

Combat-Related Mental Health Disorders: The Case for Resiliency in The Long War

COL Daryl J. Callahan, DO, MSS, MC, USA

More US military service members have been deployed since 9/11 than in the previous 40 years. A greater number of these deployed service members are surviving, which has increased the incidence of combat-related mental health disorders among veterans of "The Long War." The societal cost of caring for veterans with such disorders is expected to surpass that of the Global War on Terror, which is estimated at \$600 billion. Because the prospect of stopping all deployment is remote, standardized prevention and treatment methods must be used to eliminate these "invisible wounds of war." It is imperative that high-quality, evidence-based, and cost-effective treatments—pharmaceutical and nonpharmaceutical—be developed. Although no approved medication currently exists for the prevention of posttraumatic stress disorder, the blood pressure medication propranolol has shown promise in erasing the behavioral expression of fear memory and may be useful for preventing more severe emotional disorders. In addition, a nonpharmaceutical method known as stress inoculation training is ideally suited to military populations and should be incorporated into military training programs. Furthermore, osteopathic physicians can improve resiliency in the communities they serve by considering the dynamic of body, mind, and spirit in their patients. Applying these methods, teaching self-regulation traits, and removing barriers to care will build resiliency among service personnel for The Long War.

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Address correspondence to COL Daryl J. Callahan, DO, MSS, MC, USA, Kansas National Guard, Office of the State Surgeon, 2800 SW Topeka Blvd., Topeka, KS 66611-1287

E-mail: daryl.callahan@us.army.mil

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More than 1.64 million military service members in the US Armed Forces (ie, Army, Air Force, Marines, Navy, National Guard, and Reserves) have been deployed since 9/11, making the current deployment the largest in 40 years.¹ Many of these service members have survived serious wounds, resulting in a large population of veterans who suffer from mental and cognitive disorders. Indeed, suicide attempts and mental disorders such as posttraumatic stress disorder (PTSD), major depressive disorder (MDD), and traumatic brain injury (TBI) are among the leading causes of hospitalizations among service members who have served in combat since 2009.²

The incidence of mental health problems among deployed service members in The Long War, which refers to the coming decades of struggle against terrorism to maintain global security,³ is estimated to be as high as 41%.^{1,4} Not surprisingly, the cost of caring for patients with these "invisible wounds of war" in the coming decades is expected to exceed the cost of the Global War On Terrorism.¹ Thus, measures must be implemented to prevent these invisible wounds and to ease their societal impact.

The current review presents the best practices currently used to recognize, prevent, and treat combat-related mental health disorders in military personnel. Early prevention and treatment initiatives that can build resiliency—defined as the ability to adapt and adjust to traumatic war experiences without requiring clinically significant short- or long-term treatment—are emphasized.

Development of Combat-Related Mental Health Disorders

Physicians must understand the causes of combat-related mental health disorders before we can develop measures to screen, prevent, and manage these conditions.

Combat Stress

Combat stress is a major cause of mental health disorders in service members.¹ The stresses that individuals encounter during combat and the effects on service members and their families have been monitored by the Mental Health Advisory Team (MHAT), a group established by the US Army in July 2003 after a highly publicized increase in suicides and behavioral health-related issues among military service personnel.

Now in its fifth report, the MHAT continues firsthand,

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onsite reporting by deploying its members to war sites (ie, Iraq and Afghanistan). The team found that combat stressors included not only the idea of killing the enemy, but also thoughts about combat experiences of a more profound nature, as listed in *Figure 1*. In addition, prolonged exposure to stress, such as that experienced during lengthy deployments, and receipt of physical combat injuries are the best predictors of developing stress disorders. Increased combat intensity, which is measured by multiple and longer deployments to a combat zone, being wounded or shot at, seeing service members injured, seeing dead bodies, and more, has also been shown to be related to incidence of mental health disorders.¹ For example, in 2004, when the combat intensity was less in Afghanistan, the PTSD rate for US men and women service members was 12% in Iraq but 6% in Afghanistan.¹

Combat stresses cause emotional and physical exhaustion over time, changing the way individuals think and cope with stress. When service members do not understand these changes and are not properly treated for them, they are at risk of developing a changed personality.⁵ The ability to cope with combat stress is an essential aspect of good mental health in service members. Thus, the distinction between performance while training and performance under stress is important, and every service member must be exposed to combat training under stress.⁶ Training to standards under stress in a realistic environment is a hallmark of military tactical training. Such training standards depend on the military service (ie, Army, Navy, Air Force, Marines, National Guard), deployment region (eg, Middle East, Pacific, Korea), and military occupa-

tional specialty. As the ancient Japanese military saying goes, "The way is training."⁷

The MHAT report suggests that predeployment combat training under stress decreases the incidence of mental health disorders, though current studies are not definitive on this point.⁶ Service members who received resilience training reported few mental health problems on deployment as reported by MHAT V.⁸ Therefore, MHAT has recommended conducting a large-scale longitudinal study—encompassing predeployment, deployment, and postdeployment findings—not only to screen service members at risk, but also to identify the causes of mental health disorders in those deployed.

