG scan of a patient with PTSD.



Imaging technology helps researchers and doctors better understand the biology behind the changes PTSD causes in the brain. By adding these imaging tests to the traditional questionnaires and DSM-IV criteria, we can diagnose PTSD with greater accuracy. Following treatment, the imaging can be repeated to measure improvement in symptoms. As the acceptance of such neurodiagnostic imaging grows, we hope those with PTSD may be more confident seeking treatment. These advances go a long way to validating the biology underlying PTSD. As we discuss next, it is time for a new label for the condition to reflect this knowledge. A new name may also improve access to care for the patients suffering from the condition.

7: WHAT'S IN A NAME? IMPROVING ACCESS TO TREATMENT

As presented in Chapter 1, the term PTSD is only the latest in a long line of terms describing the same condition. There is a movement today to rename PTSD. Losing the word "disorder" would lift the stigma associated with the condition, making active duty military personnel and veterans less hesitant to seek treatment. Jonathan Shay, M.D., Ph.D., a psychiatrist who most recently worked at the VA clinic in Boston, echoed these sentiments in remarks at the American Psychoanalytic Association meeting (1).

Such views have also been well-received in Congress. Former chairman of the VA Subcommittee, Robert Filner, proposed "PTS" instead (2). Removing the word "disorder" might reduce the negative connotations. Making it easier to talk about would improve access to care. As Dr. Shay pointed out, if a soldier loses an arm in a roadside bombing incident, "he wouldn't be diagnosed with 'MAD,' or missing arm disorder." (1) But, we believe, changing the name to PTS doesn't go quite far enough.

A new term is needed to convey the physiological cause of this condition. We propose the biological term “complex cortical injury” or CCI. This descriptive term would include both PTSD and mild traumatic brain injury (TBI). Both PTSD and TBI describe real neurological changes in the cortex. Both conditions share many common features. These changes are caused by experiencing or seeing severe trauma as well as many near misses directed at US forces. Approximately 10% of soldiers deployed to Iraq and Afghanistan are thought to have mild TBI. The advanced imaging technology described previously may greatly facilitate the identification of CCI. In so doing, we can improve access to care and treatment outcomes. Progress can be made in halting, and possibly reversing, the escalation in suicide rates.

Dr. Shay concludes that physicians should look at PTSD as they would any physical injury, and identify the problem as early as possible. “I want to get everyone thinking like a trauma surgeon rather than an internist” (1). We agree. Dr Lipov had surgical trauma training in Cook County Hospital in Chicago, one of the premier trauma hospitals in its day. We

agree with Dr Shay and believe the need to treat PTSD is acute and grave.

8: CONVENTIONAL TREATMENT OF PTSD

The “gold standard” treatment for PTSD generally involves two separate but complimentary components. The first is the use of medication to reduce anxiety and/or arousal. These medications are in the class of selective serotonin reuptake inhibitors (SSRIs). These medications increase the amount of serotonin circulating in the brain and have a primary indication for mood disorders, but have been shown to be helpful in PTSD. At present, clinical trials have been carried out for four SSRIs including citalopram (Celexa), fluoxetine (Prozac), paroxetine (Paxil), and sertraline (Zoloft). Of these, only sertraline is currently FDA-approved with PTSD as an indication for use.

The other component of treatment is cognitive-behavioral therapy (CBT). During CBT, a therapist helps the client change how he or she thinks about the traumatic event and the response to that event. The main objective is to help the patient identify feelings associated with PTSD and then develop methods to cope with these feelings. In the case of exposure therapy, the goal is to reintroduce portions

of the traumatic event in a controlled, safe environment. The standard course of cognitive-behavioral therapy is three months with one to two visits per week.

Selective Serotonin Reuptake Inhibitors

The selective serotonin reuptake inhibitors (SSRIs), in particular sertraline (Zoloft) and paroxetine (Paxil), have emerged as the first-line treatment of choice for patients with PTSD. This is likely due not only to response rates but also because of the low frequency of significant side effects. Although there is considerable variability study-to-study, the average response rate for sertraline is 49-57%, and 42-53% for paroxetine. But, not all studies demonstrate significant clinical effects (1). For these studies, clinical response is defined as a significant reduction in anxiety symptoms. However, both commonly used drugs take between 2-8 weeks for maximal clinical effect and complete remission occurs for only a small minority (under 10%). As with most SSRIs, there is a high placebo response. Of the placebo-controlled

studies reviewed above, response rates for placebo range from 22-36%. There is elegant and rather extensive literature supporting the use of SSRIs for the treatment of PTSD both in isolation and in conjunction with cognitive-behavioral therapy. There are, however, a number of concerns and limitations that accompany both treatments:

Specific SSRIs may or may not work in any given patient. It is unknown why some people respond to one SSRI and not another. Genetics likely play a role. On average, in any given SSRI trial, 50-60% of patients respond with a reduction in symptoms.

Dosage of SSRIs must be increased gradually. Generally, it will take between 2-8 weeks for a therapeutic effect to be observed. These drugs generally have significant side-effects that interfere with daily activities (such as rashes, headaches, insomnia, joint and muscle pain, nausea, diarrhea, bleeding problems, diminished libido and suicidal ideation) (2).

Seroquel, a special case.

Seroquel is approved to treat schizophrenia, bipolar disorder and depression, but it has not been endorsed by the Food and Drug Administration as a treatment for insomnia. However, psychiatrists are permitted to prescribe approved drugs for other uses in a common practice known as "off-label" prescribing. It has been claimed that it is the only drug to offer relief from the nightmares and anxiety of PTSD. However, this may not be true since Prazosin demonstrated a dramatic 70-80% reduction in combat-related PTSD nightmares (3) without the side effects seen with Seroquel. Possible side effects of Seroquel include diabetes, weight gain and uncontrollable muscle spasms. These side effects have resulted in thousands of lawsuits. Researchers at Vanderbilt University published a study in the New England Journal of Medicine suggesting a new risk: sudden heart failure. The investigators found three cardiac deaths per year for every 1,000 patients taking anti-psychotic drugs like Seroquel (4). The cost of Seroquel is also significant. It was the VA's second-biggest prescription drug expenditure since 2007, behind the blood-thinner Plavix. The agency spent $125.4 million last fiscal year on Seroquel, up from $14.4 million in 2001. Spending on Seroquel by

the Department of Defense has increased nearly 700 percent since 2001, to $8.6 million last year, according to purchase records (5).

The pharmaceutical approach may be moving away from this conventional path. New techniques include modulation of the sympathetic nervous system (SNS) which is a part of the autonomic nervous system. The role of the SNS is to mobilize the body's resources under stress, to induce the fight-or-flight response. It is also constantly active at a basal level in order to maintain homeostasis. In PTSD, the SNS is known to be chronically activated over the normal baseline levels (6). A more effective approach to correcting SNS activity may be the stellate ganglion block, discussed in the second part of this book. Although polypharmacy plus CBT is the current standard of care, there is limited evidence for success of these treatments. High-quality studies can assist clinicians in providing the best possible care to veterans and others who suffer from this serious disorder.

How does Cognitive Behavior Therapy help?

