Sleep and Traumatic Brain Injury

Traumatic Brain Injury Model System Consumer Information

For more information, contact your nearest TBI Model Systems. For a list of TBI Model Systems, go to: http://www.msktc.org/tbi/model-system-centers

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How common are sleep problems following a TBI?

Many people who have brain injuries suffer from sleep disturbances. Not sleeping well can increase or worsen depression, anxiety, fatigue, irritability, and one's sense of well-being. It can also lead to poor work performance and traffic or workplace accidents. A review of sleep disorder studies and surveys suggest that sleep disorders are three times more common in TBI patients than in the general population and that nearly 60% of people with TBI experience long-term difficulties with sleep. Women were more likely to be affected than men. Sleep problems are more likely to develop as the person ages.

What are types of sleep problems?

Sleep disturbances have been found in people with all severities of brain injuries – from mild to severe. Sleep is a complex process that involves many parts of the brain. For this reason, and depending on the location and extent of injury, many different kinds of sleep disturbances can occur after brain injury.

Common sleep disorders include:

- Insomnia: Difficulty with falling asleep or staying asleep; or sleep that does not make you feel rested. Insomnia can worsen other problems resulting from brain injury, including behavioral and cognitive (thinking) difficulties. Insomnia makes it harder to learn new things. Insomnia is typically worse directly after injury and often improves as time passes.
- Excessive Daytime Sleepiness: Extreme drowsiness.
- Delayed Sleep Phase Syndrome: Mixed-up sleep patterns.
- Narcolepsy: Falling asleep suddenly and uncontrollably during the day.

Common sleep syndromes include:

- Restless Leg Syndrome (RLS): Urge to move the legs because they feel uncomfortable, especially at night or when lying down.
- Bruxism: Grinding or clenching teeth.
- Sleep Apnea: Brief pauses in breathing during sleep, resulting in reduced oxygen flow to the brain and causing loud snoring and frequent awakening.

- Periodic limb movement disorder (PLMD): Involuntary movement of legs and arms during sleep.
- Sleepwalking: Walking or performing other activities while sleeping and not being aware of it.

What causes sleep problems?

The brain directs sleep by putting your body to rest. Injury to the brain can lead to changes in sleep.

Physical and chemical changes

The "internal clock" in the brain controls when people sleep and wake every day. If injured, the brain may not be able to tell the body to fall asleep or wake up. There are chemicals in our body that help us to sleep. An injury can change the way that these chemicals affect the body. If brain mechanisms for starting and stopping sleep are injured, a condition called post-traumatic hypersomnia may result in which a person sleeps many hours more than normal.

Changes in breathing control

Sometimes the brain's ability to control breathing during sleep becomes altered after a TBI, resulting in periods of apnea (when breathing actually stops for long enough for blood oxygen levels to drop). This is called sleep apnea. Other factors may affect the chance of having sleep apnea such as family history or being overweight.

Medications

Medications taken after a brain injury may cause problems going to sleep or staying asleep, or can make people sleepy during the day and unable to participate in activities.

- Prescription drugs for treating asthma and depression may cause insomnia. Also, stimulants that are meant to treat daytime sleepiness can cause insomnia if taken too close to bedtime. These problems can often be avoided by adjusting the timing of the medication or by substituting a different drug – of course, in consultation with your physician. Many other medications can cause sedation (sleepiness), as well.
- Most over-the-counter sleep aid medications contain an antihistamine (commonly diphenhydramine) and are not recommended for people with TBI because they may cause disturbances in memory and new learning. Retention of urine, dry mouth, nighttime falls and constipation are also possible side effects of this class of medications.

Daytime sleeping (napping) and physical inactivity

Napping during the day is likely to disturb sleep at night. Inactivity or lack of exercise can also worsen sleep.

Pain

Many people who have suffered brain injuries also experience pain in other parts of the body. This discomfort may disturb sleep. Medications taken to relieve pain may also affect sleep.

Depression

Depression is much more common in persons with traumatic brain injury than in the general population. Sleep problems such as difficulty falling asleep and early morning waking are common symptoms of depression.

Alcohol

While alcohol may help bring on sleep, drinking alcohol before bedtime is likely to interfere with normal sleep rather than improve it.

