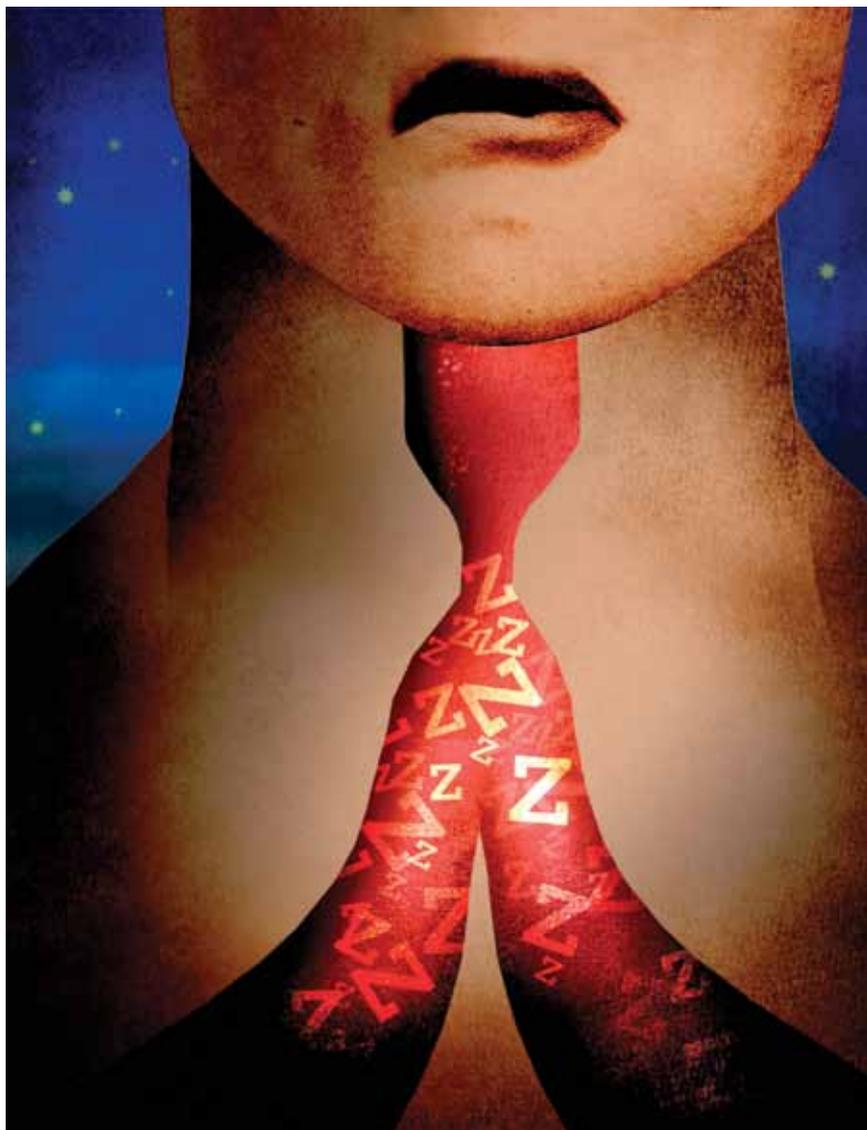


# Sleep Apnea and the Brain

Obstructive sleep apnea, which has been linked to cognitive problems, is treatable.

BY TOM VALEO



**O**bstructive sleep apnea (OSA) usually produces the type of loud snoring exaggerated for comic effect by cartoon characters and comedians. Homer Simpson snores operatically. So does Curly of the Three Stooges.

But there's nothing funny about OSA. This common form of "sleep-disordered breathing" results when the tongue and soft palate in the back of the throat relax during sleep and block the windpipe,

leaving the sleeper gasping and struggling for air (for more *Neurology Now* coverage of OSA, go to <http://bit.ly/uwtoFK>). Although these episodes don't always wake up the sleeper, they often rouse a person dozens of times during the night. In either case, the person may fail to get the deep, restful sleep that restores the body and the mind. As a result of these episodes of sleep-disordered breathing, people with OSA often experience head-

aches, irritability, forgetfulness, and daytime sleepiness that can be severe. People with OSA are up to five times more likely to be involved in a serious traffic accident. Sleep-disordered breathing, such as the kind caused by OSA, has also been associated with hypertension, heart disease, diabetes, mild cognitive impairment, and dementia.

