

Sleepless After TBI

Why is it important to treat sleep disorders in TBI?

Over 5 million people in the United States are currently living with a disability associated with brain injury. Although the major disabilities include cognitive difficulties and seizures, there is a growing awareness within the traumatic brain injury (TBI) community regarding the consequences of sleep problems and the impact it has on recovery and quality of life.

A review of sleep literature and surveys suggest that sleep disorders are three times more prevalent in TBI patients than that of the general population.^{2,3} In the face of medical complications and the physical and cognitive impairments that are associated with newly diagnosed traumatic brain injuries, sleep disorders can go unnoticed.³ However, early identification and treatment of sleep difficulties is warranted for improving rehabilitation and maximizing function and independence among patients.

Many patients with a TBI that are seen in the office complain of difficulty with sleep. For them, sleep no longer plays its fundamental role of revitalization after a tiring day. Problems sleeping can have significant consequences on one's behavior and mood such as anxiety, irritability and depression.¹⁻⁵ In addition, not sleeping can also increase fatigue, decrease concentration when performing activities or learning new things, and affect one's sense of well-being. Given that trauma to the brain already causes cognitive impairments, irritability, concentration difficulties, fatigue and pain, sleep disturbances not only contribute to these problems but may very well compound their severity.

It is important to realize that insomnia is also an under-recognized disorder in the general population. If not properly treated, patients who have sleep disorders may be at high risk for motor vehicle accidents and falls, which can subject them to traumatic brain injuries. Although this article is intended for TBI patients, the information can help anyone who has sleep disturbances.

What is sleep?

Sleep is a complex but essential and necessary activity for revitalizing, restoring and rejuvenating life. The brain is the primary controller of sleep, regulating when and how much you sleep. To break it down, sleep is divided into two phases, rapid eye movement (REM) and non-rapid eye movement (NREM) phases, which cycle back and forth throughout the night.^{4,5} REM sleep is considered deep sleep, the period when we dream and



our eyes move rapidly. NREM sleep is divided into four stages, where progression into stages three and four means you are having deeper and more restful sleep.

Why is sleep important?

Although the purpose and function of sleep is not clearly understood, studies have shown the negative effects on performance, concentration, memory and behavior when one has inadequate sleep.¹⁻⁵ Because the brain is involved in sleep regulation, a traumatic brain injury can interfere with achieving adequate sleep. Therefore, it cannot be stressed enough that appropriate attention to sleep disorders is necessary to improve rehabilitation and quality of life.

What are sleep disorders?

As discussed above, the mechanism of sleep is very complex involving interactions of chemicals and nerves between the brain and the body. The most common syndromes contributing to sleep disorders include:

- Insomnia: Difficulty with falling asleep, staying asleep or having non-restorative sleep
- Narcolepsy: Falling asleep spontaneously
- Sleep-wake schedule disturbance: The schedule for sleeping and being awake are different from the desired schedule, but the time spent sleeping is normal

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- Restless legs syndrome (RLS): Urge to move the legs because they feel uncomfortable, especially at night or when lying down
- Bruxism: Grinding or clenching of the teeth
- Sleep Apnea: Blockage of breathing when sleeping causing loud snoring and frequent awakenings
- Periodic limb movement disorder (PLMD): Involuntary movement of extremities during sleep causing arousal, but the individual is unaware
- Sleepwalking: Walking or performing other activities while sleeping and not being aware of it

Sleep difficulties in TBI can be caused by the above syndromes or other disorders including psychiatric illnesses (e.g., depression, anxiety), neurological disabilities (e.g., TBI, seizures), or medical diseases (e.g., pain, asthma, acid reflux). Medications used (e.g., stimulants, alcohol, caffeine, nicotine), poor sleep hygiene and other physiological factors (e.g., increased metabolic, cardiac and nervous system activity, body temperature, adrenaline and electrical activity in the muscles and brain) can cause sleep disorders.

If you have a sleep disorder, what should you do?

