

A Comprehensive Review of the Connection Between Sleep Apnea and PTSD

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ABSTRACT

Post-traumatic stress disorder (PTSD) is a mental health condition that can develop after experiencing a traumatic event such as war, crime, sexual abuse, terrorism, natural disasters, or a car or plane crash. Sleep problems are another common symptom of PTSD. Sleep disorders most commonly associated with PTSD include insomnia and nightmares. People with obstructive sleep apnea (OSA) experience temporary trouble breathing during the night, often accompanied by severe snoring, choking, or a choking sound. Among the general population, the risk of sleep apnea increases with age. However, young veterans with PTSD may be at high risk for their age group. One study found that 69% of young Iraq and Afghanistan veterans tested positive for OSA. Good sleep is beneficial for people with PTSD and plays a very important role in reducing the fear associated with traumatic memories. Studies show that sleep, especially REM sleep, helps facilitate the fear of nightmares, a process in which your brain forgets the association of a neutral stimulus with a fear response.

Keywords: Sleep Apnea, PTSD, REM Sleep, Obstructive Sleep Apnea (OSA)

Overview of the Connection Between Sleep Apnea and PTSD
Post-traumatic stress disorder (PTSD) is a mental health condition that can develop after experiencing a traumatic event such as war, crime, sexual abuse, terrorism, natural disasters, or a car or plane crash. The National PTSD Center estimates that 7 to 8 percent of people develop PTSD at some point in their lives. People with PTSD experience a variety of symptoms, including flashbacks, memory problems, and a tendency to feel scared or startled easily [1].

Sleep problems are another common symptom of PTSD. Sleep disorders most commonly associated with PTSD include insomnia and nightmares. However, emerging research shows that there is a strong connection between PTSD and another sleep disorder called sleep apnea [1].

People with obstructive sleep apnea (OSA) experience temporary trouble breathing during the night, often accompanied by severe snoring, choking, or a choking sound. When these symptoms occur, the brain is forced to start breathing again, disrupting sleep. As a result, people with OSA wake up feeling refreshed and suffer from excessive daytime sleepiness even when they are asleep at night [1].

The Connection Between PTSD and Sleep Apnea

OSA affects between 17 and 22 percent of the general population. Among people with PTSD, this number ranges from 12 to 90 percent. People who have both OSA and PTSD are more likely to have more severe PTSD symptoms. Irregular breathing in sleep can be a sign of untreated OSA, which is associated with worsening PTSD symptoms as well as an increased risk of heart failure, dementia, and certain cancers. Irregular breathing in sleep is present in 95% of people who put out fires (firefighters) and 91% of victims who have committed serial crimes. Veterans are up to 3 times more likely to develop PTSD. Men, who make up a

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larger percentage of the veteran population, are also more prone to sleep apnea. According to one study, 69 percent of Vietnam soldiers with PTSD also had sleep-disordered breathing [1,2].

Among the general population, the risk of sleep apnea increases with age. However, young veterans with PTSD may be at high risk for their age group. One study found that 69% of young Iraq and Afghanistan veterans tested positive for OSA. People with PTSD who also experience sleep problems such as OSA are likely to experience more severe depression, greater risk of suicide, increased substance abuse, and poorer quality of life. People who develop OSA before the age of 70 are also at risk of premature death [1,3].

PTSD Cause Sleep Apnea

Does PTSD cause sleep apnea or vice versa? It's hard to say, but people with more severe OSA (the number of times a person has

apnea or stops breathing for 10 seconds or more per hour) are more likely to have severe PTSD. At the same time, the more severe their PTSD, the more severe their OSA. Specifically, for each clinically significant increase in PTSD symptom severity, veterans' OSA risk increases by 40% [1,4].

Sleep disturbance caused by sleep apnea can lead to sleep deprivation, which worsens PTSD symptoms and makes recovery more difficult. Even if a person is asleep while OSA symptoms do not wake them up, sleep apnea stimulates the sympathetic nervous system and reduces overall sleep quality. Sleep deprivation can impair mood and decision-making, making it less likely to use CPAP therapy, which is a common treatment for sleep apnea [1,4].

