Studies, Statistics & Solutions

Preventing

Sleep Casualties
The mission of AIS is to improve the health of the community and the world by setting the standard of excellence of stress management in education, research, clinical care and the workplace. Diverse and inclusive, The American Institute of Stress educates medical practitioners, scientists, health care professionals and the public; conducts research; and provides information, training and techniques to prevent human illness related to stress.

AIS provides a diverse and inclusive environment that fosters intellectual discovery, creates and transmits innovative knowledge, improves human health, and provides leadership to the world on stress related topics.
COMBAT STRESS

We value opinions of our readers.
Please feel free to contact us with any comments, suggestions or inquiries.
Email: editor@stress.org

Editor In Chief: Daniel L. Kirsch, PhD, DAAPM, FAIS
Editor: Kathy Platoni, PsyD, DAAPM, FAIS, COL (RET), US Army

Combat Stress is a quarterly magazine, published in February, May, August and November. Each issue contains news and advertising designed with service members, veterans and their families in mind. It appeals to all those interested in the myriad and complex interrelationships between combat stress and health because technical jargon is avoided and it is easy to understand. Combat Stress is archived online at stress.org. Information in this publication is carefully compiled to ensure accuracy.

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Chaired by Colonel Platoni, the role of this board is to develop initiatives and communications to serve the stress management needs of Service Members and veterans.

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What is the Alpha-Stim® AID?
The Alpha-Stim® AID is a medical device used for the management of anxiety, insomnia and depression (AID). Alpha-Stim® AID provides a safe, effective and proven alternative to drugs. Use it while working at your desk, or at home watching TV or meditating. After treatment, there are no physical limitations imposed so you can immediately resume your normal activities. The treatment is simple and easily administered at any time.

In a US Army Study, “The treatment subjects averaged about 43 extra minutes total time slept when compared to control subjects who reported an average 19 minutes less total time slept.”


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It’s the waveform. Alpha-Stim® generates a unique and patented waveform that no other device can replicate. The waveform in a therapeutic device is analogous to the precise chemical compound that differentiates one drug from another.

Alpha-Stim’s® waveform is distinctive in its proven safety and effectiveness. It uses such a low current that some people can’t even feel it. It is never turned up to where it is uncomfortable.

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Patient Self Reports: Alpha-Stim® vs. Drugs

Anxiety

<table>
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<tr>
<th>Drug</th>
<th>Alpha-Stim® (N=114)</th>
<th>Alpha-Stim® (N=358)</th>
<th>Xanax (N=2282)</th>
<th>Ativan (N=838)</th>
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<tr>
<td></td>
<td>80%</td>
<td>85%</td>
<td>84%</td>
<td>80%</td>
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Insomnia

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<th>Drug</th>
<th>Alpha-Stim® (N=622)</th>
<th>Lunesta (N=462)</th>
<th>Sonata (N=62)</th>
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<tr>
<td></td>
<td>68%</td>
<td>56%</td>
<td>61%</td>
<td>64%</td>
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Depression

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<th>Drug</th>
<th>P ENTER (N=2028)</th>
<th>Wellbutrin (N=1160)</th>
<th>Alpha-Stim® (N=89)</th>
<th>Alpha-Stim® (N=311)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>70%</td>
<td>67%</td>
<td>78%</td>
<td>83%</td>
</tr>
</tbody>
</table>

Percent of Patients Reporting Improvement

Patients who reported a positive response according to WebMD Drug Surveys, and Alpha-Stim® Service Member and civilian surveys. Alpha-Stim® Data from 2011 Military Service Member Survey (N=112) and Alpha-Stim® Patient Survey (N=1,743). Conducted by Larry Price, Ph.D., Associate Dean of Research and Professor of Psychometrics and Statistics, Texas State University. Pharmaceutical Survey Data from www.WebMD.com/drugs. Accessed on October 24, 2011.

Scan to take the Alpha-Stim® AID for a test drive

In the USA the FDA restricts this device to sale by, or on the order of a licensed practitioner. It is sold over-the-counter throughout the rest of the world. Side effects occur in less than 1% of people and they are mild and self-limiting consisting mainly of headaches and skin irritation on the ear lobe electrode site. © Copyright 2014 by EPI, Inc. ALL RIGHTS RESERVED. Alpha-Stim® is a registered trademark. Manufactured under U.S. patents 6,612,068, 8,457,765 and Worldwide Patents Pending.
Sandi Pomeroy, PT has been treating me with Reflexercise and the Associative Awareness Technique for over two years now and I just have to rave about this form of treatment. It has been extraordinarily beneficial in every conceivable way.

I am a survivor of the Fort Hood Massacre and 34 years of military service, both active duty and Army Reserve, in addition to 4 deployments in time of war. AAT has made a significant difference in my life. I live with an undercurrent of anxiety that has now departed because of these techniques. I am trying very hard to convince some of my trauma patients, as I do specialize in the treatment of PTSD, to arrange a visit with Sandi, as the benefits have been unlimited and the potential for healing, infinite.

I thank Sandi profusely for what she have taught. She has labored intensively to bring AAT and Reflexercise to the Dayton VAMC. It is my sincere hope that there are listening ears in the wings and that there is an avenue for these interventions to take hold in the VA system for the many thousands of returning forces that stand to reap tremendous benefits from these very powerful techniques. Of equal importance is the fact that they have no side effects and this therapy cannot be overprescribed in lethal amounts.