Caffeine and Nicotine

Nicotine from tobacco may cause sleep disturbances and is often overlooked. Caffeine can disturb sleep when consumed in the afternoon or evening.

What can be done to improve sleep?

Changes in behavior and environment are the first line to treating sleep difficulties.

Daytime Suggestions

- Set an alarm to try to wake up at the same time every day.

- Include meaningful activities in your daily schedule.
- Get off the couch and limit TV watching.
- Exercise every day. People with TBI who exercise regularly report fewer sleep problems.
- Try to get outdoors for some sunlight during the daytime. If you live in an area with less sun in the wintertime, consider trying light box therapy.
- Don't nap more than 20 minutes during the day.

Nighttime Suggestions

- Try to go to bed at the same time every night and set your alarm for the next day.
- Follow a bedtime routine. For example, put out your clothes for morning, brush your teeth and then read or listen to relaxing music for 10 minutes before turning out the light.
- Avoid caffeine, nicotine, alcohol and sugar for five hours before bedtime.
- Avoid eating prior to sleep to allow time to digest, but also do not go to bed hungry, as this can also wake you from sleep.
- Do not exercise within two hours of bedtime but stretching or meditation may help with sleep.
- Do not eat, read or watch TV while in bed.
- Keep stress out of the bedroom. For example, do not work or pay bills there.
- Create a restful atmosphere in the bedroom, protected from distractions, noise, extreme temperatures and light.
- If you don't fall asleep in 30 minutes, get out of bed and do something relaxing or boring until you feel sleepy.

Talk to your doctor

If your sleep problems persist, talk to your doctor to explore safe and effective solutions. Evaluation of sleep problems should include a thorough history of such problems, medication review, an assessment of your bedtime routines, and a comprehensive medical evaluation. Before recommending any action, your physician will explore with you a variety of possible causes for your sleep problems, including pain or depression. If necessary, he or she may recommend a polysomnographic evaluation (also known as a sleep lab). Based on your symptoms, medical history and specific needs, your doctor will be able to make a personalized treatment plan to help you achieve restful sleep.

Treatment options

Non-pharmacological therapies

- If mood or emotional issues such as anxiety or depression are causing sleep difficulties, psychotherapy (counseling) may be an appropriate treatment.
- Sleep restriction may improve sleeping patterns by restricting the number of hours spent in bed to the actual number of hours slept.
- For those with anxiety, relaxation therapy can help create a restful environment both in your bedroom and in your body and mind.
- Use of special bright lights (phototherapy) has been shown in studies to help promote sleep. When exposed to these lights at strategic times in the day, you may be able to sleep more at night. However, consult with your doctor first, as these bright lights can cause eyestrain and headaches.

Medications

Ask your doctor about medications that can help you sleep through the night or keep you awake during the day. Special care is necessary when choosing a medication in order to avoid daytime sedation or worsening of cognitive and behavior problems.

Natural remedies

Some consumers have found herbal teas, melatonin and valerian useful for sleep problems, and these are sold in health food and drug stores with no prescription needed. However, these remedies have multiple drug interactions, and you should tell your doctor if you are using them.

Recommended readings and resources

- Brain Basics: Understanding Sleep – NINDS/NIH. *http://www.ninds.nih.gov/disorders/brain_basics/understanding_sleep.htm*
- University of Maryland Sleep Hygiene: Helpful Hints to Help You Sleep. *http://www.umm.edu/sleep/sleep_hyg.htm*
- *www.sleepnet.com*
- Thaxton, L., & Myers, M.A. (2002). Sleep disturbances and their management in patients with brain injury. *J Head Trauma Rehabil*, 17(4), 335-348.

Disclaimer

This information is not meant to replace the advice from a medical professional. You should consult your health care provider regarding specific medical concerns or treatment.

Source

Our health information content is based on research evidence whenever available and represents the consensus of expert opinion of the TBI Model Systems directors.

Authorship

Sleep and TBI was developed by Brian Greenwald, MD and Kathleen Bell, MD in collaboration with the University of Washington Model Systems Knowledge Translation Center. Portions of this document were adapted from materials developed by the New York TBIMS, the Carolinas TBI Rehabilitation and Research System, and from *Picking up the pieces after TBI: A guide for Family Members,* by Angelle M. Sander, PhD, Baylor College of Medicine *(2002)*.