Age

Age plays a key role in both cognitive and physical health problems in service members. Indeed, such conditions are more likely to appear later in life, beginning between ages 40 and 50 years, as a result of cumulative effects. In the Vietnam War, the initial prevalence of PTSD among service members was estimated to be 15% among men and 8% among women. By comparison, the National Vietnam Veterans Readjustment Study found that 10 to 20 years after service, the lifetime prevalence of PTSD increased to 30% for men and 25% for women.⁹ Similarly, a long-term prospective study of World War II veterans showed a 15-year increase in mortality from physical decline after serving in combat.⁹ After 15 years, the mortality rates returned to normal.⁹ Thus, the cumulative effects of age increase the risk of mental and physical health conditions. This increase in rates of PTSD and other illnesses adds to the cost of caring for veterans.

Prevalence

Family physicians may not be aware of how widespread combat-related mental health disorders are in their patient populations. In 2008, the RAND Corporation published a monograph detailing key findings related to the societal costs of PTSD, MDD, and TBI. Of the 1.64 million service members who have been deployed to Operation Iraqi Freedom and Operation Enduring Freedom,¹ many have returned without mental or cognitive injury. However, an estimated 300,000 service members have returned home with PTSD or MDD, and 320,000 with TBI.¹ Some 5% of the returning service members report symptoms of all three conditions.¹ By comparison, the National Institutes of Health estimates that 5.2 million Americans, or 3.6% of the population aged 18 to 54, suffer from PTSD annually.¹ The majority of PTSD cases result from personal involvement in violent acts such as assaults, rape, murder, and traumatic accidents.¹⁰

In addition to the high rates of mental illness among service members returning from combat zones, evidence suggests that reserve service members and those who recently left military service have higher risks of these conditions. This population constitutes an understudied subgroup.

In summary, one-third of deployed troops can be expected

- ☐ Seeing the destruction of homes and villages
- ☐ Seeing dead bodies or human remains
- ☐ Engaging in firefights or coming under small-arms fire
- ☐ Engaging in hand-to-hand combat
- ☐ Being attacked or ambushed
- ☐ Knowing someone personally who was seriously injured or killed
- ☐ Being directly responsible for the death of an enemy combatant
- ☐ Being uncertain about a redeployment date
- ☐ Not knowing the length of deployment or duration in a hostile area
- ☐ Lacking privacy or personal space
- ☐ Being wounded or injured

Figure 1. Combat stressors. Source: Tanielian T, Jaycox LH, eds. *Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery*. Santa Monica, CA: RAND Corporation; 2008:1-26.²

Table 1
Cost of MDD and PTSD Treatment
per Military Service Member

Condition	2-Year Cost, range*
MDD	\$15,461 - \$25,757
PTSD	\$5,904 - \$10,298
Combined	\$12,427 - \$16,884

* Upper ranges include suicide costs. Costs were estimated using a model that projected costs incurred during a soldier's first 2 years after returning home from deployment. The higher cost range included completed suicide and the lower range is without suicide. Costs related to family strain, homelessness, substance abuse, domestic violence, and other factors not included.

Abbreviations: MDD, major depressive disorder; PTSD, posttraumatic stress disorder
Source: Tanielian T, Jaycox LH, eds. *Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery*. Santa Monica, CA: RAND Corporation; 2008:1-26.

to develop PTSD, MDD, TBI, or any combination of the three conditions.¹ Based on this estimate, associated mental and cognitive conditions are projected to total more than \$600 billion in disability payments and medical care over the lifetime of a veteran of The Long War.^{1,11}

Costs

Before considering and supporting prevention and treatment options, physicians and the public should understand the costs of combat-related mental health disorders. The RAND Corporation was able to project the cost, which varied based on productivity and improved with treatment. The \$600 billion expenditure would improve over the lifetime of veterans with effective treatment if they remained productive, paying for itself in the first 2 years after they returned from deployment.¹ The calculated costs include lifetime disability compensation and treatment and varied based on the effectiveness of treatments and the resulting increase in productivity (Table 1).¹