--April 24, 2013

Thank you again for such enormous relief and recovery, which is ongoing to date with enormous improvements. Sandi has also been treating one of my trauma patients twice weekly and has literally helped him move from victim to victor in the process.

--UPDATE: October 6, 2014

COL (RET) Kathy Platoni, Psy.D.
Clinical Psychologist
Editor, Combat Stress
From all of us at AIS, we send our heartfelt gratitude to the donors who generously supported the AIS Getaway Giveaway!

A REALLY BIG THANK YOU

Dr. Heidi Hanna, FAIS, Founder of Synergy, author of Stressaholic

Mr. Paul Huljich, AIS member and author of “Stress Pandemic”
The goal of the American Institute of Stress Getaway Giveaway was to provide a program of honor and thanks to a few lucky service members, veterans and their families. Research shows that simply taking time to be with friends and family, engaging in leisure activities, is a powerful and effective stress buster!

We received generous donations from AIS members, corporate sponsors and Charlie Daniels himself—all in effort to support our service members and veterans and honor them with a chance to relax and reconnect with their spouses or special guests and recharge their batteries.

Each winning package included:
2 nights hotel stay in 5 star luxury accommodations
2 Charlie Daniels concert tickets— and a chance to meet Charlie before the show and $200 cash!

We were able to provide these retreats in San Antonio, Branson and Las Vegas this year. In the future, we hope to expand the Getaway program to cover more locations and provide military stress focused seminars and relaxation classes as an addition to the getaway packages.

Please watch your inbox for information on how you can contribute to future Getaway Giveaway programming and give back in a small way to those who have sacrificed so much for our freedom.

With much gratitude,

Kellie Marksberry
AIS Executive Director
Sleep loss and disturbed sleep are inexorably linked with military service. The very nature of military operations requires active duty Service Members (ADSMs) to go without sleep in order to accomplish their missions. Yet, this operational requirement has, over time, transcended field training and war-time missions to become a cultural norm, whereas the military expects Service Members to receive less than optimal sleep on a chronic and routine basis. Sleep is an essential biologic requirement, similar to food and water. Sleepiness is not weakness or lack of discipline; however, there is a volitional component and effective countermeasures (such as caffeine and bright light) can help to combat sleepiness and allow Service Members to operate with less sleep. Without adequate sleep, Service Members are prone to become “sleep casualties.” Military commanders are well versed on heat casualties and are held accountable when these occur. Mitigation strategies are well established for heat casualties, with appropriate acclimatization and fluid intake, as these are preventable injuries. Sleep casualties are slightly more complex, but equally just as preventable. Ensuring adequate sleep prior to sustained operations, utilizing countermeasures to minimize the effects of sleep loss and fatigue, having a sleep/rest plan during the mission and encouraging a recovery period with prolonged sleep after the mission completion, all help to mitigate the risk of sleep casualties.

Behaviorally (or Occupationally) Induced Insufficient Sleep

Sleep casualties can manifest in one of two ways. In the short term, insufficient sleep results in falling asleep or dozing off at an inappropriate time or place. Long term consequences can include the development of mental, physical and sleep disorders. Failure to obtain any sleep in a 24 hour period results in humans performing...
Disclaimer: The opinions and assertions in this manuscript are those of the authors and do not necessarily represent those of the Department of the Army, the Department of Defense, or the U.S. government.

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at a level of legal intoxication. Performance deteriorates in a similar manner for individuals exposed to chronic partial sleep loss, such as sleeping 4-6 hours per night on a habitual basis. Lack of adequate sleep in the short term predisposes the ADSMs to becoming acute sleep casualties, such as falling asleep at inappropriate times, lapses in judgment or the development of more serious sequelae, such as motor vehicle accidents or mental errors, which may readily compromise their mission. The long term health consequences of insufficient sleep are well reported and include increased risks of obesity, diabetes mellitus, coronary artery disease and death, all of which constitute chronic sleep casualties.

The requirement for adequate sleep (7-8 hours on a regular nightly basis) is viewed among military members as a lofty goal that is for the most part, unobtainable. A common viewpoint in the military is that Service Members should be able to sleep when they are told to do so. Poor sleep practices, excessive caffeine intake and lack of sleep-discipline are the commonly ascribed reasons that Service Members do not receive sufficient sleep. In reality, there are many reasons why ADSM do not obtain adequate sleep, in both non-deployed and deployed settings. An individual’s set-point for sleep onset is determined by their circadian rhythm, or biological clock, along with their homeostatic sleep drive. The circadian rhythm determines when an individual would ideally go to sleep. The homeostatic drive is affected by how long an individual has been awake, with a greater duration of wakefulness promoting increased pressure to fall asleep. Ideally, the circadian rhythm and homeostatic sleep drive align to allow a smooth transition from wakefulness to sleep. In the setting of prolonged periods without sleep, all individuals will eventually fall asleep, irrespective of their biologic set point. Conversely, an individual’s chronotype, or when they would ideally go to sleep on a regular nightly basis, is difficult, if not unamenable to change. Thus, some Service Members are challenged with the regimented military schedule that may not align with their biologic clocks.