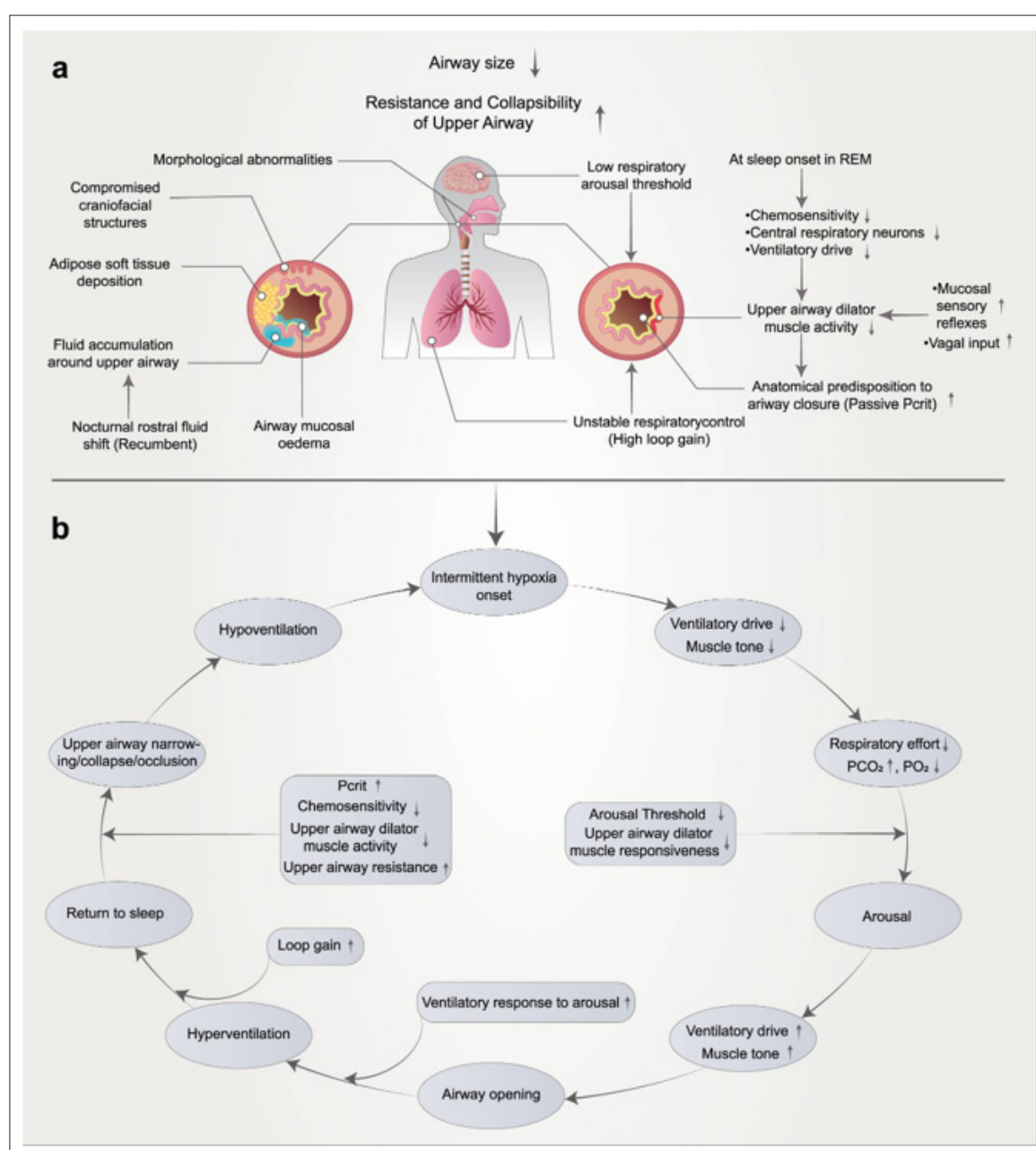


Figure 1: Schematic of the pathway and the physiological mechanism of human brain and lung tissue for the path of oxygen circulation during complete sleep [1].