Although your doctor will provide you with the most appropriate care, there are a few simple steps you can take that can help you sleep better. Here are some healthy habits that can help promote sleep:

- Stick with a sleep schedule. Go to bed and wake up at the same time every day.
 - If you don't fall asleep in 30 minutes, get out of bed and do something relaxing like watch TV or read a book until you feel sleepy.
 - Avoid napping during the day. This will make you less tired when you try to sleep at night.
- Make sure your bedroom is protected from distractions, extreme temperatures, noise and light.
- Move the clock from sight if it is distracting.
 - Use the bedroom for sleeping. Do not eat, read or watch TV in bed.
 - Avoid eating or excessive drinking prior to sleep to allow time to digest, but do not go to bed hungry, as this can also wake you.
 - Exercise regularly, but time your workout to end no later than three hours before bedtime.

Medications, herbs and drugs ...

- AVOID non-prescription sleep medications. Most over-

the-counter sleep aid medications contain an antihistamine (commonly diphenhydramine) and are not recommended for people with TBI because they can cause disturbances in memory and new learning. Retention of urine, dry mouth, nighttime falls and constipation are also possible side effects.

- Nicotine from tobacco is under recognized as a cause of sleep impairment. One more good reason to stop smoking!
- Some people think of alcohol as a handy remedy to promote sleep, but it actually causes sleep disruption by decreasing deep and refreshing sleep.
- Melatonin and valerian are commonly used herbs to aid with sleep. However, both have multiple drug interactions and your doctor should be made aware of your use of either of these herbs.
- Avoid caffeine, nicotine and alcohol in the afternoon and evening, or altogether.
- Prescription drugs can also cause sleep difficulties. Common offenders, such as medications used to treat asthma and depression, can cause sleeping problems. If you are on a stimulant to treat daytime sleepiness, such as amphetamines, these drugs can also increase wakefulness, and if taken too close to bedtime, they can cause insomnia. These problems can often be stopped by adjusting the timing of the medication or by substituting a different drug – after consulting with your physician.

What if nothing helps?

If the above suggestions have not helped with your sleep difficulties, your doctor may be the next step in getting help. Prior to going to your doctor, it would be beneficial to keep a sleep diary to bring with you to the doctor's office.^{4,5} The diary should include at least two weeks' information regarding:

- 1) your sleep schedule (time and number of hours spent awake and asleep),
- 2) daily activities performed at work or home,
- 3) name and time of medications taken,
- 4) type of foods or beverages consumed, such as caffeinated beverages.

This information can speed up finding causes of your sleep difficulties and treating each appropriately.

When you attend the doctor's appointment, it is also beneficial to have someone accompany you. Your spouse, relative or friend can provide useful information about how you sleep (snoring, twisting, kicking and turning in bed) or how you engage in daily activities, whether you take too many naps or have difficulty with concentration.

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Your doctor will ask a complete history including medical, psychiatric and neurological illnesses and current medications you are taking. Before making recommendations, he or she will explore with you a variety of possible causes for your insomnia, including pain or depression, which often cause sleep disturbances. Frequent urination may also contribute to repeated awakenings or difficulty falling asleep. Patients should seek appropriate medical treatment as these symptoms may be warning signs for other diseases. A social history, information about illicit drugs, and alcohol / tobacco use will also be asked, all of which can adversely affect sleep.

As mentioned, certain medications you are taking may be a source of your insomnia, sometimes requiring a change. Some may cause difficulty with breathing, stimulate you or make you urinate more frequently — all symptoms that contribute to keeping you awake at night. If a new drug needs to be added, interactions with your current medications also need to be ruled out. In addition, some blood tests may be performed to rule out the presence of unknown medical illnesses or determine if you are a candidate for certain medications.

History regarding the mechanism of your TBI can also provide clues to your struggle with sleep. For example, if you were involved in a motor vehicle accident and had additional injuries to your neck or jaw, the damage can cause problems with breathing and getting enough air into your lungs. Also, TBI patients are more prone to gaining weight from medications and/or injury to eating centers in the brain, all of which contribute to sleep apnea.

Information regarding how you sleep now compared to how you slept prior to your TBI is also important.⁴ Some patients already suffered from sleep disorders before their brain injury and may have had medical causes. This is where family members can provide useful information if there are memory difficulties associated with the TBI.

Your doctor may further assess your sleep disturbance with a questionnaire called the Pittsburgh Sleep Quality Index (PSQI).⁵ This is a quick and user-friendly survey test for patients with a TBI that can also determine a cause of the sleep difficulties.