The sleep duration of ADSM is shorter than the civilian population. Multiple studies have documented that ADSMs report approximately 6 hours of sleep, both in deployed and non-deployed settings. The onset of learning to accept less sleep likely develops during basic training. In a study assessing sleep in basic trainees sleeping on their usual sleep schedule (2030-0430) or one better aligned with their circadian rhythm (2300-0700), the sleep times were 5.4 hours for the usual group and 5.9 hours for the intervention group. Aligning the sleep period more closely with trainees’ circadian rhythms increased total sleep time by 31 minutes, without extending the total time away from training. This, in turn, was associated with improved marksmanship scores and decreased fatigue. Similarly, the average sleep duration of cadets attending the United States Military Academy was 5 hours. Military personnel of this age range require at least 8 hours of sleep for optimal performance and likely more, given the rigors of their military training. Thus, both enlisted personnel and officer candidates are indoctrinated into a culture where appropriate sleep practices are not enforced. While education about the consequences of insufficient sleep, most notably the U.S. Army Surgeon Gen-
eral’s Performance Triad, which includes education about good sleep practices, are resulting in changes about appropriate sleep practices, the cultural belief still persists within military circles that sleep is a luxury and not an essential biologic requirement.

**Sleep Disorders in Active Duty Service Members**

Within the context of short sleep duration, multiple other military specific factors contribute to the development of clinically significant sleep disorders in ADSMs. There are those disorders, such as behaviorally or occupationally induced insufficient sleep syndrome, shift work sleep disorder and delayed sleep phase syndrome, which are, in part linked to the duty day of ADSMs. Conversely, insomnia, obstructive sleep apnea (OSA), comorbid insomnia and OSA (when insomnia and OSA occur at the same time) and a complex disorder consisting of disruptive nocturnal behaviors (such as screaming, yelling, tossing, turning, thrashing, sleep walking and combative behaviors), combined with nightmares, constitute sleep disorders that may be partially or wholly exacerbated due to the stressors of combat. While sleep disorders such as shift work and jet lag, insomnia and OSA are relatively well-established in the civilian population, the literature regarding ADSMs is not as robust. Our discussion will focus on the literature that is available, as well as our collective clinical experiences and recommendations for treatment.

**Shift Work Sleep Disorder**

Because military life is characterized, to a large degree, by early start times, late working hours, and rotating work schedules, many ADSMs suffer from shift work disorder (SWD). Humans have evolved to be diurnal creatures and non-traditional work schedules can result in misalignment between the body’s natural rhythm and professional demands. SWD is the most common circadian rhythm disorder, characterized by excessive sleepiness or insomnia for greater than one month’s duration and occurring in the setting of a work schedule which overlaps the usual sleep time. The prevalence for SWD ranges from 2 to 10 percent of the general population, with 10 to 38 percent of shift workers meeting clinical criteria for SWD. Individuals employed in rigorous occupations, such as military personnel, likely are affected more frequently than the general population. There is also a clinical subtype which involves an overlap of insufficient sleep, secondary to long work hours, combined with circadian misalignment. The occurrence of these two disorders in ADSMs very likely increases performance impairments. A number of reports have suggested that SWD is associated with negative health consequences, to include cardiovascular disease, gastrointestinal problems, cancer, and mood disorders. Individuals with SWD are at increased risk for motor vehicle and industrial accidents, workplace errors, depression, and missed days of work.

As most shift workers are chronically sleep-deprived, the key tenets for management of this clinical disorder are to obtain sufficient sleep and ensure safe work and commuting practices. This requires a problem-solving and motivational approach, with involvement of commanders and co-workers. Understanding mission requirements and tailoring sleep/rest cycles...
to the ADSM is essential to ensure optimal performance. Understanding the management of SWD applies to all military leaders, as nighttime operations are some of the most frequent causes of disturbed sleep during prolonged missions. All ADSM should receive training for healthy sleep practices (Table 1), to include optimizing the sleeping environment and avoiding sleep-interfering behaviors and substances (i.e., caffeine, alcohol, large meals) prior to bedtime. Minimizing the frequency of shift changes is one of the simplest and most powerful options available to military leaders. If rotating shifts are required, ADSMs should remain on the same shift for 2 to 4 weeks before schedule changes are implemented. To maximize sleep, ADSM working evening or night shifts should maintain a consistent sleep schedule, even on days off. On work days, taking a planned nap prior to night shifts, judicious use of caffeine and using bright light (2,500 to 10,000 lux) during the early part of the shift can improve alertness. Avoiding bright light in the later part of the shift and wearing sunglasses when leaving work during bright morning hours can result in an enhanced ability to fall asleep.

Medication management of SWD is often oversimplified to “uppers” versus “downers.” Low-dose melatonin may help with circadian misalignment, and sedative hypnotic sleep aids may be considered to facilitate sleep during the desired sleep pe-