Cognitive-Behavioral Therapy (or CBT) helps people change the way they think about situations or feelings. In so doing, CBT helps people respond differently even though the situation or feeling remains the same. For instance, CBT has been used for decades to help people overcome a wide variety of unhealthy habits like overeating or smoking. Because CBT helps change thought patterns, it is also used to treat PTSD.

People with PTSD often become fearful of reminders about their traumatic event. Certain pictures, smells, or sounds can trigger intrusive thoughts and feelings connected with the traumatic event. They may also cause nightmares, disrupting sleep patterns and compounding the stress. Thus, the person with PTSD naturally tries to avoid situations likely to cause flashbacks.

While avoidance is a natural response, it short-circuits the healing process. It can even make PTSD symptoms last longer or become more intense. Eventually, the person might turn to drugs or alcohol to further avoid difficult feelings or pain. When avoidance becomes extreme, the survivor might have a hard time

resuming relationships at home and work. The survivor's quality of life begins to suffer.

The overall goal of therapy is to help the survivor change how he or she thinks about the traumatic event. The person can move on and resume a more normal life if he or she knows how to manage the PTSD symptoms instead of avoiding difficult situations. Exposure therapy is one component of CBT and is likely the most effective (per VA/DOD practice guidelines). Other forms of CBT include Stress-Inoculation Training, Cognitive-Processing Therapy, Acceptance and Commitment Therapy. Exposure therapy is reviewed briefly to give the reader a sense of what is actually happening in therapy.

Exposure Therapy

The goal of exposure therapy is to help reduce the level of fear and anxiety connected with trauma reminders. If the fear is lessened, so might the tendency toward avoidance. As the name implies, exposure therapy gives the client practice confronting reminders in a safe and controlled setting (such as

viewing a picture that reminds him or her of the traumatic incident).

Often, exposure therapy is paired with teaching relaxation skills. Relaxation techniques help the patient manage his/her anxiety and fear instead of avoiding it. The client learns that these symptoms will lessen with time and practice. Eventually, the reminders will no longer cause such intense reactions.

So, how exactly does a person actively confront feared situations, thoughts, and emotions during exposure therapy? The patient might directly confront feared objects or activities with the therapist. Or if this is not possible, the client would be asked to imagine a situation (such as a combat experience). Some high-tech methods help with this approach such as "Virtual Iraq" and others.

Some people are hesitant to go through exposure therapy because it sounds scary to confront fears. It requires a tremendous commitment and can be difficult at times. This may lead to lack of compliance or coming back for therapy. A key component of most conventional treatments for PTSD is confronting and

dealing with feared situations, thoughts, and feelings. Conventional treatments simply differ in the way this is accomplished.

9: ALTERNATIVE APPROACHES FOR TREATING PTSD

Multiple approaches have been tried to treat PTSD, including the more recent bio-energy techniques such as Qi gong, Reiki, distant healing and acupuncture. According to Army Brig. Gen. Lorie Sutton, the list of treatments employed over the centuries include music, animal-facilitated therapy, art, dance/movement, massage therapy, EMDR, virtual reality, acupuncture, spiritual ministry, transcendental meditation, and yoga. As head of the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury, Dr. Sutton says “it just makes sense to bring all potential therapies to bear" (1). The last alternative approach, prior to the reassignment of General Sutton, was the Theater of War.

In this "Theater of War," the wounds date back millennia and the words spoken by actors are translated from Greek, but they speak to Iraq and Afghanistan combat veterans and the doctors and therapists who treat them. In fact, writer and producer Bryan Doerries was inspired to produce the

performance by Dr. Jonathan Shay, author of the psychology book "Achilles in Vietnam," based on the premise that Greeks used theater as a way to reintroduce combat veterans into society through the plays of Sophocles and others. Unfortunately, the above out-of-the-box approaches have not produced significant results, and Dr Sutton, as well as her replacement, have been reassigned.

Other attempts at treating PTSD include use of the street drug Ecstasy. The National Institutes of Health (NIH) spent in excess of 5 million dollars to evaluate this approach. The FDA has approved a clinical protocol that combines Ecstasy, technically MDMA (methylenedioxymethamphetamine), with talk therapy sessions. The study itself has provoked controversy because there are significant doubts about the long-term risks of Ecstasy and the lack of efficacy. Another approach is known as Eye Movement Desensitization and Reprocessing (EMDR). Its efficacy to date is approximately 25-33% but the research is not clear on how it works.

As discussed above PTSD treatments have come a long way without demonstrating efficacy. The primary

author of this book introduced a novel and effective approach to treat PTSD called stellate ganglion block (SGB), and the rest of the book focuses on this approach.

10: Stellate Ganglion Block (SGB), a hope on the horizon.

We believe the new horizon in psychiatry is the biological basis of behavior. Psychiatric conditions are starting to be seen as biologic in nature, and some have suggested PTSD is similar to pain. This was recently highlighted when emotional upset responded well to acetaminophen (1). Thus, it is not entirely surprising that a pain procedure such as SGB would help those with PTSD.

The stellate ganglion block (SGB) is an anesthetic injection in a group of nerves in the neck, called the stellate ganglion. The anesthetic is bupivacaine, the same medication often used in an epidural during labor and delivery. The SGB is not a new procedure. It has been used since 1925 to treat chronic pain (such as CRPS). Those with CRPS usually report heavy sweating and a burning feeling. The SGB can also be used to treat headache and pain from shingles.

The primary author of the book was the first to apply SGB to treat PTSD (2). Utilization of an anesthetic technique to treat psychiatric conditions may seem improbable, however SGB has been used in the past

for this purpose. A few examples are as follows: successful treatment of depression at the Cleveland Clinic, 1947 (3); post-climacteric psychosis (psychosis due to menopause) (4); panic disorder (5); schizophrenia (6); and most recently civilian PTSD (2) and military- related PTSD (7). These striking results were also replicated in animal models (8).

Unfortunately, these reports of positive effects after an SGB were largely ignored until very recently. Two issues were stacked against the SGB: 1) it bucked the current trend of cognitive therapy and pharmacological approaches, and 2) doctors were unsure how it actually worked.

This is not the first time that the SGB has been underutilized. In 1954, Dr. Moore wrote in his book, Stellate Ganglion Block:

> "Often in disease where in Stellate block has proven its value, it is tried only as the last resort when all other medical and surgical therapy has been exhausted. Such neglect of a valuable measure should be condemned. When problems arise ... this

procedure should be used immediately in conjunction with other acceptable medical therapy, not as a last resort." (9)

We hope to bring this approach to clinical use to relive the PTSD burden in the near future.

11: FREQUENTLY ASKED QUESTIONS REGARDING SGB AS PTSD TREATMENT

What is the PTSD treatment technique?

Stellate ganglion block (SGB) –the 'block' is an injection of an anesthetic, bupivacaine, which is commonly used during labor epidurals.

How is it applied? What is actually done.

A local anesthetic is injected next to the nerves in the neck.

The patient receiving a SGB lies on his or her back, flanked by an X-ray machine. Then a local anesthetic is used to numb the skin and surrounding tissue. The needle is then placed into the neck near the group of nerves called the stellate ganglion. These nerves are located at the seventh cervical vertebra (C7). With the needle in place, x-ray and dye is injected to help pinpoint the right location for the anesthetic.