The RAND study estimated that the savings from evidenced-based treatment for PTSD and MDD would pay for itself in 2 years (Table 2). These figures do not include current or potential costs stemming from family strain, homelessness, substance abuse, domestic violence, or several other factors. Thus, the actual costs associated with deployment-related cognitive and mental health conditions are likely greater than these figures.¹

RAND estimates varied based on completed suicides. One estimate showed that, for each returning veteran with PTSD or MDD that is receiving evidenced-based care, the 2-year savings were \$1063 and the number of suicides declined.¹ By investing in high-quality, evidenced-based care for service personnel with PTSD and MDD, it is estimated that the US military will save \$1.7 billion over a 2-year period.¹ These studies collectively show that quality treatment improves productivity and saves enough money to pay for itself.

Table 2
Two-Year Cost Reduction in Lost Productivity Associated With
Closing Treatment Gaps

Condition	2-Year Cost Reduction by % Service Members Treated		
	30	50	100
MDD	-\$25,000	-\$23,000	-\$16,000
PTSD	-\$10,000	-\$9,000	-\$8,000

Abbreviations: MDD, major depressive disorder; PTSD, posttraumatic stress disorder.
Source: Data compiled from Tanielian T, Jaycox LH, eds. *Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery*. Santa Monica, CA: RAND Corporation; 2008:1-26.

Unfortunately, barriers to care often exist. Fifty-three per cent were able to access care and only 50% found that treatment to be minimally adequate. The main concerns cited for not seeking care include concern for medical side effects, harm to career or loss of security clearance. Additional barriers to care are listed in Figure 2. It is interesting to note that insurance coverage was not a substantial barrier to seeking care.

Screening Service Members

Cost-effective approaches to management of combat-related mental health disorders entail the use of evidence-based treatments (as discussed above) as well as quality prevention. Thus, screening service members for mental health disorders both before and after deployment would be of great benefit, as it would ensure early detection and intervention before any existing mental health condition worsens. However, the screening process is laborious and requires many resources, and it has failed to diminish the impact of mental health issues on military readiness.^{1,12}

The military maintains deployable personnel in a state of readiness and tracks the readiness of individuals, families, units, and the total force. Military healthcare providers spend a significant amount of time and resources determining factors that impact readiness. In spite of screening out those service members not fit for any number of reasons, including mental

- Medical adverse effects
- Harm career
- Security clearance
- Family issue
- Coworker issues

Figure 2. Barriers to mental health care. Source: Adapted from Tanielian T, Jaycox LH, eds. *Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery*. Santa Monica, CA: RAND Corporation; 2008:1-26.²

health reasons, combat-related mental health disorders continue to impact readiness adversely because of multiple deployments and intensity of combat exposure. Examining the results of screening is useful in determining the scope of combat-related mental health disorders. The need for mentally resilient service members is continuous, and incorporation of resiliency training into the military culture could ensure that such service members exist.

Prevention Strategies for Service Members

Like evidence-based treatments, preventive measures can help cut the costs of combat-related mental health disorders. Primary prevention of combat-related mental and cognitive disorders would entail avoidance of the activity—an unrealistic option. Thus, risk factor reduction and early diagnosis and treatment are the best options.

Suicide Prevention Education

When discussing the risk of mental health disorders among service members, it is important to mention suicide risk. The US Army is experiencing its largest number of suicides in nearly 30 years.¹³ This spike in suicides continues a trend, with 67 confirmed suicides in 2004 and 140 in 2008.¹³ When investigations are complete, the number of suicides in 2009 may have increased to 160.¹³

The increased suicide trend has not abated despite increased attention to the problem. In the general population, suicide is more prevalent among men, whereas nonfatal suicidal behaviors are more prevalent among women.¹⁴ The risks are higher for young adults, unmarried adults, and those with a psychiatric disorder.¹⁴ Although attempts to treat patients in the general population have increased over the past decade, the incidence has remained largely unchanged.¹⁴ Some observers may even wonder if the increase in incidence is the result of too much attention.