Table 1. Healthy Sleep Practices

<table>
<thead>
<tr>
<th>Recommendations for Healthy Sleep Practices in Active Duty Service Members</th>
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<tbody>
<tr>
<td>1. Do not look at a clock at night. If you have a clock in your bedroom, make sure you have to leave the bed to turn off the alarm.</td>
</tr>
<tr>
<td>2. Go to bed and awaken at the same time every day, including weekends. Do not sleep more than 1 hour longer on weekends.</td>
</tr>
<tr>
<td>3. If not sleeping, get out of bed and find something relaxing to do.</td>
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<tr>
<td>4. Try not to drink more than 1 regular cup of coffee per day. Avoid energy drinks.</td>
</tr>
<tr>
<td>5. Have a relaxing sleep ritual 30 minutes prior to bed: read, take a shower, have a cup of tea prior to sleep each night.</td>
</tr>
<tr>
<td>6. Avoid using computers, TV or video games 1 hour prior to bedtime. Light stimulates your brain and keeps you awake.</td>
</tr>
<tr>
<td>7. Know when you feel sleepy. Most people have circadian dips (normal periods of sleepiness) around 1300 and 1630 hours causing them to feel sleepy. Assess when you feel sleepiest at night; this is the best time to go to sleep.</td>
</tr>
<tr>
<td>8. Plan out your day. Write down your concerns or engage in journaling for 15 minutes, 1 hour prior to sleep. This may help your mind rest.</td>
</tr>
<tr>
<td>9. Avoid over the counter sleep medicines. The best sleep is without any medications or alcohol.</td>
</tr>
<tr>
<td>10. Quality sleep is what matters! Five hours of good sleep is much better than 8 hours in bed.</td>
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period. It is important to understand that sedating medications may have residual effects upon awakening (i.e., cognitive impairment, decreased concentration) and that ADSMs and their leaders absolutely must plan for this in their risk assessments. Caffeine can increase alertness, but should not be used within 6 hours of the desired bedtime because it may cause difficulties in falling and staying asleep. Modafinil and Armodafinil (Nuvigil®) are two of the more newly prescribed wake-promoting agents that are associated with decreased sleepiness, fewer motor vehicle crashes and improved performance and quality of life. Nevertheless, no medication should act as a substitute for sleep and military leaders must be aware that they cannot rely on pharmacotherapy as a long-term solution to SWD.

Jet lag and Circadian Rhythm Disorders

Sleep in an operational setting is inherently difficult due to ambient noise, uncomfortable sleeping quarters and all too frequently, the requirement for increased vigilance due to potential life-threatening hazards. In a study of sleep in deployed United States Airmen, it was reported that 83.3 percent of participants met criteria for insomnia. Another factor which can disturb sleep is circadian misalignment or jet lag. Jet lag and SWD occur at some point in many ADSM due to deployments and mission requirements. Upon changing more than 2 to 3 time zones, especially with eastward travel, individuals are predisposed to developing jet lag. Jet lag is associated with difficulties falling asleep, maintaining alertness during the day, fatigue and decreased performance. The greater the time zone change, the more difficult it is to realign the circadian clock. Similar to SWD, treatment strategies for jet lag include maximizing sleep prior to travel, adhering to the sleep schedule at the destination, appropriately timed doses of melatonin and light therapy. Melatonin appears to have greater efficacy with increased numbers of time zones crossed. Caution has been suggested in the administration of both pharmacologic agents that promote either sleep or wakefulness to reported side effects and paucity of efficacy data. Both jet lag and SWD, if not addressed, may predispose ADSMs to develop insomnia, which is the most frequently occurring sleep disorder in military personnel.

Insomnia

Upon returning from deployment, insomnia is likely the most frequently clinically significant disorder in ADSMs. While post-traumatic stress disorder (PTSD) and traumatic brain injury (TBI) are recognized as the signature illnesses of the current wars, sleep disorders also occur, occur with great frequency in ADSMs and veterans. Diagnoses of insomnia increased 19 times in active duty U.S. Army personnel from 2000 to 2009. In 2011, 13.4 percent of ADSMs and 18.4 percent of Soldiers were taking prescribed sedative hypnotics for sleep. In one study, insomnia was the most common complaint of returning OIF/OEF veterans and was associated with the development of PTSD. Pre-existing sleep disturbances may readily exacerbate the negative consequences of combat. Data from the Millennium Cohort Study reported that even after controlling for past
mental health history, and combat trauma, Soldiers who reported symptoms of insomnia pre-deployment were more likely to develop anxiety, depression, and PTSD during deployment than were Soldiers who did not report these symptoms. As a result of this and multiple other studies, insomnia (which was once viewed as an associated symptom of other diseases) is now recognized as a distinct medical disorder that requires specific, focused treatment. With the exceedingly high rates of insomnia in ADSM, it is not a stretch to state that insomnia is one of the signature illnesses of military service.

Recognition and treatment of insomnia will not simply improve the subjective complaint of poor sleep quality. Insomnia is a clinical diagnosis that can be rendered during a Sleep Medical Evaluation, as opposed to OSA, which is diagnosed during a polysomnogram (Table 2). Patients with insomnia are at increased risk for adverse medical consequences, such as cardiovascular disease and mortality, as well as behavioral medicine sequelae, and diminished quality of life. Notably, insomnia is a common disorder among individuals who attempt suicide. Most insomnia diagnoses, up to 85 percent, occur in association with another (comorbid) medical, behavioral medicine, or sleep disorder. In this context, multiple studies suggest that treating insomnia not only improves sleep, but also enhances quality of life and health-related outcomes in the associated comorbid conditions of depression, PTSD, chronic pain, and alcohol dependence.

Studies evaluating the diagnosis, treatment and prevention of insomnia in ADSMs are limited. There are multiple FDA-approved medications for insomnia, however, none of these medications have been tested in military populations. Currently, the “gold standard” treatment for insomnia is cognitive-behavioral treatment (CBTI). Overall, CBTI is cost-effective, decreases sedative-hypnotic medication and decreases healthcare utilization. Four randomized controlled clinical trials have reported CBTI to be as effective as pharmacotherapy on a short-term basis, with sustained long-term clinical improvements. Both the National Institutes of Health and the American Academy of Sleep Medicine recommend CBTI as first-line treatment for insomnia, including insomnia that is associated with other medical, behavioral medicine and sleep disorders. Importantly, specific behavioral treatment preferences have been identified within a military population.