## LESS OXYGEN TO THE BRAIN

A recent study suggests how OSA might contribute to dementia, including Alzheimer's disease, and to its precursor, mild cognitive impairment (MCI), defined by the U.S. National Library of Medicine as "the stage between normal forgetfulness due to aging and the development of dementia." People with MCI generally recognize they're having memory problems, but the lapses do not interfere significantly with everyday activities, and not everyone with MCI develops dementia.

Kristine Yaffe, M.D., member of the American Academy of Neurology (AAN) and professor of psychiatry, neurology, and epidemiology and biostatistics, and Roy and Marie Scola Endowed Chair in Psychiatry at the University of California, San Francisco, led a study that began with 298 older women who were free of cognitive problems. An overnight sleep study showed that 35 percent of them stopped breathing in their sleep 15 or more times per night. During the next five years, 44 percent of these women developed mild cognitive impairment or dementia, compared to only 31 percent of the women with normal nighttime breathing.

But why does OSA cause so many problems? Is the fragmentation of sleep that results from frequent waking to blame? The shallowness of sleep? The decreased amount of sleep? Some or all of the above?

BRIAN STAUFFER

Dr. Yaffe and her colleagues determined that when people stop breathing repeatedly during the night, they develop “hypoxemia,” which is a drop in the amount of oxygen dissolved in their blood. This strains all the tissues and organs of the body, but the brain especially. Although the brain represents less than two percent of a person’s total body weight, this three-pound organ consumes about 20 percent of the body’s oxygen supply. During episodes of sleep-disordered breathing, when blood oxygen levels drop—sometimes by nearly half—the brain starts to be negatively affected. Women in the study who simply woke frequently during the night, or who didn’t get a lot of sleep, showed no greater tendency toward MCI or dementia. Only those who experienced repeated nighttime hypoxemia were more likely to develop those conditions.

“We used to think that impaired sleep caused cognitive impairment,” says Michael J. Thorpy, M.D., member of the AAN and director of the Sleep-Wake Disorders Center at the Montefiore Medical Center in the Bronx, NY. “But this paper shows that nocturnal hypoxemia plays an important role, and this suggests that the cognitive impairment might be partially reversible in some cases. That’s a very important finding.”

However, the investigators who assessed study participants for cognitive impairment were aware of whether or not those same patients had sleep disorders. As a result, some experts suggest that the association between sleep disorders and cognitive impairment in the study may have been exaggerated. That doesn’t

mean that the association isn’t real or that people should ignore the symptoms of OSA. But it does mean that more research is needed to establish the connection more firmly.

### **MILLIONS OF PEOPLE WITH OSA UNDIAGNOSED**

An estimated 20 million Americans have OSA, but at least eight out of 10 remain undiagnosed, largely because they assume their breathing during sleep is normal. The most effective treatment consists of continuous positive airway pressure (CPAP), which is provided by a machine that blows a stream of air into a mask worn by the sleeper. The airflow keeps the airway open, but people don’t get the treatment unless they spend a night in a sleep lab, where the breathing problem can be identified and measured.

“In the early stages, people usually don’t know they have sleep apnea,” says Dr. Thorpy. “Many men come in because their wife complains about the snoring, but the patients themselves have no idea they’re snoring.” Only after a night in the sleep lab do these patients discover that they stop breathing multiple times during the night and experience a dangerous drop in the amount of oxygen dissolved in their blood.

“[Sleep apnea] can be devastating to the brain. The drop in oxygen saturation can kill brain cells.”

—MAHA ALATTAR, M.D.

Jasur Qawiyy was one of those people who never suspected he stopped breathing in his sleep many times every night. He snored loudly and sometimes felt himself choking in his sleep. He also woke up occasionally drenched in sweat with his heart racing. During the day, he often felt exhausted, had headaches, and was so

grouchy that his friends complained. Qawiyy looked so burned out that strangers sometimes would come up to him and ask, “Are you okay?”

But Qawiyy had been feeling that way since he was in high school, and he assumed it was normal. By 1998, when he was 27, he seemed to have fully adjusted to the condition: He was married, had a good job, and attended Georgetown University in Washington D.C.