Not only is suicide risk higher for young adults and those with a history of family violence, including neglect and emotional abuse, it is also increased in victims of physical or sexual abuse. The risk increases when a military service member is under investigation for some wrongdoing, has a history of substance abuse, has legal or financial problems, has health or relationship problems, or has poor coping skills.¹⁴ Exposure to suicide prevention education does not increase risk of “copycat suicides.”¹⁵ In fact, comprehensive prevention programs will reduce not only suicides but also “copycat suicides” and attempted suicides (eg, parasuicides and suicidal gestures).¹⁵ A reduction in suicide rates has been shown with prevention programs by restricting access to lethal means and training healthcare personnel to recognize and treat depression.¹⁴ Decreasing the lethal means has decreased suicide rates by 1.5% to 23%; training programs for healthcare personnel have reduced suicides by 22% to 73%.¹⁴ Effective prevention programs exist, but unfortunately many people engaging in suicidal behavior do not receive any treatment.

A large US Air Force study¹⁵ of two cohorts, one with and one without suicide prevention education, revealed a 33% reduction in suicide risk in the former group. This degree of risk reduction is surprising, but the increased resiliency of the community in this study is equally impressive. Eleven initiatives were mandated and followed in this study to improve broad-based, community-level suicide prevention. Reductions occurred not only in suicide risk, but also in severe and moderate family violence (54% and 30%, respectively), accidental deaths (18%), and homicides (51%).¹⁵ Thus, community-level suicide-prevention efforts can increase resiliency in service members and their families.

Resiliency Training

As mentioned earlier, resiliency can be defined as the ability to adapt and adjust to traumatic war experiences without requiring significant short- or long-term treatment. Many service members demonstrate the resiliency needed for a long war. In fact, two-thirds of service members return from combat without developing cognitive or mental conditions,¹ and many returning service members thrive and learn from their experiences. The positive effects of deployment often lead to a greater sense of self-worth; therefore, teaching resiliency skills can be an invaluable component of measures aimed at preventing combat-related mental disorders.

Resiliency Skills and Personality Traits—Resiliency requires multiple skills, especially empathy, adaptability, and serendipity.¹⁶ Empathy is closely associated with the “survivor personality,” which can be defined as someone who survived a major event and did so through personal effort.¹⁷ Empathy is more than bouncing back from adversity; it is the skill to spot early clues and have the intuition and problem-solving ability to resolve stressful situations. Horace Walpole described serendipity as an unexpected or accidental event that leads to perceptive thoughts of wisdom; he considered serendipity a resiliency skill.¹⁶

Indeed, resiliency is more than bouncing back from adversity; it is being able to combine and apply problem-solving skills obtained through endless difficult situations to bring about unexpected opportunity.¹⁶ Survivors develop inner resiliency and convert misfortune into good luck.¹⁷ These individuals thrive, not just survive. Resiliency illuminates the connection between personality and job performance under stress. If personality traits can be trained to improve resiliency, service members may benefit from such training.

For resiliency, a desirable personality trait is the ability to self-regulate, leading to better self control, goal orientation, and task motivation. Favorable cognitive traits can lead to hardiness under stress or dispositional resilience.¹⁸ People interpret stress and respond using three cognitive styles that lead to hardiness: commitment (the ability to find meaning), control (the ability to respond effectively), and challenge (the ability to see potentially life-threatening events as opportunities).¹⁸

The stress-CARE personality model describes cognitive, affective, and self-regulatory traits as the precursors to behavior.¹⁸ The cognitive traits are externally directed hardiness and internally directed self-evaluation. The affect trait is disposition, which can be either positive or negative. The self-regulatory traits are self-control and goal orientation. The stress-CARE model makes relatively specific predictions of job performance based on the presence of these traits.

Of the stress-CARE traits, self-regulation is particularly associated with favorable outcomes. Self-regulation is the process by which a person sets and achieves certain goals. This trait has a finite capacity and, under stress, can be analogous to a fatigued muscle that recovers with rest. Self-regulation is strengthened through repeated use, much like muscles respond to fitness training, and it can be used to develop emotional and motivational controls.¹⁸ Emotional control is exemplified by the ability to perform in the presence of anxiety, distractions, and frustration; a lack of emotional control can lead to general anxiety and fear of failure. Motivation is the desire to perform well and master tasks that lead to competitiveness.

Leaders with self-control develop strong morals and gain the trust of followers.¹⁸ Poor self-regulation is associated with poor outcomes, such as weak self-control, poor physical stamina, less strength to stay on task, and passive responses to unpleasantness.¹⁸ Personality changes during times of stress and the ability to learn self-regulation can have a direct effect on performance-related behavior and a service member's opinion of the stressful event. Many decorated veterans return from stressful combat having learned valuable life lessons that serve them well throughout their lives. Thus, personality change can lead to positive outcomes when combined with self-regulation and hardiness.