To date, the most common therapy for insomnia within the military health care system remains treatment with sedative-hypnotic medications. Sedative-hypnotic or medical therapy is associated with a myriad of side effects, to include infections, motor vehicle accidents, falls, complex behaviors during sleep such as sleep walking and driving, and mortality. The reliance on medical therapy is primarily due to a shortage of behavioral sleep medicine providers. Some reports estimate that as many as 15 to 20 percent of all deployed soldiers have received a medication to aid with sleep. Off-label use of anti-depressants, anti-psychotics and anti-histamines are also commonplace. As with the management of SWD, we recommend that behavioral
# Table 2. Overview of a Sleep Medicine Evaluation

<table>
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<th>Sleep Medicine Evaluation</th>
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<tr>
<td><strong>Goal:</strong></td>
<td>Evaluation and treatment of sleep disorders to improve sleep quality, safety, and overall quality of life</td>
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**Primary Care Physician:**
- Discuss sleep-related concerns
- Assess potential causes for sleep-related symptoms
- For some sleep disorders, the primary care physician may initiate treatment.
- Primary Care Physician may send referral to sleep medicine depending on suspected diagnosis.
- If sleep disorder does not respond to initial treatments, Sleep Medicine Evaluation is warranted.

**Sleep Medicine Evaluation:**
- Complete sleep history and evaluation, to include:
  - Sleep patterns
  - Patient and spouse-reported sleep complaints
  - Assessment of daytime impairment related to sleep disturbance
- Medical history review
- Medication and substance intake
- Determine likely sleep disorder diagnosis
- Order polysomnogram (sleep study) as indicated

**Polysomnogram:**
- Sleep for a night in a sleep laboratory
- During sleep study have the following monitored:
  - Brain waves
  - Heart rate
  - Breathing patterns
  - Oxygen levels
  - Eye movements
  - Limb movements
  - Video for any movements or sounds
- Sleep Medicine Physician interprets the information recorded during sleep study to render appropriate diagnostic formulation and treatment plans

**Follow up:**
- 1. Appointment with sleep medicine provider
- 2. Discuss results of sleep study, diagnoses, treatment as appropriate.
Interventions are the cornerstone for the management of chronic insomnia.

**Obstructive Sleep Apnea**

In addition to circadian rhythm disturbances and insomnia, sleep-disordered breathing is being discovered at an alarming high rate among ADSMs. Diagnoses of OSA have increased dramatically over the past decade due to multiple factors, to include improved recognition, increased rates of overweight and obesity in military populations and associations with other disorders. A patient set-up for a polysomnogram, used for the diagnosis of OSA, is shown in Figures 1 and 2.

Two of the hallmark diagnoses from this period, traumatic brain injury (TBI) and PTSD, are associated with increased rates of sleep-disordered breathing. Between 2001 and 2009, the number of cases of OSA increased from 3,563 to 20,435\(^{17}\). Among males 40 years and older, the prevalence was 7 percent. This was a 6-fold increase in incident diagnoses, with an 8-fold increase among those over the age of 40 years, and a 4-fold increase among those aged 20 to 24\(^{17,42}\). Among those returning from deployment who are screened in sleep disorders centers for nonspecific symptoms, such as fatigue and depressed mood, the rates of OSA vary from 50 to 62.7 percent\(^{43,44}\). In contrast, the U.S. civilian population prevalence is approximately 2.5 percent of females and 4 percent of males overall\(^{45}\). Estimates in U.S. veterans hover around 3 percent, based on a sample of 4-million older males within the VA system\(^{46}\); however, based upon the findings...

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**Figure 1. Patient with standard electrodes for monitoring during a sleep study**

![Image 1](U.S. Army photo by Staff Sgt. Christopher Klutts)

**Figure 2. Technologist view of patient sleeping during sleep study**

![Image 2](U.S. Army photo by Staff Sgt. Christopher Klutts)
above, it is likely that the prevalence of OSA in veterans will increase over time.

Similar to civilian and veteran populations, the most frequent comorbidities of OSA in ADSMs are hypertension, non-specific respiratory complaints, obesity and tobacco use. During Operations Iraqi Freedom and Enduring Freedom, research conducted in military sleep centers has reported associations between sleep disorders, PTSD and TBI in recently deployed veterans. Nearly 40 percent of patients in one cohort were found to have comorbid insomnia and OSA, often referred to as “complex insomnia,” which can be challenging to treat.

The impact of sleep disorders among patients with TBI is well established. Sleep disturbances following TBI have been reported in up to 72.5 percent of patients, with sleep-disordered breathing also being very common (23 to 36 percent). There may be an association between mechanism of injury and the type of sleep disorder. In a recent study, OSA was linked to blunt trauma, whereas insomnia was linked to blast injury. However, given the small size of the study and the complex nature of brain injury, this finding merits further study before a definitive association can be reached.

Numerous studies have shown that rates of OSA are increased among those with PTSD, with rates ranging from 40 to 91 percent. One recent study in an active duty cohort with PTSD showed that 67.3 percent met criteria for OSA, with an average AHI of 24.1 ± 22.8 events per hour. OSA is notably associated with a decline in cognitive functioning and negative mental health outcomes in veterans with PTSD. Treatment of OSA with continuous positive airway pressure (CPAP) can improve symptoms in patients with PTSD. A major challenge is that patients with OSA and PTSD have lower CPAP adherence, potentially due to the high rates of comorbid insomnia, disruptive nocturnal behaviors and nightmares.