Fear of nightmares and REM sleep

Good sleep is beneficial for people with PTSD and plays a very important role in reducing the fear associated with traumatic memories. Studies show that sleep, especially REM sleep, helps facilitate the fear of nightmares, a process in which your brain forgets the association of a neutral stimulus with a fear response. As your brain learns to consolidate and remember events during REM sleep, it can also reduce the fear associated with certain memories. Fear of nightmares occurs during REM sleep. When a person with PTSD wakes up from a nightmare, REM sleep is disrupted, and this important process affects the disorder the next

day. If a person has sleep apnea, they are more likely to have a sleep disorder. In fact, for some people with OSA, most apneas occur during REM [1,5].

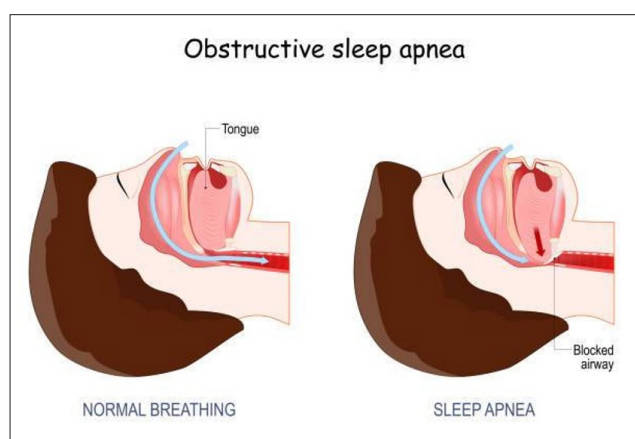


Figure 2: Schematic of the normal breathing path of a person versus a person with sleep apnea [1].

Some researchers believe that the connection between PTSD and sleep apnea originates in the brain. People with PTSD have lower levels of growth hormone (GH) than people without PTSD, and reduced GH secretion is associated with more awakenings during the night. Chronic stress, such as in those with PTSD, can lead to frequent awakenings [1,6].

Treatment Pathways for Sleep Apnea and PTSD

Because sleep problems are a triggering symptom of PTSD, better sleep hygiene is often part of a PTSD treatment plan, along with talk therapy and medication. Doctors may recommend following a strict sleep schedule, adopting a relaxing bedtime routine to reduce stress, and reducing caffeine and alcohol consumption [1,7].

Sleep apnea is usually treated with a weight loss program or weight loss surgery for overweight people and continuous positive airway pressure (CPAP) therapy. In CPAP therapy, people sleep with a mask that is connected via a hose to a CPAP machine on their bedside table. CPAP treatment keeps the airways open during sleep and reduces apnea during the night [1,7].

Fortunately, evidence shows that for people with sleep apnea and PTSD, continuous CPAP therapy can reduce not only sleep apnea symptoms, but also PTSD symptoms, including

anxiety, depression, nightmares, and quality of life. Unfortunately, the reverse is also true: untreated OSA is associated with poorer outcomes for PTSD [1,4].

Adherence to CPAP Therapy

Adherence to CPAP therapy is less common than doctors would like, simply because it feels uncomfortable to sleep with the mask over your face. Individuals with PTSD are significantly less likely to use CPAP, often due to discomfort with masking, nightmares, and claustrophobia. Nightmares are specifically associated with greater resistance to CPAP therapy. People with PTSD use CPAP therapy for a shorter period of time, only 3.5 hours on average, and generally on fewer nights. One study of veterans found that among those without PTSD, 70 percent adhered to CPAP therapy. Among veterans with PTSD, this adherence rate dropped to less than 50 percent [1,8].