What is Chicago Block? How different is it from SGB?

Historically, SGB has been done “blind” without the assistance of X-ray. The injection was fine-tuned by the patient describing what was being felt. The dose of the anesthetic was 10 to 15 cc. However, the higher the amount of anesthetic used the higher the chance of complications. Until now, C7 was believed to be the best target. But the C7 vertebra is much closer to the lung and arteries in the neck than C6, making this injection site less safe. Our team modified the SGB to address these issues and achieve better outcomes. Thus, to keep everyone straight, we define the “Chicago Block” as: right side injection of 7 cc bupivacaine at C6 (instead of C7).

Is FDA approval required to implement this approach?

No. The FDA has ruled that approval is not needed for this approach since SGB is a conventional procedure and uses a conventional anesthetic. Thus an exemption was granted for this approach.

How does SGB work in treating PTSD?

The stellate ganglion is a collection of nerves in the neck which are further connected to areas in the brain responsible for PTSD . Applying anesthetic to the ganglion reverses the brain changes of PTSD leading to the brain returning to a pre-trauma state (Details provided chapter below.)

How long does it take before the patient experiences relief from PTSD?

This question was studied in 7 patients and was found to have significant reduction of PTSD symptoms in 30 minutes after the treatment. This finding was presented at the anesthesia meeting (American Society of Interventional Pain Physician) ASIPP 2011.

How long does the effect last?

The first soldier's block was effective for 4 months. The second block is still effective 3 years later and the patient remains off all medications. Similar results were reported by Dr. Mulvaney in 2010.

Has this approach for PTSD treatment been validated in other centers?

Yes. Multiple military institutions have seen similar results. The institutions include Walter Reed Army Medical Center with Dr. Sean Mulvaney, San Diego Naval Hospital with Dr. Anita Hickey, and two other Military Hospitals. A total of 45 military personnel have been treated to date, most reporting excellent results.

Does SGB have non-military applications?

Yes. SGB has been successfully applied to women suffering from PTSD as a result of trauma, sexual and or domestic abuse.

Is it possible to wean the patients off the psychiatric medications after the treatment?

Yes. Both of Dr. Mulvaney's patients have been taken off of all psychiatric medications. Other clinicians have seen similar results.

How long has this method been used and are the downsides understood?

The SGB has been used safely since 1925, so it is well understood. The most common complication is seizures. These can be minimized by appropriately trained physicians and the use of X-ray guidance during the procedure. One large study of complications was undertaken in 1992 by German researchers Wulf and Maier. This study was done prior to X-ray guidance, which makes the procedure even safer today. The researchers evaluated surveys of all the physicians doing SGB in Germany in 1991. A combined total of 45,000 blocks were evaluated. They found that 14 patients had seizures, 9 had pneumothorax (air on the lungs) and few other complications. All of these were treated successfully. No fatalities were reported. Wulf and Maier concluded that severe complications following SGB are extremely rare. Keep in mind that the Chicago Block injection site is safer than SGB, especially if done with x-ray guidance.

12: PRESS COVERAGE AND MEDICAL JOURNAL ARTICLES ON SGB

All it takes to treat soldiers suffering from post-traumatic stress disorder is one good shot--- at least

according to a pioneering Chicago doctor. Dr. Eugene Lipov, an anesthesiologist and founder of Chicago's Advanced Pain Centers, says he has successfully treated 14 military veterans--- and dozens of others afflicted by the disorder--- using a single anesthetic injection to nerves in the neck. Now, years after Lipov began trying to sell the Pentagon on the tactic, the Navy has launched a two-year study of his approach. Dr. Anita Hickey, the principal investigator in the Navy's trials, said the procedure could prove more attractive to some soldiers than current treatments for PTSD. "Oftentimes, active-duty military are much more willing to come and get a (biomedical) procedure than to get psychological therapy or pharmacological therapy." she said. Called stellate-ganglion block, or SGB, the procedure involves a shot of local anesthetic directly into the body's sympathetic nervous system, via a bundle of nerves on the right side of the neck. The process seems to curb the body's "fight or flight" response, which can become chronically activated after stressful experiences lead to physical changes in the nerve bundle, which is known as the stellate ganglion. "The military will try dog therapy, where you pet a dog and

feel better?" Lipov told The Daily. "I don't get that. PTSD changes the brain, so the brain needs to be changed back."(1)

Israel News Coverage

… A new trial treatment from the US is now being introduced in Israel and maybe, maybe it will ease the burden of those suffering. It's a type of miracle shot. In Chicago, they found out that a small dose of local anaesthetic, similar to that used by your dentist before a procedure, when given as a shot in the neck, actually dramatically reduces flashbacks and anxiety for up to half a year or more and has been successful in some patients where all other treatments had failed…. This treatment is still in a trial process and I understand that Sheba hospital in Tel Hashomer wishes to join this research effort…

Dr. Chaim Moshe Adahan… Because there are so many cases of soldiers with Post Traumatic Stress Disorder (PTSD) here in Israel, Sheba Hospital in Tel Hashomer was chosen to join this research effort which today is also being studied by the US army to test the efficiency of this shot … What I saw in Chicago encourages me to test out this treatment

here in Israel… One ending comment. The Doctor was speaking about a US soldier who fought in Afghanistan and received the treatment, and of course our hope is that this treatment will help Israeli soldiers as well. Again, this is a wonderful opportunity for 2 military allies to collaborate at defeating a common post battlefield enemy, P.T.S.D.(2)

Pentagon Scientists Inject Necks to 'Cure' PTSD

Wired web site April 30, 2010 By Katie Drummond

Finding an effective treatment for post-traumatic stress disorder has been a top Pentagon priority for years. ..a small new study out of Walter Reed Army Medical Center might offer more than temporary relief — with nothing more than a quick jab to the neck. Led by Lieutenant Colonel Sean Mulvaney, Pentagon scientists gave STB(SGB) injections to two soldiers, one on active duty and another who'd been suffering from PTSD symptoms since serving in the Gulf War nearly two decades ago. Their study reports that both men "experienced immediate, significant and durable relief" after the 10-minute procedure,

and no longer exhibit symptoms that would qualify them for a PTSD diagnosis. Seven months later, both had successfully stopped using antidepressant and antipsychotic medications with the guidance of a psychiatrist. … a Chicago-based doctor named Eugene Lipov is already conducting his own double-blind trial on war-vet volunteers. One of his patients, 28-year-old John Sullivan, found little relief with prescription anti-anxiety meds. But the former Marine Corps Sergeant told ABC News that the STB (SGB) injection completely eliminated his nightmares, flashbacks and ongoing anxiety."[It was] not painful and the results were within five minutes — I felt more relaxed and calmed down. It's been great."…STB is likely to be met with more enthusiasm from the Pentagon than another potential PTSD treatment. MDMA, the key ingredient in ecstasy, was in the spotlight last week after successful results of a study on 21 veterans. (3)

Treating Post-Traumatic Stress Disorder With a Jab to the Neck,
New Research Suggests Numbed Nerves Could Cure Anxiety and Flashbacks in Veterans
ABC News Medical Unit Apr. 30, 2010

By COURTNEY HUTCHISON

A quick jab to the neck may be all it takes for immediate relief of Post-Traumatic Stress Disorder (PTSD), according to new research from Walter Reed Army Medical Center in Bethesda, Maryland.