Untreated OSA adversely impacts overall cognitive functioning with decreased focus, alertness, and visual-spatial and constructional abilities. A driving simulator study in patients with OSA demonstrated a decreased ability to process environmental data. These findings have strong implications for ADSMs and their leaders. Untreated OSA may readily impair ADSM’s ability to perform their military duties due to impaired cognitive function and/or sleepiness. Appropriate therapy with CPAP has been shown to improve performance; yet, some patients will have residual symptoms that require further evaluation and treatment. CPAP therapy is deemed adequate when a patient uses it for a minimum of 4 hours per night, 70 percent of nights and their self-reported sleepiness and cognitive impairments have resolved. It is our recommendation that patients with OSA aim for 6 hours of CPAP usage 90 percent of nights.

**Nightmares and Other Disruptive Nocturnal Behaviors**

Nightmares, or bad dreams, are defined as dysphoric and vivid dreams that may or may not be depictions of traumatic events. This type of unpleasant
Sleep mentation can disrupt sleep continuity and negatively affect daytime mood and functioning. In civilian and military populations, nightmares are more frequently comorbid with PTSD or other stress-related psychiatric disorders. Other disturbing nocturnal behaviors such as enactment of trauma-related dreams, night sweats, and vocalizations are also commonly reported by ADSMs returning from combat deployments. The constellation of nightmares, disruptive nocturnal behaviors and REM without atonia (lack of paralysis in REM sleep) is a newly proposed sleep disorder: trauma associated sleep disorder or TSD. TSD has the potential to facilitate diagnosis and treatment of ADSM, veterans and trauma survivors who previously did not receive diagnoses for this symptom constellation.

The number of studies specifically focused on associated risk or protective factors, prevalence, and consequences of nightmares and other disruptive nocturnal disturbances in ADSMs is limited. However, a growing number of trials have focused on the efficacy of Prazosin and cognitive-behavioral treatments of PTSD-related nightmares. Prazosin, an alpha-1 noradrenergic receptor antagonist, has been shown effective in ADSMs, veterans, and civilians. Prazosin does not have sedative/hypnotic properties and is well-tolerated by a vast majority of patients. Imagery Rehearsal Therapy and related nightmare-focused cognitive behavioral techniques, in addition to systematic desensitization, have also shown promising results in the treatment of nightmares in civilians or military populations. Both Prazosin and Imagery Rehearsal Therapy have been recommended by the American Academy of Sleep Medicine for the treatment of trauma-related nightmares. Whether the combination of Prazosin and cognitive behavioral techniques can be beneficial for treatment-resistant nightmares has not yet been evaluated.

Technology-based Treatments and Self-help Options

Pharmacological and non-pharmacological treatments such as CBTI, Image Rehearsal Therapy and CPAP are the first-line treatments for ADSMs with sleep disorders. Interactive web sites, mobile device apps, and ambient and behavioral sensing devices are also available to help provide education, conduct assessments, monitor sleep behaviors, and provide treatment of insomnia and other sleep-related conditions. For example, Afterdeployment.org, developed by Department of Defense’s (DOD) National Center for Telehealth and Technology, is available to healthcare professionals, military Service Members, veterans, and their families. The website addresses various domains of health and well-being, including post-traumatic stress, anger, relationships, suicide prevention, alcohol use, and sleep. The sleep topic area of the site consists of useful self-assessments, information, and personal story videos to help encourage ADSMs and others in the military community to improve their sleep and seek medical care.

The CBT-i Coach app (Figure 3), developed through a collaboration of the National Center for PTSD, the DoD’s Na-
tional Center for Telehealth and Technology (T2), and Stanford University, is designed for patients who are experiencing difficulty sleeping and who are participating in cognitive behavioral therapy for insomnia. The app includes several useful features, including a sleep assessment, sleep diary, sleep-management tools, and reminders. The sleep-management tools are based on evidence-based strategies for treating insomnia (e.g., stimulus control, sleep restriction, sleep interfering and arousal/activation behaviors). The built-in reminders function helps users to remember to complete the sleep diary, sleep assessments, and when to go to bed and awaken based on prescribed times. In 2014, the U.S. Army Public Health Command, the Combined Arms Support Center Sustainment Center of Excellence Mobile (ScoEMobile) and the Performance Triad Team at the Office of the Surgeon General released a Performance Triad app. The content of this app is organized by sleep, activity and nutrition, the three categories derived from the Performance Triad (http://armymedicine.mil/Pages/performance-triad.aspx). The app provides educational resources intended for Soldiers, as well as family members, healthcare workers, retirees, and civilians regarding how to optimize their performance, improve their well-being, and enhance their overall health.

Stress management and relaxation training apps are also accessible for people suffering from sleep problems. Breathe2Relax (Figure 4), released by the DoD’s National Center for Telehealth and Technology (T2) is one such app. The app provides instructions for diaphragmatic breathing through the use of innovative graphics, animation, narration and videos that teach diaphragmatic breathing skills. The app allows users to learn and practice this skill on their own or as part of a stress management program that is supervised by healthcare professionals. The app also allows users to keep track of their stress levels on a visual analogue scale, provides detailed information about the effects of stress on the body, and it includes a “virtual body scanner” animation that shows how each part of the body is affected. The app also includes an “Tabs” feature that allows users to customize the app to their specific needs.