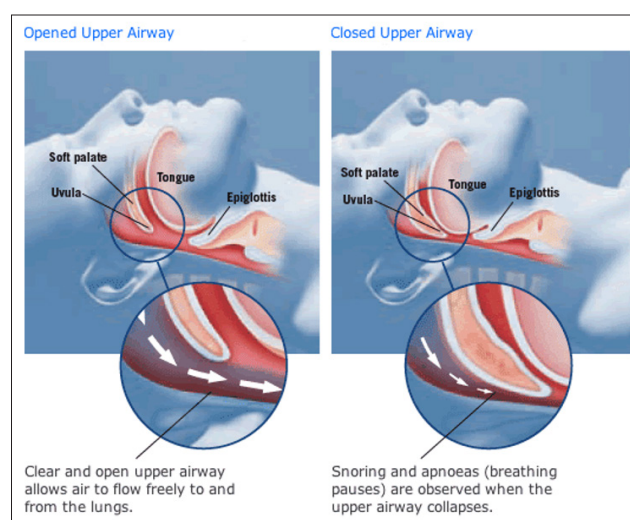


Figure 3: Schematic of the opening and closing mechanism of the airway in correct breathing during sleep and sleep apnea [1].

Non-adherence to CPAP therapy has serious consequences. A study of people with PTSD and OSA found that those who followed their CPAP therapy experienced a 75% improvement in PTSD symptoms. For those who didn't, their symptoms worsened by 43 percent [1,8].

Studies show that the more a person uses their CPAP therapy, the more their PTSD symptoms improve. CPAP therapy has an even stronger positive effect among those with severe PTSD compared to those with mild to moderate symptoms. In particular, CPAP therapy can significantly reduce the frequency and distress of nightmares by up to 50% for

people with PTSD. CPAP therapy also relieves PTSD symptoms of daytime sleepiness and improves quality of life [1,8].

If you suffer from PTSD and are concerned that you may also have sleep apnea, see your doctor if:

Your sleeping partner complains of heavy snoring or mentions that your breathing pauses or stops during sleep [1,9]. You wake up during the night or feel suffocated. You still feel tired after a full night's sleep [1,9].

You have trouble staying awake at school or work or while driving [1,9].

If you notice any of these symptoms, consult your doctor about your sleep. With ongoing treatment, including CPAP and speech therapy, symptoms of PTSD and OSA can be significantly reduced [1,10].

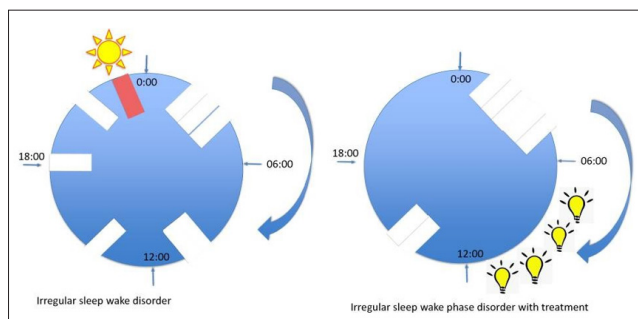


Figure 4: Schematic of the effect of the hours of the day and night on the rhythm of human sleep and wakefulness [1].

Discussion

Post-traumatic stress disorder (PTSD) is a mental health condition that can develop after experiencing a traumatic event such as war, crime, sexual abuse, terrorism, natural disasters, or a car or plane crash. The National PTSD Center estimates that 7 to 8 percent of people develop PTSD at some point in their lives. OSA affects between 17 and 22 percent of the general population. Among people with PTSD, this number ranges from 12 to 90 percent. People who have both OSA and PTSD are more likely to have more severe PTSD symptoms. Irregular breathing in sleep can be a sign of untreated OSA, which is associated with worsening PTSD symptoms as well as an increased risk of heart failure, dementia, and certain cancers. Irregular breathing in sleep is present in 95% of people who put out fires (firefighters) and 91% of victims who have committed serial crimes. Veterans are up to 3 times more likely to develop PTSD. Sleep disturbance caused by sleep apnea can lead to sleep deprivation, which worsens PTSD symptoms and makes recovery more difficult. Even

if a person is asleep while OSA symptoms do not wake them up, sleep apnea stimulates the sympathetic nervous system and reduces overall sleep quality. Good sleep is beneficial for people with PTSD and plays a very important role in reducing the fear associated with traumatic memories. Studies show that sleep, especially REM sleep, helps facilitate the fear of nightmares, a process in which your brain forgets the association of a neutral stimulus with a fear response. As your brain learns to consolidate and remember events during REM sleep, it can also reduce the fear associated with certain memories [1,11,12].

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