



CTA Special Topics Series
Sleep and Trauma: 101

Sleep is an essential state during which a variety of important regulatory and processing activities take place in the brain and body. Deprivation of sleep is well known to cause a range of physical and mental symptoms including irritability, inattention, sensory disturbances and even psychosis. In contrast, quality sleep of sufficient duration and normal architecture can refresh, invigorate and improve mood, cognitive processing, physical performance and creativity.

There are multiple stages of sleep each characterized by a unique brain-wave pattern created as various brain areas/neural networks increase and others decrease activity. Each full cycle from light sleep through Stage IV sleep is approximately 90 minutes. In any given night there will be between 3-5 periods or cycles of sleep. Each stage of sleep appears to have an important physiological role; in deep sleep, for example, growth hormone is released; during REM sleep new experiences are consolidated and information in short-term memory is “transferred” into long term memory.

During a normal 8 hour period approximately 90 minutes will be REM sleep. In infancy (until about 4 months) the baby can go from wakefulness directly into REM sleep and the younger you are the more time you spend in REM sleep. During REM sleep activity in the brain (as measured by brain metabolism) increases 20%! It is hypothesized that during REM sleep a considerable degree of “processing” of emotionally-charged experience takes place; awakening from REM sleep will almost always result in recall of a dream, though dreaming can take place in other phases of sleep.

Many of the fundamental brainstem/diencephalon monoamine networks (e.g., norepinephrine and serotonin) appear to play a major role in normal sleep regulation. It is no surprise then that alterations of these systems following trauma (see below) will also result in changes in sleep. During REM sleep, for example, the locus coeruleus (LC: the source of the major norepinephrine-containing neural network in the brain, an essential component of the stress-response systems) is essentially shut off. When REM sleep ends and LC is reactivated. In children with a sensitized and hyper-reactive LC (which may result from developmental trauma, intrauterine drug /alcohol exposure or from impaired attachment experiences) a characteristic pattern of sleep disturbance is seen: 1) difficulty settling in to sleep and 2) waking after each REM cycle – typically 90 minutes to a few hours after falling asleep. These children often will wake and leave their beds to either explore the home or to find reassurance with a caregiver.

Between 50-90% of maltreated children or who have PTSD also have sleep difficulties. Sleep impairment following trauma and neglect, then, is the rule rather than the exception. In children who have experienced trauma, the development of sleep disorder is often indicative of which children will eventually develop full-blown PTSD. Impaired sleep due to trauma can include difficulty falling asleep (sleep latency), true insomnia, nightmares or night terrors (which usually wake the child up), sleep apnea or other breathing difficulties during sleep (which also wake the child up), and the inability to stay asleep for more than one sleep cycle (mid-night awakening).

Severity of PTSD correlates with the likelihood of sleep disorder, and even moderate PTSD is often coupled with severe sleep disorder. Though prolonged sleep is sometimes characteristic of children and adolescents who are prone to dissociation (and thus, often females), lack of sleep causes more severe outcomes. Impaired sleep makes children twice as likely to exhibit neuropsychiatric symptoms; these

include severe emotional and behavioral problems such as hyperactivity, increased sensitivity to stressors, concentration problems, violent interactions, and enuresis (nocturnal bed-wetting). Unfortunately, as the child rarely shares their sleep problems with the caregivers or teachers, these symptoms are often judged to be part of a primary neuropsychiatric disorder such as ADHD or bipolar disorder, rather than related to previous trauma and sleep disruptions. The exacerbation of trauma-related symptoms by sleep deprivation is common; and therefore a primary focus of good therapeutic work in trauma is a thorough sleep history and the creation of good sleep routines and habits (the topic of a separate CTA Clinical Topics article).

On a positive note, some factors have been identified that appear to help prevent the development of sleep and related problems following trauma. In children who witnessed war-related traumatic events, the presence of two consistent caregivers made those children much less likely to have PTSD or sleep difficulties. Thus, the secure attachment served as a buffer to feelings of dyscontrol. As with other trauma-related problems, it appears that a key preventative and therapeutic strategy is to increase and support the consistent, positive relationships in a child's life.

Watch for more on this and related subjects in future CTA Special Topic issues.

Selected Readings on Sleep and Trauma

Bader, K., Schafer, V., Schenkel, M., Nissen, L., & Schwander, J. (2007). Adverse childhood experiences associated with sleep in primary insomnia. *Journal of Sleep Resistance, 16, 285-296.*

This study discusses how people who have insomnia and experienced childhood trauma experience more nocturnal motion (i.e., restlessness) and more frequent awakening than people who have insomnia and did not experience childhood trauma. Thus, the hyperarousal that accompanies PTSD is probably the reason for sleep impairment.