Example of Resiliency Training for Military Personnel—The Kansas National Guard Resiliency Center began looking abroad to find methods of preventing combat stress. The Israeli Air Force Psychology Branch introduced members of the US Agri-Business Development Team (ADT) to stress inoculation. Members of ADT are pictured in *Figure 3* during predeployment resiliency training before a 1-year deployment to Afghanistan to assist with the local agriculture. The team members were taught to communicate under stress. After instruction, blindfolded team members had to complete tasks by relying on a “battle buddy” (*Figure 3*), effectively using coping mechanisms learned.

The Resiliency Center is a new training program under the Kansas Adjutant General's Department. It is intended as predeployment or preparatory training for wartime and disaster relief use. Not only military members will be trained, but also first responders, family members, and the community will



Figure 3. Resiliency training at the Kansas National Guard Resiliency Center. Members of the Agri-Business Development Team are pictured in predeployment resiliency training before a 1-year mission to assist with the local agriculture in Afghanistan. After instruction, blindfolded team members had to rely on a “battle buddy” to complete tasks and therefore use coping mechanisms learned during instruction.

gain resiliency skills. The web-based training is exportable and is being taught in several other states. The programs available include “Flash Forward” and “Life Ties—Family Resiliency Course.” Additional courses that include physical hardiness with flexibility and core strengthening are being planned.

Treatment Strategies for Service Members *Pharmaceuticals*

Pharmaceutical approaches to the prevention of combat-related mental disorders have only recently been explored. No medications are currently approved in the United States for the prevention or management of PTSD. Nevertheless, recent studies suggest that “off-label” administration of propranolol may be useful for prevention of PTSD, as described later in this section.

Propranolol, a beta-blocker developed in the late 1950s,¹⁹ has long been used to control heart rate, anxiety, and hypertension. However, most providers avoid prescribing propranolol as a hypertension treatment because it crosses the blood-brain barrier and causes central nervous system (CNS) symptoms. This knowledge was used to develop other beta-blockers with chemical structures that precluded crossing of the blood-brain barrier and, therefore, failed to elicit the CNS effects of propranolol. Studies have analyzed the efficacy of the CNS effects of propranolol in treating patients with acute stages of PTSD by describing the brain pathways through the amygdala.

Symptoms of PTSD are closely associated with the fear circuitry of the brain. Traumatic events are followed by an immediate release of catecholamines (eg, adrenaline). Adrenaline

release facilitates a paniclike state and the activation of the amygdala. The amygdala is a deeply positioned, almond-sized structure present in each hemisphere of the brain. Studies involving stimulation of the amygdala have deepened our understanding of anxiety, fear, phobia, memory recall, and fear conditioning. The basolateral nucleus of the amygdala, in particular, is involved in fear conditioning and emotional arousal. At the time of a traumatic event, the release of adrenalin serves to strengthen memory consolidation, and this is mediated by the amygdala.

The ability to remember fearful events is most likely an evolutionary advantage. However, excessively fearful events increase the release of adrenalin, and adaptive emotional memory and arousal can lead to PTSD symptoms. In addition, prolonged exposure to fear can result in tachycardia and hypervigilance, potentially resulting in an increased risk for PTSD.

Once made, a fearful memory lasts forever and can create substantial emotional disorders that make finding a long-term cure difficult. However, evidence²⁰ suggests that propranolol may prevent fear memories by blocking the effects of memory enhancement in the amygdala.

Propranolol is effective in the treatment of survivors who present with acute stress-related rapid heart rates and hyperarousal.²¹ Researchers postulate that an excess of adrenaline improves memory consolidation and induces fear conditioning, leading to PTSD.^{21,22} Another study has revealed that administration of propranolol soon after a traumatic event has preventive effects.²² Therefore, propranolol is useful for mitigating, if not preventing, PTSD.

Kindt and colleagues²³ have shown that administration of propranolol before an emotional memory is consolidated erases the behavioral expression of the fear memory within 24 hours of initial treatment and possibly prevents emotional disorders. Propranolol does not induce amnesia, nor does it effect declarative memory, which is dependent upon the hippocampus. Thus, management of fear memories with propranolol may prove to be effective for the treatment of acute stress and the prevention of PTSD.