Finally, a doctor who was concerned about Qawiyy’s excess weight—a major cause of OSA—asked a few questions about his snoring and other symptoms and suggested Qawiyy spend a night in the sleep lab to undergo polysomnography. This kind of testing uses machines to monitor breathing, heart rhythm, brain waves, and other bodily functions while the patient sleeps. Qawiyy agreed.

### **“I HADN’T SLEPT THAT WELL IN YEARS”**

“They put the wires on me and planned to wake me in a couple of hours for the CPAP,” says Qawiyy, who is now 38, “but my breathing was so bad, they woke me after only an hour and put the mask on me. I went back to sleep, and when the guy came in to wake me in the morning I said, ‘Is this how you’re supposed to feel?’ I hadn’t slept that well in years. It was life-changing. I wanted to take the CPAP machine home with me.”

Qawiyy suspects his excess weight contributed to his OSA. By the time he got tested, he says, he probably weighed about 400 pounds, although he avoided stepping on the scale by that point. He had a 60-inch waist and a 22-inch neck. Obese people often develop enlarged fat pads in the windpipe, decreasing its diameter and making it easier for the tongue and soft palette to block it. (Another less common form of sleep apnea, called central sleep apnea, can result from congestive heart failure, stroke,



certain medications, or other problems that weaken the signals from the brain instructing the muscles of the diaphragm to contract and draw air into the lungs.)

Now Qawiyy is a registered polysomnography technologist himself at Mary Washington Healthcare's Sleep and Wake Disorders Center in Fredericksburg, VA. He has lost weight—he now sports a 44-inch waist—and might be able to sleep without the CPAP machine, but he continues to use it every night.

“Sometimes when people lose enough weight, they can get off the machine,” he says, “but I’m still losing weight. Besides, at the sleep lab, I see people whose blood-oxygen level drops to 70 or even 60 percent while they sleep—anything below 90 percent is not good—and they’ll stop breathing for 30 to 45 seconds. When that happens hundreds of times during the night, you’re doing damage to your brain, heart, and other organs.”

#### A CALL FOR BETTER SCREENING

The new evidence linking cognitive impairment and dementia to the drop in blood oxygen that results from OSA should serve as a call to physicians to screen more patients for sleep-disordered breathing, says Maha Alattar, M.D., an AAN member and a sleep medicine specialist who works with sleep-care technician Qawiyy at Mary

Washington Healthcare.

“I hope that both primary care physicians and neurologists recognize patients with symptoms of OSA,” says Dr. Alattar, who is building a Web site called *The Sleep & Wellness Doc* ([doctormaha.com](http://doctormaha.com)). “Screening for sleep disorders such as sleep apnea is still not strongly emphasized in the neurology guidelines, but we know that sleep deprivation and especially OSA can be devastating to the brain. The drop in oxygen saturation can kill brain cells.”

Dr. Alattar found the recent paper by Dr. Yaffe linking the drop in blood oxygen produced by OSA to cognitive impairment to be alarming because the women in the study were experiencing only mild to moderate OSA.

“We don’t even know what moderate or severe sleep apnea does,” Dr. Alattar says. “What’s of further concern is that if mild sleep apnea can cause dementia, what would more severe or advanced OSA do to the brain?”

Many sleep specialists hope that Dr. Yaffe’s study will inspire physicians to screen patients for signs of the disorder. (See box, “When to See a Doctor.”)

“I’m enthusiastic about Dr. Yaffe’s paper,” says Alon Y. Avidan, M.D., M.P.H., associate professor of neurology and director of the Neurology Clinic at the David Geffen School of Medicine at UCLA and AAN member. “It’s a call for family physicians and geriatricians to screen patients for snoring, daytime sleepiness, and other signs of OSA. Sure, it’s hard to separate underlying disorders related to comorbid conditions in older patients from signs of OSA. Older people might be using medications that make them sleepy, or they might have psychiatric or pulmonary conditions or other problems that can worsen cognitive problems. But physicians should try hard to distinguish these underlying problems from OSA.”



For more information on sleep apnea, see **RESOURCE** **CENTRAL** on page 35.

### WHEN TO SEE A DOCTOR

According to the Mayo Clinic, you should consult a medical professional if you or your partner observes the following:

- ▶ Snoring loud enough to disturb the sleep of others or yourself
- ▶ Shortness of breath that awakens you from sleep
- ▶ Intermittent pauses in your breathing during sleep
- ▶ Excessive daytime drowsiness, which may cause you to fall asleep while you’re working, watching television or even driving