….In a study published Friday in the journal Pain Practice, Stellate Ganglion Block (SGB), a ten-minute procedure that applies local anesthetic to a bundle of nerves in the neck, proved an effective remedy for this anxiety disorder, potentially offering an alternative to the pharmaceuticals traditionally used to treat the flashbacks, anger, anxiety, and sleep disturbances caused by PTSD.

Unwilling to take medication for the rest of his life for his PTSD, John Sullivan, 28, a retired Marine Corps Sergeant from Chicago, sought out the experimental treatment from a Chicago-based anesthesiologist, Dr. Eugene Lipov. Lipov is not part of the Walter Reed study. While the block itself has been used to relieve certain kinds of pain since 1925, Lipov was the first to begin treating PTSD with this injection. He accepted Sullivan as part of a double-blind placebo study he's currently conducting on retired soldiers. Sullivan was

injured by a grenade explosion in 2003 while serving in Iraq. In the years that followed, he would suffer flashbacks, nightmares, and anxiety, but it was not until a year ago that he was diagnosed with PTSD and was prescribed anti-anxiety medication. "I didn't realize it at first, but I was losing my interest in going out with people, almost becoming a hermit, I wouldn't want to do work, call people... anything," Sullivan said. But medication and therapy "wasn't working 100 percent," Sullivan said, "I'd take an anxiety pill and then I would be drowsy at work and I'd still be nervous and not want to go out with friends." The injection, which he received two months ago, "was different," he said, "not painful and the results were within five minutes -- I felt more relaxed and calmed down. It's been great." (4)

Doctor studying possible PTSD treatment

Chicago Tribune April 07, 2010

By Peter Cameron

Amy Little escaped an armed robbery attempt physically unharmed, but the aftershock lasted years.

…But the attempt left Little, now 23, with extreme anxiety. Routine encounters with men who had similar physical attributes as those would-be robbers gave her panic attacks, and irrational fear paralyzed her.

… Therapy helped a little, but her anxiety eventually got so bad, she said, that she gained 80 pounds and flunked out of Northern Illinois University. In October 2007, she went to see Dr. Eugene Lipov and got a shot in the neck. Lipov, … Since then, Little's anxiety has dropped significantly, and she has been accepted to nursing school, which she will start in the fall. "It's a completely different feeling when you can actually control your own life again," said Little, who received additional shots in December 2007 and December 2008 but said she has not needed one since. …(4)

Patient #1: NOVEL PROCEDURE TAKES SHOT AT PTSD

Journal Star Apr 11, 2010

PEORIA

By ANDY KRAVETZ

Peoria veterans says stellate ganglion block has helped get stress disorder under control.

Although Brown was wounded twice--once in a mortar attack and once with the helicopter he was riding in crash landed--he did not learn the extent of his injuries until he returned home. Months of savage nightmares because of his experiences in Iraq, Jason Brown of Peoria now can sleep, thanks to a novel way to treat post-traumatic stress disorder, a treatment spearheaded by a suburban Chicago doctor. The idea of using a shot to "zap" nerves in the neck has been used for years to help breast cancer survivors who suffer from hot flashes or nightmares. But Dr. Eugene Lipov, … thought the same thing could be a breakthrough treatment for veterans who struggle with PTSD…."Fifty percent of the people stop taking their medicine within six months, so compliance is not an issue with the block," he said. "It doesn't have the

side effects, the fogginess and the sexual side effects of the medicines." For Brown, the procedure has been life changing…For part of his tour, he worked under Lt. Gen. William Caldwell, who was the spokesman for forces in Iraq at that time…

He said he had all the signs of PTSD - a dislike of crowds, a compulsion to keep windows closed, a fear of potholes and nightmares. "I would physically act out against my wife when I slept. In my sleep, I picked her up and threw her across the room," he said. "It didn't really affect her, but it bothered me a lot more than it did her. She realized that I wasn't seeing her. "Brown refused to drive and said he closed his eyes when his wife got behind the wheel… I also went to the VA for help and they put me on some medications, but I really didn't think that was the answer," he said. "I could get through the daytime OK, but medications couldn't stop the nightmares. "

Things came to a head when he realized one night he had his wife in a choke hold. ..Blocking the Stellate ganglion seems to "set the nerve fibers back to normal before the trauma," Lipov said. What happens, in layman's terms, to a person who suffers from PTSD is

that there is a rapid growth of new nerves within the brain, but those new nerves tend to overload the system and cause more harm than benefit. The block, he said, stops that growth and "prunes" the nerves back to normal. …Nightmares are gone… He has had two injections, and says he started to immediately feel better after the first shot…."It calms you down so you can work on it yourself in a traditional way," he said. With the PTSD under control, Brown was able to get a handle on why he didn't feel right after that mortar attack….The nightmares are largely gone. He hasn't acted out in his sleep in months and feels like the procedure has given him a new lease on life.. (4)

Iraq War Vet Says New PTSD Treatment Works

CBS (CHICAGO)

JAN 2010

Dr. Eugene Lipov treats vets who have Post Traumatic Stress Disorder with a 60-year old method traditionally used to ease migraine discomfort. It involves a shot of anesthesia to the neck.

Jason Brown served in the military for six years, with a year-long tour in Iraq. The Illinois man is now one of more than 300,000 Iraq and Afghanistan veterans suffering from Post-Traumatic Stress Disorder. He, like many others, are searching for a treatment. ...Jason Brown came straight from Central Casting, a rugged Midwestern boy, willing to face the dangers of serving his country in Iraq. "Every time they would take us up, we would start taking sniper fire from outside the base," said Jason about his time installing communications wires at 19 separate bases in Iraq. The Army Reservist returned home to Peoria and the loving embrace of his wife Amanda. But in his sleep, Jason began to act out in a violent way. "I would have her by the throat. I'd be holding her against the wall, and I wouldn't know it until I'd wake up," said Jason. "That's why I got help 'cause I would wake up hurting her," said Jason...For Jason, his feelings of anxiety subsided almost immediately, including those frightening nighttime incidents. There was also a reduction in visual impairment often associated with PTSD. ...(4)

Cervical sympathetic blockade in a patient with post-traumatic stress disorder: a case report.

Eugene Lipov MD, et al. Annals of Clinical Psychiatry; 2008

…A 48-year-old male victim of armed robbery and assault was bound, gagged, and hit in the head with a gun "over 100 times." The patient demonstrated symptoms consistent with the diagnostic criteria of PTSD—extreme anxiety, impaired sleep and loss of appetite. He was treated with escitalopram, alprazolam, and olanzapine, as well as psychotherapy, but his symptoms persisted. Fifty-five days post-trauma, SGB was administered. The patient experienced almost-immediate reduction in anxiety and return of his appetite. Over the next week, his sleep improved and he was able to cut back significantly on his use of anti-anxiety medication ….(5)

The use of stellate ganglion block in the treatment of panic/anxiety symptoms with combat-related posttraumatic stress disorder; Preliminary Results of Long-Term Follow-up: A Case Series

Sean Mulvaney, MD et al. Pain Practice 10.3; May 2010

…..One of the patients in the Reed case reports is a 36-year-old white male on active military duty whose symptoms began after the battle of Fallujah. The other patient is a 46-year-old Hispanic male retired from military service whose symptoms began 18 years ago in the first Gulf War. For over a year, both patients had been receiving pharmacologic treatment, which was ineffective in treating their symptoms; both suffered adverse effects from their medications, including depression, somnolence and erectile dysfunction.