Although erasing memories is arguably unethical, the apparent effectiveness of propranolol, as shown in limited studies,^{22,23} and its unique ability to circumvent the onset of amnesia make it a model drug for the treatment of PTSD. Accordingly, propranolol is recommended in the Veterans Administration/Department of Defense (VA/DoD) Clinical Practice Guidelines for PTSD.²⁴

Stress Inoculation Training

Stress inoculation training, developed by Donald Meichenbaum, PhD, is a form of cognitive-behavioral therapy that involves gradually exposing a patient to small amounts of stress in an educational and treatment setting.²⁵ Through such exposure, an individual develops preparedness for stressful situations and increased resilience. This process enhances atti-

tudinal inoculation with each exposure and arouses coping mechanisms that protect people in more stressful situations.

Stress inoculation training is performed in three overlapping phases: (1) educational, (2) skills acquisition and consolidation, and (3) final application and follow-through.²⁵ These three phases are general guidelines, and their implementation varies with the type of stressor addressed and the coping abilities of the patient. Primary care providers should collaborate with counselors trained in cognitive behavioral training, such as social workers and psychologists, when considering if a patient should be provided the stress inoculation training.

Establishing rapport between the trainee and trainer begins the educational phase, or the "initial conceptual education phase," of stress inoculation training. Establishing trust is critical to enhancing the skills taught throughout all phases.²⁵ Discovery and nurturing are involved throughout this process, in which the trainer uses thought-provoking questions to stimulate the development of ownership by the trainee.

The second phase, acquiring and consolidating coping skills, includes the development of coping mechanisms via skills the trainee already has.²⁵ In a clinical setting, the skills training includes teaching intra- and interpersonal coping mechanisms.

The third phase, final application and follow-through, includes the demonstration of coping skills on a graduated basis (ie, following theories of inoculation), with an emphasis on relapse prevention.²⁵ Role-playing, imagery, and graded exposure to stressors are some of the methods used.

The components of stress inoculation training can help service members understand that stress is not abnormal; rather, it is a normal reaction to an abnormal situation.²⁵ Normal coping mechanisms taught include intrusive thoughts of denial, which are normally broken down into smaller doses of stress to make them easier to handle. Abnormal adaptive behavior may lead to cyclic behavior that leads to overemployment. For example, increased vigilance while on sentry duty is a normal coping mechanism when in a combat environment. On the other hand, vigilance in scanning overpasses and alleys upon returning home becomes hypervigilance, which is an abnormal behavior. Indeed, unintentional use of coping mechanisms can lead to brooding, avoidance, and mendacious thinking, but suppression of these intrusive thoughts can be taught in small increments.

Stress inoculation training gives service members skills to reduce the unintentional use of such ineffective coping mechanisms. It also imparts the ability to master coping mechanisms for many different stressful situations. Thus, stress inoculation training methods can be used to treat diverse conditions ranging from social anxieties (eg, fear of testing or public speaking) to issues that are more complex (eg, victims of abuse, prisoners of war, and combat veterans with PTSD). Many types of stress disorders have been successfully managed with these methods and may be ideal for military and community application.

The Difference a DO Makes

Pharmacotherapy and the psychosocial methods discussed here should be used in a comprehensive approach to patient care that includes acknowledgment of the potential adverse effects of such treatment. Patient monitoring is essential and best done by the primary care providers that treat the patients regularly.

Osteopathic manipulative treatment has not been studied for effectiveness in PTSD prevention or treatment. However, osteopathic principles and practice emphasize the role osteopathic physicians play in the endeavor to return a patient's body to normal function. Indeed, the basic tenets of osteopathic medicine state that the patient is "the product of dynamic interaction between body, mind, and spirit" and that "[a]n inherent property of this dynamic interaction is the capacity of the individual for the maintenance of health and recovery from disease."²⁶ An opportunity exists for osteopathic physicians to improve the rates of recovery from, and prevention of, mental health disorders such as PTSD in the great number of US military service members deployed during The Long War.

Prevention and Treatment at the Community Level

Although prevention and treatment are valuable for the individual service member, the benefits of these techniques are enhanced when incorporated at the community level. Israeli communities provide an excellent example of this concept. Israelis emphasize prevention and resiliency training not only as part of military training, but also in community mental health programs. In Israel, communities under stress have developed resiliency centers, in which resiliency counselors teach community PTSD prevention at three levels: individual, community, and leadership.²⁷ Individuals in all three levels are taught self-regulation techniques and SIT.²⁸

Traits that lead to self-regulation during combat (as discussed in relation to the stress-CARE model) are outside the scope of most civilian tasks; individuals acquire these skills only after joining the military and receiving training. A civil-military gap may develop if the same type of training is not available to the community. It appears that community-level training has multiple advantages. It maximizes social bonding and increases group cohesion, leading to better esprit de corps and resiliency within the group. The resilient community can, in turn, provide a support structure for its individual members as well as for the soldiers it sends to war, ultimately mitigating costs by increasing community productivity.