Figure 3
Figure 4
human body responds to stress. Advancements in intelligent ambient and behavior-sensing technologies have allowed for real-time assessment and monitoring of disturbed sleep. Sleep actigraphs (small wrist watch-like devices that monitor movement counts) that are typically worn on the wrist are useful for determining sleep patterns and tracking circadian rhythms over time. Actigraphy has been used in sleep-related studies for decades. It does have limitations and is not typically used in routine diagnoses of sleep disorders. However, advancements in this technology have made actigraphs more accurate and, because of their low cost, they are increasingly used in sleep clinics to aid in clinical assessments. There are now many actigraphy-like apps, biosensing, and ambient sensing devices available to anyone suffering from sleep problems. For example, *Fitbit* is a device that tracks activity and can monitor sleep and wakefulness patterns. *Lark* is a wearable actigraphy-based monitoring device that is connected to smartphones via wireless connections and the app *Sleep Rate* uses data from a heart rate monitor and the iPhone’s microphone to monitor environmental noise (such as snoring) that may cause sleep disturbances. Data from many of these devices and apps can be uploaded to a personal computer or the Internet for review. While these apps can aid in assessment of an individual’s sleep, they have limitations and are not a substitute for a Sleep Medicine Evaluation and sleep studies for persistent sleep difficulties.

These types of technology-based tools provide several advantages for ADSMs and healthcare providers. They provide options to address sleep problems anywhere and at any time, they are affordable, and they make use of a stepped-care approach to address insomnia and other sleep conditions. In some cases, ADSMs may manage their symptoms and if their sleep disturbances do not resolve, the technology-based tools can provide routes to seek more intensive treatment.

**Conclusion**

Sound, restful sleep is a force multiplier, which can help to optimize the performance of ADSMs and can decrease their morbidity and mortality. Both ADSMs and their military leaders have a responsibility to allocate time in their individual and unit training plans for 7 to 8 hours of regular, uninterrupted sleep. Only with this change can we begin to decrease the acute and chronic sleep casualties that have characterized the current war efforts. The use of technology-mediated sleep treatments and self-care options hold promise to assist with managing sleep and the acute onset of sleep disturbances in ASDMs, but further evaluations of their efficacy is necessary. From the medical side, research on the diagnosis and optimal treatment of circadian rhythm disorders, insomnia, and OSA is required. In addition, further characterizing a newly discovered clinical entity, TSD, which encompass nightmares and disruptive nocturnal behaviors in ADSMs, is critical to understanding the true impact of military service on sleep. As the military reduces its overall force, many of our ADSMs will transition their care to the VA, requiring coordination to provide the patient care and sleep our veterans deserve.
REFERENCES


GET INSIDE OUR HEAD

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Mayor Kingseed, Members of the Centerville City Council, Pastor Miltenberger, Cub Scouts, Students, Musicians, Citizens of the Magnificent Community of Centerville, Ohio, and Honored Veterans of all wars, thank you for the tremendous honor or being selected as your keynote speaker this year. As a veteran of 34 years of military service and 4 wartime deployments, this has touched my heart in 1000 ways.

"In the desperate search to find meaning in the devastation and human wreckage that define war, it is an unmistakable feat that the human spirit remains triumphant in the face of unequalled adversity. It is in this milieu that we are exposed to unforeseen epiphanies that bestow value in the seemingly inconsequential and in places where one would least expect to derive meaning and purpose. There are multiple lessons to be gleaned from the battlefield, but the most astounding instruction may very well be what we discover within one another" (Platoni, 2008).

"There is an unanticipated human element to be retrieved from the most inhumane of human enterprises. Stated simply, it is about what you would sacrifice and surrender for your uniformed brothers and sisters, a unity and camaraderie to which one would gladly adhere, generating bonds forged for a lifetime. There is nothing so momentous, so significant as becoming part of that company of unsung heroes; those willing to lay down their lives for brother and sister Soldier, Airman, Marine, Sailor, or Coastguardsman, without reconsideration, and to the bonds among brothers and sisters Soldiers that enable survivorship and the very resolve to endure, to flourish. Though the human toll of the battlefield can hardly be quantified, there is remarkable knowledge to be unearthed from the catastrophic; those very life events that defy the confines of the human experience. It is the Warrior Ethos that takes on profound meaning in the wartime theater of operations, becoming an all-consuming force that supersedes race, gender, ethnicity, and even military rank structure. There are few comparable driving forces" (Platoni, 2008).
in the face of total madness. At some point, accountability for the lives outside of one’s own becomes the all-encompassing reason for being. This is the pure and unadulterated antithesis of man’s inhumanity to man. Their lives in your hands become significantly more vital, far more consequential than your own. It is why there is no humanly force strong enough to stop an infantryman from rounding the corner in the most treacherous neighborhoods of sectarian violence, knee deep in floating raw sewage, M-16 A-2 engaged, knowing that the next millisecond may be his very last on earth, to clutch the collar of his dying comrade in order to drag him to safety” (Platoni, 2008).

“Plainly, what you would do is ingrained in the soul, as you would forsake all else to accomplish the most unselfish of deeds. In the face of mortal danger, nothing else matters but who has become your next of kin. It is in the heat of battle, where the frontlines are indistinguishable from the rear echelon, where there is no embarrassment for the breadth and depth of bonding among boots on the ground and the unshakable expressions of love for one another, which almost always surpasses race, ethnicity, age, and oftentimes, gender that this is born (Platoni, 2008).