The Walter Reed case reports, … concluded that "selective blockade of the right Stellate ganglion at C6 level is a safe and minimally invasive procedure which may provide durable relief from PTSD symptoms, allowing the safe discontinuation of psychiatric medications."(6)

In search of an effective treatment for combat-related post-traumatic stress disorder (PTSD). Can the stellate ganglion block be the answer?

Eugene Lipov MD. Pain Practice. July/August 2010: pg 265-266

The efficacy of these approaches has been disappointing prompting funding for research on other treatments, one of the more novel of which was the use of MDMA (methylenedioxymethamphetamine), better known by its "street" name Ecstasy. Five million dollars of funding was allocated to research on MDMA by the National Institutes of Health (NIH) in 2003, and further studies were conducted over subsequent years. ….To date, eight patients with PTSD have been treated in the author's clinic, seven of whom had excellent results. Among the dramatic success stories, two stand out: a soldier with severe traumatic brain injury and PTSD and a 24-year-old rape victim (non-military-related)…. However, advances in medical science

are often detours in ongoing research involving a chain of observations and discoveries which prove efficacious. Consider Sir Alexander Fleming's discovery of penicillin 1928 as he tidied up some petri dishes in his lab. Staphylococcus bacteria was unable to grow next to an as yet unnamed moldy substance (penicillin). The road from discovery to drug was over a decade long, but after much refinement and testing the first patient, Reserve Constable Albert Alexander, was treated in 1940. This discovery arguably revolutionized modern medicine, and countless lives have been saved since. Of course, time (and clinical trials) will tell to what degree SGB offers efficacious and durable for relief of PTSD. This approach is attractive because it is readily available for military and non-military PTSD sufferers whose lives have been severely affected by PTSD.(7)

Improvement in PTSD symptoms within 30 minutes of stellate ganglion block (SGB).

E. Lipov MD, A. Hickey MD. Oral abstract presentation at ASIPP (American Society of Interventional Pain

Physicians). Annual Meeting, Washington D.C. June 25 2011

Background and Objectives. Stellate ganglion block (SGB) reduces sympathetic nervous system activity in the head, neck, upper extremity and thorax. It is a common treatment for complex regional pain syndrome (CRPS) and has recently been used to treat post-traumatic stress disorder (PTSD) (Lipov 2008, Mulvaney 2010). The aim of this study was to evaluate the effect of SGB on PTSD symptoms 30 minutes after the procedure given that relief from CRPS pain is usually evident within the first 10 minutes of the SGB procedure … Finally, functional MRI has identified a common cortical structure responsible for the discomfort of CRPS (Lipov 2009), PTSD (Lipov 2009), and social rejection (Dewall 2010).

Methods. The 7 selected patients underwent SGB using the fluoroscopic-guided technique (7 mL bupivacaine 0.5%) to the anterior lateral body of the right C6. No sedation was used during the procedure.

Thirty minutes after the procedure, the PCL was re-administered to assess PTSD severity.

Results. Of the seven patients treated, six demonstrated a ≥ 50% reduction in severity compared to their baseline PCL score (Student's paired t-test $p<0.01$). ..

Conclusions. Fluoroscopic-guided SGB appears to provide significant relief of PTSD symptoms within 30 minutes, a response period similar to that of CRPS treatment..(8)

RESEARCH IN PROGRESS

Near term submission from Dr Lipov: A retrospective clinical care series of eight patients treated by Dr. Lipov in whom PTSD symptom severity was measured pre- and post-SGB treatment by psychometrically validated instruments. The case series found significant improvements in overall PTSD severity ($p=0.02$) including symptoms related to the psychological dimensions of avoidance ($p=0.03$), and hyperarousal ($p=0.01$).(9)

Near term submission from the military hospital: comparable (to above) preliminary evidence of SGB efficacy has been observed in another clinical case series among active duty military members which found 75% of patients had significant reductions in PTSD symptoms, ranging from 19% to 76%. Moreover, the average crude percent decrease in the Clinician Administered PTSD Scale (CAPS) scores for the case series was 32% (p=0.013). Other dimensions of physical and mental health also showed improvement including decreased pain (50%) and depression (38%). (10)

13: WHY DOES THE SGB/CB WORK FOR PTSD?

The theory is based on solid information published by other researchers. What is new is the way the data is assembled. Recent neuroanatomical findings demonstrate hard-wired connections between the stellate ganglion and intracerebral structures (inside the brain), especially the insular cortex (see Figure 1, below). We are often asked exactly how a neck injection can affect the brain. The following is a simplified explanation.

First, one must understand how the nerves have been changed in patients with PTSD and how the SGB reverses those changes. The key biological evidence points to nerve growth factor (NGF) because PTSD triggers are known to cause an increase in NGF (1). The NGF is known to elevate immediately prior to any adrenaline-stimulating episode, like jumping out of an airplane (2). The NGF increase in the brain leads to the growth of new nerve shoots or “sprouts” in the brain (3). Sprouting eventually causes an increase in brain norephinephrine (NE) levels (4). Elevated NE is

believed to lead to the development of PTSD (5). An injection of local anesthetic next to the stellate ganglion or SGB reduces NGF (6). (See summary Figure #2.)

Another way to understand how NGF affects the nerves is the way fertilizer promotes leaf growth (Figure 3). The SGB reduces the NGF, the "fertilizer," thus causing the "leaves" to fall off, or in biological terms, stunting new nerve growth. This process returns the patient to a pre-PTSD state, as has been shown by our team and others.

Figure 1. Demonstration of SGB effect on PTSD.

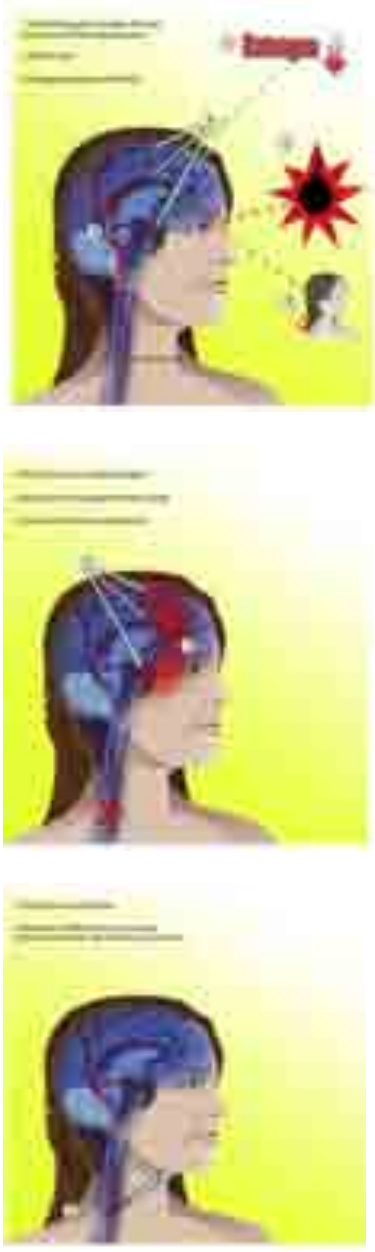


Figure 2. Overview of the SGB mechanism of action.