One example of a functioning community-level program is the Kansas National Guard Resiliency Center and its Flash Forward program. This resiliency instruction program focuses on pre-deployment preparedness and incorporates training developed by the Israeli military. A unique feature of this program is "Warfighter Diaries," a social networking site that allows military service members and their families to post and review information about themselves and resiliency issues

they are facing. For the URL of this site and other resiliency Web sites see *Figure 4*.

Research on the effectiveness of such community programs is in its infancy. The Israel Ministry of Defense (MOD) rehabilitation department has tracked PTSD and found a diagnosis rate of 10% among its veterans, with 71% of these individuals still married after their service term has ended.⁴ By comparison, approximately 25% of US veterans have PTSD (15%-41%, depending on inclusion criteria and samplings), with only 36% of them still married after service.⁴

The Israel MOD rehabilitation department also studied the effectiveness of PTSD treatment using clinical practice guidelines and standard questionnaire methods. Treatments were conducted according to clinical practice guidelines similar to the VA/DoD guidelines and included cognitive-behavioral therapy methods and, when appropriate, psychopharmacology.⁴ The study conducted by the MOD rehabilitation department included 6000 veterans (50% with known PTSD and 50% in a 2-year cognitive treatment plan), 1000 of whom were in treatment at any given time.⁴ Responses to PTSD therapy were similar to responses by US veterans, revealing that 35% improved, 38% did not change, and 27% got worse.⁴ Implementation of early pharmaceutical (eg, propranolol) management would likely yield even greater improvements in these outcomes.

Conclusion

Treatment of combat-related mental health disorders is expected to cost \$600 billion in lifetime of care and disability payments to veterans.^{1,11} Moreover, available treatments have not yet reached the desired level of effectiveness. Providing quality treatment that service members are willing to undergo has the potential to narrow gaps in care and result in productivity gains that will pay for the cost of treatment. Effective treatment will also yield benefits by building resiliency in service members and the communities that support them. Imple-

- War Fighter Diaries: <http://www.warfighterdiaries.com>
- US Department of Veterans Affairs: <http://www.ptsd.va.gov>
- Defense Centers of Excellence: <http://www.dcoe.health.mil>
- US Army, Comprehensive Soldier Fitness: <http://www.army.mil/csf/>
- US Surgeon General, *Mental Health: A Report of the Surgeon General*: <http://www.surgeongeneral.gov/library/mentalhealth>

Figure 4. Web site sources on resiliency for military service members and their families.

menting these measures, and employing osteopathic principles and practice, can be a legacy of the current war.