After a complete assessment, the solution to your sleeping problems may easily be determined by removing sleep deprivors and adding sleep-inducing therapies. Prior to instituting these therapies, some doctors may want to perform a sleep study that requires spending a night at a sleep center and being monitored with cameras and sensors to evaluate the quantity and quality

of sleep. The sleep study will also be able to evaluate for the presence of the conditions discussed above.

What treatments are available?

The first and most appropriate treatment is education. Behavior and environmental modifications are the first line of defense when treating sleep difficulties. In addition to modifying your sleep hygiene and altering environmental factors, other strategies focus on changing behaviors that contribute to lack of sleep. Although these treatment regimens take a long time and require patient compliance, they are thought to be more effective than using medications.²

If previous suggestions do not provide adequate improvement in sleep, there are non-pharmacological therapies available to consider before pharmacological agents are started. If there are mood or emotional issues involved with the sleep difficulties, psychotherapy can be an appropriate treatment. Cognitive-behavioral therapy (CBT) is a form of psychotherapy designed to help change one's behavior, perception or feelings about sleeping.^{1,5} CBT involves incorporating proper sleeping practices (previously described) and changing your thoughts about sleeping into positive beliefs. Like a self-fulfilling prophecy, if you think you will sleep badly, most likely you will. CBT, however, does require dedication that involves frequent visits to the doctor and other health care providers.

Sleep restriction is another method used to improve sleeping patterns by restricting the number of hours spent in bed to the actual number of hours slept.^{1,5} Although this can cause sleep deprivation at first, it is usually followed by more rapid sleep onset. Once this is achieved, the time restriction can slowly be increased in consecutive nights. Chronotherapy is similar to sleep restriction, but it is targeted to shift the patient from an undesired to a desired sleep schedule.^{1,5}

For those with anxiety, relaxation therapy involves creating a restful environment both in your bedroom and in your body and mind. Keeping your bedroom free of distractions, performing breathing techniques (taking long, deep and slow breaths) and creating relaxing images in your mind can help you sleep more comfortably and fall asleep more easily.

An additional non-pharmacological treatment for sleeping difficulties is using phototherapy. Studies have shown the use of special bright lights helps promote sleep.^{1,5} When exposed at strategic times, this may help you sleep more at night. However, consult with your doctor prior to using this, as these bright lights

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can cause eyestrain and headaches.

If the above non-pharmacological treatments do not help you, your doctor may start you on prescription medications. There are special precautions when considering the appropriate medication for TBI patients because some drugs can cause sedation and worsen cognition and behavior.

The following groups of medications are possible treatment options for sleep disorders in TBI patients. It is important to note that although many drugs belong to the same class, their side effects can vary greatly. Discuss with your doctor which medication is best for you.

- Sedatives/Hypnotics – This category is made up of two drug types. The first is benzodiazepines. Depending on how long a specific benzodiazepine drug stays in your system, cognitive sedation effects and risk of abuse potential can occur. This makes them unsuitable for TBI patients.^{2,4,5} The second type is known as non-benzodiazepines and includes drugs such as Ambien and Lunesta. These were developed as alternatives to benzodiazepines because they cause less functional and cognitive impairments.^{2,4,5} Lunesta, in particular, has been shown to be safe with long-term use.²
- Antidepressants – This class of medications has sedating properties and can be especially useful for those who suffer from sleep disorders associated with depression.^{2,4,5}
- Melatonin – This drug is a naturally occurring hormone in our bodies that is thought to help people fall asleep. Rozerem is a prescription drug that promotes this hormone and has been approved for long-term use because of its limited side effects.^{2,4}
- Antihistamines – As discussed before, these over-the-counter medications can worsen daytime sleepiness and affect multiple organ systems. They should be avoided in TBI patients.^{2,4,5}

In conclusion, sleep disturbances are common complaints in both the TBI and general population. The guidelines suggested above can help you understand how sleep works, its importance and the many causes of sleep disorders. A visit to your doctor may further help you determine your causes of sleep difficulties. Based on your symptoms, medical history and specific needs, your doctor will be able to formulate a personalized treatment plan to help you finally achieve a night of restful sleep. ❖

About the Authors...

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