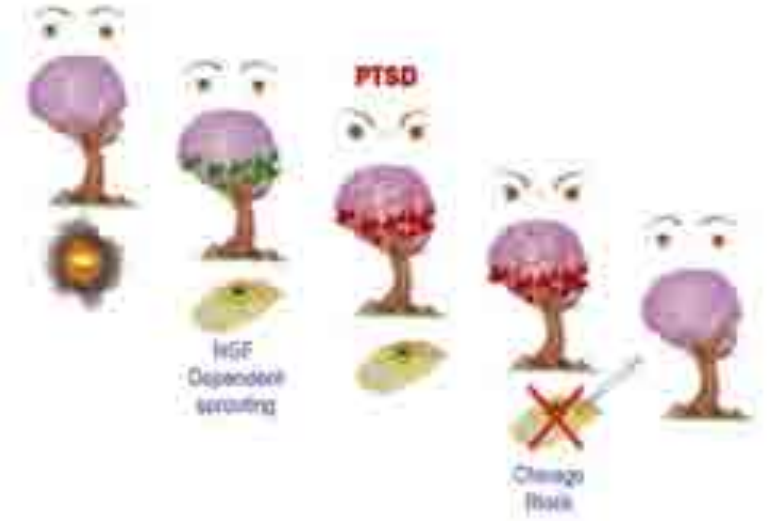


Figure 3. Simplified SGB effect explanation.

14: DEVELOPMENT OF THE CHICAGO BLOCK

Why was SGB/CB used for PTSD Treatment in the first place?

In 2005, Dr. Lipov's Advanced Pain Centers began treating women suffering from hot flashes with the SGB (stellate ganglion block), which we hope will soon be renamed the Chicago Block (CB) due to the difference in technique employed (see below). In response to a Chicago Tribune article, which questioned the need for the use of SGB as a new approach for hot flash treatment, the author revisited all the research published on the SGB. This extensive search identified a key study from Finland detailing the successful use of clipping (putting a metal clip on a ganglion or a nerve which turns that nerve "off") at the thoracic sympathetic ganglion to treat PTSD.

The author quickly realized that, neurobiologically, the thoracic ganglion clipping is very similar to SGB. This realization led to the inspiration to pursue treating PTSD with SGB. Unfortunately, trauma happens too often and opportunity presented itself to treat a victim of a crime who subsequently had developed a

severe case of PTSD. The patient was on the way to a hospital to be admitted for PTSD when the author became aware of this patient and offered to help. The patient was treated the same day and 30 minutes after the SGB reported going from a sensation of being revved up to 100 mph to that of slowing down to 30 mph and comfortably coasting. This patient's remarkable recovery prompted further research developments related to the CB in Chicago and beyond.

15: WHAT IS THE CHICAGO BLOCK? HOW DIFFERENT IS IT FROM SGB?

Historically, SGB has been done “blind” without the assistance of X-ray. The injection was accomplished by the patient describing what was being felt. The dose of the anesthetic recommended has been as high as 10-15cc, but the higher the amount of anesthetic, the higher the chance of complications.

Until now, C7 was believed to be the best target location for the injection. However, the C7 vertebra is much closer to the lung and arteries in the neck than C6, making this injection site less safe. With the modified SGB (the “Chicago block” pioneered by our team), the C6 tubercle (a bone at the sixth cervical vertebra) is located. Then the needle is placed into C6 vertebra until the bone is contacted and anesthetic is injected at that level. Only the right side seems effective.

To prevent confusion among clinicians, we suggest renaming the SGB to the Chicago Block given the difference in the anatomic location and the additional indications for hot flashes and PTSD. In summary, the

“Chicago Block” uses a C6 vs C7 approach, right-sided only, with 7 cc of anesthetic.

16: HOW DO PTSD TREATMENTS COMPARE?

EMDR (Eye Movement Desensitization & Reprocessing): EMDR remains controversial due to questions about its methods and theoretical foundations. Some studies report equal efficacy of CBT (see below) with and without EMDR.

Cognitive-behavioral therapy (CBT): Biological effect unknown, theoretical foundation is not biological. Moderate efficacy reported to date. Compliance with treatment (completion of treatment) is limited to 50% due to multiple visits required for therapy and the disturbing nature of therapy (reliving disturbing events). Richard McNally, a PTSD expert at Harvard University in Cambridge, Massachusetts, compared exposure therapy to watching a scary movie again and again so that over time the movie no longer seems frightening. However, he said, some people are reluctant to participate in such therapy because they find it too distressing. He adds that others may enroll in therapy but not participate fully for the same reason and may therefore not benefit. An excerpt of a Washington Post article elaborates further:

BY: Washington Post Staff Writer Shankar Vedantam
Friday, October 19, 2007

The report by the National Academies emphasized that the therapies might not be useless. [emphasis added] Rather, it said, the evidence is weak when it comes to drawing any kind of conclusion about most of them. The findings of the panel, widely considered the nation's most influential scientific arbiter, will have far-reaching consequences. The report comes when awareness of PTSD has risen as a result of its incidence among veterans returning from the wars in Iraq and Afghanistan.

"If a treatment that is not shown to be efficacious is nevertheless delivered to veterans, and if the treatment is relatively inert, even if it does not harm the veterans, it may demoralize the veteran," [emphasis added] said Richard McNally, a Harvard University psychologist and PTSD expert. "Providing treatments that do not have a good basis in evidence can result in people not improving, therefore getting

demoralized and therefore not seeking treatment that can actually help them."

Pharmacologic approaches to PTSD: Selective serotonin reuptake inhibitors (SSRIs). Incomplete biological understanding of the effect of serotonin reuptake. Delayed onset of action. Limited compliance due to multiple common side effects.

Seroquel: Antipsychotic major tranquilizer, poor compliance due to hypersomnolence (over-sleepiness), sexual side effects, diabetes, weight gain, and heart complications (see Chapter 8).

Other biological approaches

Hyperbaric Chamber (HBO2) sealable diving chamber is a pressure vessel with hatches large enough for people to enter and exit, and an air compressor to raise the internal air pressure. FDA categorizes HBO2 as “more than minimal risk”; there is a 1:3000 risk of provoked seizures and small risk of fire/explosion. Not-FDA approved at this time for PTSD.

For PTSD, no systematic reviews were identified, and only one case report was identified reporting on the use of HBO2 in a young military Veteran with post-

concussion syndrome and PTSD (1). Another writer commented on the procedure in PTSD "Breakthrough?" Real Science Doesn't Need Endorsement. (2) HBO2 compliance is limited due to multiple "dives" (sessions) required (up to 40 typically). High cost $6000 to $8000 per patient, with limited efficacy. The possible mechanism of effect for PTSD is unclear.

Stellate Ganglion Block (SGB): High efficacy reported to date although limited data has been published to date. Over 90% compliance reported due to the few number of procedures required and often immediate effect noted (within 30 minutes). Proposed biological mechanism exists.