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References

1. Tanielian T, Jaycox LH, eds. *Invisible Wounds of War: Psychological and Cognitive Injuries, Their Consequences, and Services to Assist Recovery*. Santa Monica, CA: RAND Corporation; 2008:1-26.
2. Relationships between the Nature and Timing of Mental Disorders Before and After Deploying to Iraq/Afghanistan, Active Component, U.S. Armed Forces, 2002-2008. *Medical Surveillance Monthly Report*. 2009;16(2):2-6. http://www.afhsc.mil/viewMSMR?file=2009/v16_n02.pdf. Accessed August 25, 2010.
3. Rumsfeld D. The Long War. Talk presented at: National Press Club; February 2, 2006; Washington, DC.
4. Doron M. PTSD/psychotherapy comparative analysis. Presented at: Israeli Ministry of Defense Rehabilitation Department, The Adjutant Generals Trip to Israel; December 10, 2008; Tel Aviv, Israel.
5. Campbell SJ. What has befallen me? The psychological aftermath of combat. In: Britt TW, Castro CA, Adler AB, eds. *Military Life: The Psychology of Serving in Peace and Combat*. Vol 1. Westport, CT: Greenwood Publishing Group; 2005:3-12.
6. Driskell JE, Salas E, Johnston JH. Decision making and performance under stress. In: Britt TW, Castro CA, Adler AB, eds. *Military Life: The Psychology of Serving in Peace and Combat*. Vol 1. Westport, CT: Greenwood Publishing Group; 2005:128-154.
7. Musashi M. *The Book of Five Rings*. Lincoln, NE; iUniverse; 2004.
8. Mental Health Advisory Team (MHAT) V. *Operation Iraqi Freedom 06-08*. Office of The Surgeon General, United States Army Medical Command; February 14, 2008:57.
9. Gifford RK. Psychological aspects of combat. In: Britt TW, Castro CA, Adler AB, eds. *Military Life: The Psychology of Serving in Peace and Combat*. Vol 1. Westport, CT: Greenwood Publishing Group, Inc; 2005:1-30.
10. National Institute of Mental Health statistics 2002. The Mental Illness Research Association Web site. <http://www.miraresearch.org/understanding/statistics.htm>. Accessed April 11, 2009.
11. Kanter E. *Shock and Awe Hits Home*. Washington, DC: Physicians for Social Responsibility; November 2007. www.psr.org/site/DocServer/ShockandAwe.pdf?docID=3161. Accessed August 24, 2010.
12. Hyams KC. Mental health screening before troop deployment. *BMJ*. 2006;333:979-980.
13. Kuehn BM. Soldier suicide rates continue to rise: military, scientists work to stem the tide. *JAMA*. 2009;301(11):1111,1113.
14. Nock MK, Borges G, Bromet EJ, Cha CB, Kessler RC, Lee S. Suicide and suicidal behavior. *Epidemiol Rev*. 2008;30(1):133-154.
15. Knox KL, Litts DA, Talcott GW, Feig JC, Caine ED. Risk of suicide and related adverse outcomes after exposure to a suicide prevention program in the US Air Force: cohort study. *BMJ*. 2003;327:1376-1378A.
16. Siebert A. *The Resiliency Advantage*. San Francisco, CA: Berrett-Koehler Publishers; 2005:191-192, 157-158.
17. Siebert A. *The Survivor Personality*. Portland, OR: Practical Psychology Press; 1984:5-48.
18. Sinclair RR, Tucker JS. Stress-CARE: an integrated model of individual differences in soldier performance under stress. In: Britt TW, Castro CA, Adler AB, eds. *Military Life: The Psychology of Serving in Peace and Combat*. Vol 1. Westport, CT: Greenwood Publishing Group; 2005:202-232.
19. Melville B. Propranolol for PTSD: blunting memories and post-traumatic stress disorder. Suite 101.com Web site. http://post-traumatic-stress-disorder.suite101.com/article.cfm/propranolol_for_ptsd. Published April 5, 2008. Accessed April 11, 2009.
20. Pitman RK, Delahanty DL. Conceptually driven pharmacologic approaches to acute trauma. *CNS Spectr*. 2005;10(2):99-106. <http://www.cnsspectrums.com/asp/articleDetail.aspx?articleid=309>. Accessed August 17, 2010.
21. Vaiva G, Ducrocq F, Jezequel K, et al. Immediate treatment with propranolol decreases posttraumatic stress disorder two months after trauma. *Biol Psychiatry*. 2003;54:947-949.
22. Pitman RK, Sanders KM, Zusman RM, et al. Pilot study of secondary prevention of posttraumatic stress disorder with propranolol. *Biol Psychiatry*. 2002;51:189-192.
23. Kindt M, Soeter M, Vervliet B. Beyond extinction: erasing human fear responses and preventing the return of fear. *Nat Neurosci*. 2009;12:256-258.
24. US Department of Veterans Affairs, National Center for PTSD. VA/DoD Clinical Practice Guidelines for PTSD. <http://www.ptsd.va.gov/professional/ptsd101/course-modules/vadod-clinical-practice-gl.asp>. Accessed August 23, 2010.
25. Meichenbaum D. Stress inoculation training: a preventative and treatment approach. In: Lehrer PM, Woolfolk RL, Sime WE, eds. *Principles and Practice of Stress Management*. 3rd ed. New York, NY: Guilford Press; 2007:3-40.
26. Rogers FJ, D'Alonzo GE Jr, Glover JC, et al. Proposed tenets of osteopathic medicine and principles of patient care [new and noteworthy]. *J Am Osteopath Assoc*. 2002;102(2):63-65. <http://www.jaoa.org/cgi/reprint/102/2/63>. Accessed August 18, 2010.
27. Harush K, Yossef D. Facing the Qassam (Kassam) missile threat. Presented at: Sderot Resilience Center, The Adjutant Generals Trip to Israel; December 9, 2009; Sderot, Israel.
28. Bar-Dror O. Israel police resiliency an Israeli police psychologist perspective. Presented at: American Israel Education Foundation, The Adjutant Generals Trip to Israel; December 8, 2008; Jerusalem, Israel.