Caldwell, B. A., Redeker, N. (2005). Sleep and trauma: An overview. *Issues in Mental Health Nursing, 26, 721-738.*

Pages 728 & 729 of this article focus on sleep issues in children and adolescents. It outlines the negative consequences of sleep disorder in traumatized children, and suggests that sleep may be most impaired in physically abused children.

Germain, A., Buysse, J. I., Shear, M. K., Fayyad, R., & Austin, C. (2004). Clinical correlates of poor sleep quality in posttraumatic stress disorder. *Journal of Traumatic Stress, 17, 477-484.*

This study showed that 1) sleep disorder characterizes almost all cases of PTSD, and 2) that age and gender, which affect sleep quality in the general population, did not predict sleep disorder in PTSD sufferers—only severity of PTSD did.

Harvey, A. G., Jones, C., & Schmidt, D. A. (2003). Sleep and posttraumatic stress disorder: A review. *Clinical Psychology Review, 23, 377-407.*

This article is a lengthy review of the relationship between PTSD and sleep. It discusses how targeting sleep can improve symptoms of PTSD, as when people get more sleep they are better at logically evaluating threat.

Montgomery, E., & Foldspang, A. (2001). Traumatic experience and sleep disturbance in refugee children from the Middle East. *European Journal of Public Health, 11, 18-22.*

The importance of consistent caregiving is discussed in this article, and positive parenting was the only buffer from sleep disorder in children who witnessed war crimes found in this study.

Nishith, P., Resick, P. A., & Mueser, K. T. (2001). Sleep difficulties and alcohol use motives in female rape victims with posttraumatic stress disorder. *Journal of Traumatic Stress, 14*, 469-479.

This article discusses how alcohol is often used to cope with sleep-related issues after a traumatic event. Further, it discusses how alcohol use can inadvertently mask sleep disorder and trauma symptoms.

Rothbaum, B. O., & Mellman, T. A. (2001). Dreams and Exposure Therapy in PTSD. *Journal of Traumatic Stress, 14*, 481-490.

This article discusses that even though exposure therapy is an effective treatment for PTSD, nightmares should not be considered a form of exposure therapy. When one is asleep, they feel like they have no control over their dreams, and thus re-experiencing a traumatic event in a nightmare is detrimental.

Sadeh A. (1996). Stress, trauma, and sleep in children. *Child and Adolescent Psychiatric Clinics of North America 5*:685-700. Find online at: <http://www.tau.ac.il/~sadeh/baby/stress.htm>

This reference is a good overview of how trauma affects sleep. It also pays attention to the attachment relationship and how it can help or hinder trauma-related sleep disorder. Additionally, it discusses attempted therapies and how they are theorized to work.

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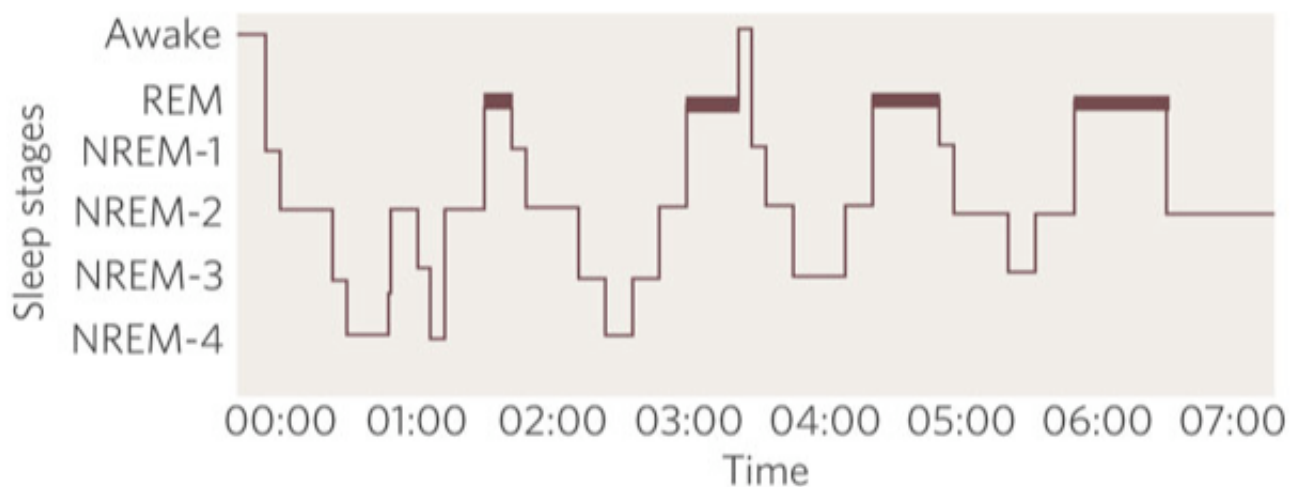


Fig 1. Sleep Architecture: from Society for Neurosciences monograph on Sleep