Non-biological approaches

Canine and equine therapy (CET): mechanism, compliance and efficacy unknown.

Theater of War (ToW): The Pentagon has provided $3.7 million for an independent production company, Theater of War, to visit 50 military sites through at least next summer to stage readings from two plays by Sophocles ("Ajax" and "Philoctetes") for service

members.(3) Mechanism, compliance and efficacy is unknown.

17. Conclusion: EXIT STRATEGY FROM "PTSD HELL"

If we stay the course with ineffective treatments, PTSD is likely to lead to misery for military and non-military trauma sufferers for years to come. We hope our work and this short summary of the advances being made will serve as a catalyst for a rapid change in the treatment outlook for those with PTSD. Several recommendations should guide this exit strategy:

1. Change the name for PTSD to CCI (see Chapter 7). A neurobiological approach to PTSD is slowly becoming more accepted, driven by the findings of MEG and functional MRI scanners, as well as biological markers. This will improve the likelihood of detection as well as treatment acceptance.

2. Conduct more research to confirm the efficacy of SGB/Chicago Block. The SGB/Chicago Block is efficacious and has FDA clearance to treat PTSD. The SGB/Chicago Block provides immediate and durable relief. Larger scale clinical trials should be

funded to validate the promising preliminary studies conducted thus far.

While the path forward is clear, it will not be without obstacles. During a trip to Washington DC in June of 2011, Dr. Lipov presented a paper at a Scientific Anesthesia Conference entitled Improvement in PTSD symptoms within 30 minutes of stellate ganglion block (SGB). It was well received. During the same visit he also meet with US Senate and House representatives who are becoming aware of the potential of the Chicago Block, and who may offer the needed support to make our solution to PTSD a reality. Unfortunately, the DOD representative was not optimistic regarding whether this approach could be funded or adapted in the near future due the bureaucracy of the military medical establishment.

At the time of this writing, our team has received news (September 2011) that funding from the DOD for a clinical study of the SGB/Chicago Block will not be granted. This was the 4th attempt since 2007 to obtain such funding. The main objection to our study was "the availability of proven and effective methods

of treatment for PTSD". Following the recite of the above critique, we have decided not to participate further in the DOD grant process. This decision was made due to the clear difference in views of PTSD between our team and the DOD. We believe minimal options exist for the PTSD treatment and the need for effective treatments is grave.

Thus, we are setting up a private funding source to provide the urgent care needed for military service men and women, as well as civilians, via our 501(c)3 not for-profit corporation, Chicago Medical Innovations (CMI) (www.chicagomedicalinnovations.org).

Future directions.

It is our sincere hope that a biological view of the disorder via a name change from PTSD to CCI will lead to increased acceptance of this disease as biologic in nature. We also hope that improving access to care will help reverse the climbing suicide rate among troops.

Future research directions include applying the biological model to develop a way to prevent PTSD

from occurring. One such strategy might be administering a medication following a PTSD-triggering event within 48 hours of the event. This medication exists and is being tested for another application on humans at this time. Finally, we hope that our contributions to the PTSD/CCI field may have a near- and long-term impact on the scourge of this devastating disease and will lead to a markedly improved quality of life for those with PTSD/CCI.

AUTHOR BIOGRAPHIES

Eugene Lipov, MD, DABA, FABA, is a leader in pain management, a pain theorist, anesthesiologist and author, including published research articles in top medical journals and chapters in neurosurgical and psychiatry textbooks. He has provided testimony at the House Committee on Veterans' Affairs in August 2010 and met with House and Senate representatives in June 2011.

Dr. Lipov spent two years in surgical residency at the VA and Cook County Hospital, and two years in anesthesiology residency at the University of Illinois and the VA hospital. He finished his training at Rush-St. Luke's hospital with advanced training in pain management where he was an assistant professor in pain management for over 5 years.

Today Dr. Lipov is the Medical Director at Advanced Pain Centers in Hoffman Estates, IL. His research interests include the development of new approaches for pain conditions and applying traditional approaches to non-traditional indications. Dr. Lipov developed a new neurostimulator approach called the

Hybrid Stimulator for back and leg pain, and he was the first to report the successful use of a neurostimulator for neck pain, and pulsed radiofrequency for CRPS. Most recently he has developed entirely new applications for the stellate ganglion block which have demonstrated efficacy in the treatment of hot flashes and Post Traumatic Stress Disorder (PTSD). His work has drawn the attention of numerous television and radio stations including ABC, NBC and WGN, and several articles have been published in the lay press regarding his medical innovations.

Briana Kelzenberg MS, PA-C works with Dr. Lipov, practicing pain management. She has special interests within the field of pain management, including psychiatry, integrative medicine, and women's health. She believes that a comprehensive, holistic approach to medicine is the key to improving quality of life. Assisting Dr. Lipov in applying the stellate ganglion block for PTSD, and witnessing the dramatic improvements in patients' quality of life, has been extremely rewarding.

REFERENCES

Chapter 1

1. http://www.ptsd.va.gov/professional/pages/epidemiological-facts-ptsd.asp Accessed 3/17/11

2. Jones E, Wessely S. Shell shock to PTSD: Military psychiatry from 1900 to the Gulf War 2005, Psychology Press. Taylor & Francis Group. Hove and New York. ISSN 0076-5465.

3.Da Costa, JM. On Irritable Heart; a Clinical Study of a Form of Functional Cardiac Disorder and its Consequences. American Journal of the Medical Sciences. 1871;121(1):2-52.

4 http://www.combatstress.org.uk/pages/what_is_ptsd.html

Chapter 2

1http://articles.cnn.com/2010-07-12/politics/veterans.ptsd_1_ptsd-michael-walcoff-

post-traumatic-stress-disorder?_s=PM:POLITICS Accessed 3/30/11.

2 RAND. Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery, 2008. Available at: http://www.rand.org/pubs/monographs/2008/RAND_MG720.pdf

3 Stiglitz JE, Bilmes LJ. The three trillion dollar war: the true cost of the Iraq conflict. W.W. Norton & Co. 2008.

4 http://army-ptsd.ptsd-info.net/colorado-springs-is-ptsd-city-scenes-from-vanguard/ accessed 5/19/11

Chapter 3

1. http://www.ca9.uscourts.gov/datastore/opinions/2011/05/10/0816728com%20.pdf)

Chapter 4

1. http://www.nytimes.com/2009/08/16/us/16women.html?_r=1

2. http://www.military.com/NewsContent/0,13319,FL_stress_081805,00.html

3. Yaeger D, Himmelfarb N, Cammack A, Mintz J. DSM-IV Diagnosed Posttraumatic Stress Disorder Among Women Veterans with and without Military Sexual Trauma. Journal of General Internal Medicine. 2006;21(3):S65-69.

4. Bostock DJ, Daley JG. Lifetime and Current Sexual Assault and Harrassment Victimization Rates of Active-Duty United States Air Force Women. Violence Against Women. 2007;13(9):927-944.

5. Campbell R, Raja S. The Sexual Assault and Secondary Victimization of Female Veterans: Help-Seeking Experiences with Military and Cirvilian Social Systems. Psychology of Women Quarterly. 2005;29(6):97-106.