“When under heavy fire and engaging enemy combatants, without regard to one’s own safety and survivability, advancing towards the enemy in the noble act of saving the lives of fellow man and woman alike, that genuine heroism is often displayed. These are not necessarily extraordinary human beings that perform such feats under the most dreadful of circumstances, never spoken, but nevertheless pressed upon the soul (Personal Communication, 1LT Ryan Quinn; 8 April 2006). “This is the tacit pledge to commit to deeds that exceed the boundaries of the self, the overwhelming sense of the community of humankind that cries out and permits us to bear witness to the magnitude of true greatness to which humankind can aspire. Perhaps there are few more magnificent or superior gifts than the willingness to suspend life for one’s fellow warriors. What then becomes critical is the unrestrained willingness to do what one will in order to defend the lives of those whose names and faces are even unknown to us, yet they wear the same uniform; to carry an extra 300 rounds of ammunition as a promise to shield those who strive to trust that you would do so. It is in the midst of such urgency that one’s own life may very well cease to have meaning unless willing to surrender it in service of humanity. This is pure sustenance; a testament to what is still today, right and virtuous and decent in a world drowning in self-righteous entitlement and moral degradation. This is where self-orientation and involvement give way to altruism, to confront the thornier issue of stepping up to the plate for a cause greater than seeking personal pleasure and reward. It all too simple to be ‘blinded and overindulged in this world of excesses’ (Brookfield, 2005). There are those genuinely destined to strive in the face of adversity, who are adept at spinning gold out of rags. True survivorship is borne of the struggle, the toll and labor of adapting to and overcoming the most and tortuous that life circumstances have to offer. From utter despondency,
comes the resilience to overcome the insurmountable, to gain strength in the face of tremendous sorrow and unceasing despair. For those of us who have defied pain of immeasurable proportions to endure unspeakable torment and where there is no chance of locating the off switch to misery, we are obliged to unearth the message that enormous good may be cultivated from the unbearable. Out of this struggle from the darkness and desolation that threaten to consume us with stagnation, there are riches and enlightenment to be found, where a transformed spirit is permitted to flourish. The most adverse of life circumstances can be the most exceptional teachers (Brookfield, 2005). The unmistakable lesson here is that becoming keeper for brother and sister Service Member, friend or colleague, for the community of humanity itself, may exceed all other life experiences” (Platoni, 2008).

Let us vow, one and all. never to forsake those who have had the courage to wear the uniform, to answer the call to duty, to face our enemies, both foreign and domestic and who have so fearlessly given to a purpose far greater and more noble than themselves. We range from the World War II generation to the millennials, from 18 to 90 plus years. We are all the Greatest Generation. We carry the signature attributes of all veterans that are to be revered: the strength of Charles Atlas, the heart of a Warrior, the love of country far more than ourselves. Each of us has a war story to tell, from the 1.7 million veterans of World War II still alive today, though in rapidly dwindling numbers, the 2,275,000 living Korean War veterans, and the 7,391,000 Vietnam veterans whose voices still wait to be heard.

We have not only witnessed history, we have made it. Remember that the freedoms with which we are blessed and too often take for granted, those that are not always protected by the Constitution, that fall to the military when our nation is threatened by enemy forces, both within and outside our borders. It is those who don the uniform and step up to bear arms that assume the job that only one percent of our nation’s population is willing to undertake. Do not allow many decades to pass before paying tribute to those who return to kiss the ground on American soil, only to be met with protests and pelted with vile substances, as we did with our veterans of the War in Vietnam. Pay attention to the plight of our veterans, the too many now homeless and helpless masses that have been cast aside by the multitudes. Do not just throw money at veterans’ causes, but give with your time and your heart, as we have too often given our very lives for the cause of freedom by the blank check we wrote to America when we raised our right hands with that solemn pledge, the Oath of Office. In the words of President John F. Kennedy, “A nation reveals itself not only by the citizens it produces, but also by the citizens it honors, the citizens it remembers”. Do not allow our legacy to be remembered only once a year, our destiny to become the neglected, the disregarded, the forgotten, as there is no greater casualty of war than this. The highest office or position in this nation should be that of the veteran, as they will always pay the greatest cost
and bear the ultimate price. We answered the call. Ask yourselves what you are willing to do to reciprocate?

EPILOGUE

“We don’t go to war for our country and the cause of freedom nearly as much as we go to safeguard the lives of our friends and our families. It is these ties that unite us in times of unparalleled suffering and catastrophe which forge relationships that will endure for our lifetimes and that often exceed the closeness of family. Departing this and attempting to replace it on the home front becomes the new struggle, as those willing to lay down their lives are among life’s most treasured keepsakes, unlikely to be replaced elsewhere. Leaving this behind is easily an immense loss. If nothing else, it is ours to seize the knowledge of all that can be gathered in regard to survivorship in the face of human tragedy and that the interconnectedness of those flung together under the most cataclysmic of life circumstances, make life more worthwhile than one might ever envision. It is in one another that the will and determination to survive the unfathomable is fueled and from which resilience thrives. And so it is in the aftermath of these events that we

must hang together so that our souls do not perish in the pangs of an emotionally amputated life. What we must prevent at all costs is the disintegration of these imperatives on the home front. We must seek every opportunity to perpetuate the lessons that remain pure sustenance, to celebrate the invincibility of the human spirit. Admittedly, there are more than a few of us who would not seek to repeat these death-defying experiences, to do this wartime thing all over again, to render ourselves vulnerable to an early demise just for the opportunity to re-experience the camaraderie, the closeness of kinship that once sustained us and that is pivotal to our emotional survival in war’s aftermath. In this endeavor, we might surely die for the opportunity” (Platoni, 2008).

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