6. Dobie DJ, Maynard C, Kivlahan DR, et al. Post Traumatic Stress Disorder Screening Status is Associated with Increased VA Medical and Surgical

Utilization in Women. Journal of General Internal Medicine. 2006;21(3):S58-64.

7. Sadler AG, Booth BM, Nielsen D, et al. Health-Related Consequences of Physical and Sexual Violence: Women in the Military. Obstetrics & Gynecology. 2000;96(3):473-480.

Chapter 5

1. American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders (Rev. 4th ed.). Washington, DC: Author. Available at: http://www.ptsd.va.gov/professional/pages/dsm-iv-tr-ptsd.asp. Accessed 2/8/2011.

Chapter 6

1. http://www.research.va.gov/news/research_highlights/ptsd-020210.cfm

Chapter 7

1. http://www.medpagetoday.com/MeetingCoverage/APsaA/12516

2. http://www.speaker.gov/blog/?p=393

Chapter 8

1. Friedman, M. J., C. R. Marmar, et al. Randomized, double-blind comparison of sertraline and placebo for posttraumatic stress disorder in a Department of Veterans Affairs setting. J Clin Psychiatry 2007;68(5): 711-20.

2. Lipov EG Cervical Sympathetic Ganglion Block : New Hope for PTSD Relief. Post-Traumatic Stress Disorder (PTSD) Causes , Symptoms and Treatment, Nova Science Publishers Inc.2010.

3. Raskind MA, Peskind ER, Hoff DJ, et al. A parallel group placebo controlled study of prazosin for trauma nightmares and sleep disturbance in combat veterans with posttraumatic stress disorder. Biol Psychiatry 2006 Oct 24.

4. Schneeweiss, S, Avorn J. Antipsychotic Agents and Sudden Cardiac Death — How Should We Manage the Risk? N Engl J Med 2009; 360:294-296.

5. http://www.emaxhealth.com/1357/military-families-asking-congress-investigate-seroquel

6. Krystal JH, Kosten TR, Southwick S, Mason JW, Perry BD, Giller EL. Neurobiological aspects of PTSD: Review of clinical and preclinical studies. Behavior Therapy Volume 20, Issue 2, Spring 1989, Pages 177-198.

Chapter 9

http://www.defense.gov/news/newsarticle.aspx?id=48779

Chapter 10

1. Dewall CN, Macdonald G, Webster GD, Masten CL, Baumeister RF, Powell C, Combs D, Schurtz DR, Stillman TF, Tice DM, Eisenberger NI.

Acetaminophen reduces social pain: behavioral and neural evidence. Psychol Sci. 2010 Jul;21(7):931-7. Epub 2010 Jun 14

2. Lipov EG, Joshi JR, Lipov S, et al. Cervical sympathetic blockade in a patient with post-traumatic stress disorder: a case report. Ann Clin Psychiat 2008;20(4):227–8.

3. JL Karnosh, WJ Gardner. The effects of bilateral stellate ganglion block on mental depression - Cleveland Clin. Quart, 1947.

4. Ikeda K, Isshiki A, Yoshimatsu N, Oumi A, Ito S, Ikeda T, Three case reports of the use of stellate ganglion block for the climacteric psychosis].Masui. 1993 Nov;42(11):1696-8.

5. Telaranta T. Treatment of social phobia by endoscopic thoracic sympathicotomy. Eur J Surg Suppl. 1998;580:27-32.

6. M. Takano, Y. Takano, I. Sato. Unexpected beneficial effect of stellate ganglion block in a schizophrenic patient. Canadian Journal of Anesthesia. 2002;49(7):758-759.

7. Mulvaney SW, McLean B, de Leeuw J. The use of stellate ganglion block in the treatment of panic/anxiety symptoms with combat-related posttraumatic stress disorder; preliminary results of long-term follow-up: a case series. Pain Pract. 2010;10:359–365.

8. Park CM, Kim JB, Kil HJ. The Effects of Superior Cervical Ganglion Block on the Behavioral Despair in Rats. Taehan Mach'ikwa Hakhoe CHI. The Journal of the Korean Society of Anesthesiologists. 1997;32(1):13-18.

9 Daniel C. Moore, M.D. STELLATE GANGLION BLOCK - Hardcover (1954)

Chapter 12

1. http://www.thedaily.com/page/2011/05/09/050911-news-neck-doctor-1-3/

2. http://www.youtube.com/embed/1A915BkUq5Y

3. http://www.wired.com/dangerroom/2010/04/pentagon-scientists-inject-necks-to-cure-ptsd/

4. http://chicagomedicalinnovations.org/media-coverage-of-soldiers-treated/

5. Lipov EG, Joshi JR, Lipov S, et al. Cervical sympathetic blockade in a patient with post-traumatic stress disorder: a case report. Ann Clin Psychiat 2008;20(4):227–8.

6. Mulvaney SW, McLean B, de Leeuw J. The use of stellate ganglion block in the treatment of panic/anxiety symptoms with combat-related posttraumatic stress disorder; preliminary results of long-term follow-up: a case series. Pain Pract. 2010;10:pp 359–365.

7. Lipov , G,E In search of an effective treatment for combat-related post-traumatic stress disorder (PTSD). Can the stellate ganglion block be the answer? Pain Pract.2010;10(4):pp 265–266.

8. Lipov G E Oral abstract presentation at ASIPP (American Society of Interventional Pain Physicians)Annual Meeting, Washington D.C. June 25 2011.

9. Lipov EG et al. Stellate ganglion block as a novel treatment option for post-traumatic stress disorder: promising results from a case series. Anesthesiology. 2011 [In Development].

10. No further details can be released due to military IRB (institutional review board) limitations.

Chapter 13

1. Smith MA. Hippocampal vulnerability to stress and aging: possible role of neurotrophic factors. Behav Brain Res 1996;78(1):25–36.

2. Alleva E, Petruzzi S, Cirulli F, et al. NGF regulatory role in stress and coping of rodents and humans. Pharmacol Biochem Behav 1996;54(1):65–72.

3. Chen PS, Chen LS, Cao JM, et al. Sympathetic nerve sprouting, electrical remodeling and the mechanisms of sudden cardiac death. Cardiovasc Res 2001;50(2):409–16.

4. Isaacson LG, Billieu SC. Increased perivascular norepinephrine following intracerebroventricular

infusion of NGF into adult rats. Exp Neurol 1996;139(1):54–60.

5. Kosten TR, Mason JW, Giller EL, et al. Sustained urinary norepinephrine and epinephrine elevation in post-traumatic stress disorder. Psychoneuroendocrinology 1987;12(1):13–20.

6. Takatori T, Kuroda Y, Hirose M. Local anesthetics suppress nerve growth factor-mediated neurite outgrowth by inhibition of tyrosine kinase activity of TrkA. Anesth Analg 2006;102:462–7.

Chapter 16

1. http://www.va.gov/VATAP/docs/HBOTBIiPTSD2010tagm.pdf

2. http://getbetterhealth.com/ptsd-breakthrough-real-science-doesnt-need-endorsement/2010.09.23

3. http://www.nytimes.com/2009/11/12/theater/12greeks.html