



Federal Aviation
Administration



Obstructive Sleep Apnea

Asleep at the controls

On a daytime flight one February day in 2008, a commercial aircraft with three crewmembers and 40 passengers flew past its destination airport after both the captain and first officer fell asleep. The pilot awoke and turned back to the destination airport, where all deplaned safely - but behind schedule. The National Transportation Safety Board determined that contributing factors to the incident were the captain's undiagnosed obstructive sleep apnea (OSA) and the flight crew's recent work schedules, which included several days of early-morning start times.



An obscure condition tackles a pro lineman

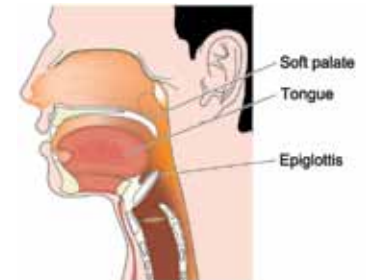
WITH THE SHOCKING DEATH of NFL lineman Reggie White, the problem of OSA was thrust into the limelight. Up to that time, OSA was relatively unknown outside the medical community. Today, OSA is recognized as a major contributor to many possible health-related ailments. In some estimates, it has been suggested that OSA affects-

- 4 - 7% of middle-aged people.
- 70% of clinically obese patients.
- 34% of all NFL linemen.

- 30% - 50% of patients with heart disease.
- 60% of patients suffering strokes.

The pathophysiology of OSA

Apnea is a medical term that means "being without respiration." Obstructive sleep apnea is characterized as a repetitive upper airway obstruction during sleep, as a result of narrowing of the respiratory passages. Most people with this disorder are overweight and have higher deposits of adipose (fatty) tissue in their respiratory passages, and the size of their soft palates and tongues are larger than average. These conditions decrease the size of the upper airway and decrease airway muscle tone, especially when sleeping in the supine (back down and horizontal) position. Gravity can pull tissue down and over the airway, further decreasing its size, impeding air flow to the lungs during inhalation.



The major impact of OSA

SNORING CAN RESULT when the airway becomes partially obstructed. With further tissue obstruction of the airway, there may be complete occlusion. Whether the obstruction is partial (hypopnea) or total (apnea), the subject struggles to breathe and is aroused from sleep. Often, these sleep interruptions are unrecognized, even if they occur hundreds of times a night. The real danger is that the OSA sufferers may not realize the condition and are only aware that they typically awaken feeling sleepy and tired. Losing sleep is more than a simple inconvenience. Good, sound sleep is essential for good health and clear mental and emotional functioning. Additionally, OSA is associated with a reduction in blood oxygen levels feeding the brain, which, of course, is a major health concern. Repetitive decreases in blood oxygen levels associated with OSA may eventually increase:

- Blood pressure.
- Strain on the cardiovascular system.
- Risk of heart attack.
- Risk of stroke.

A costly problem on the ground

The National Sleep Foundation (NSF) estimates that sleep deprivation and sleep disorders cost Americans more than \$100 billion annually in lost productivity, medical expenses, sick leave, and property and environmental damage. In addition, the NSF estimates that -

- About 70 million people in the U.S. have some sort of sleep problem.
- 40 million suffer from chronic sleep disorders.
- As many as 30 million are affected by intermittent, sleep-related problems.



THE NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION conservatively estimates that -

- 100,000 accidents are caused by drowsy drivers each year, resulting in more than 1,500 fatalities, 71,000 injuries, and \$12.5 billion in diminished productivity and property loss.
- People with OSA have a *six times* greater risk factor for automobile accidents.

A potential problem in flight?

The implications for pilots and crewmembers are significant. It has been suggested that people with mild-to-moderate OSA can show performance degradation equivalent to 0.06 to 0.08% blood alcohol levels, which is the measure of *legal intoxication* in most states. Most pilots will not fly intoxicated, but OSA sleep deprivation may be causing the equivalent effects! Further exacerbating the problem are time zone changes and post-flight alcohol consumption, which can inhibit wakefulness. Normally, when you stop breathing while asleep, the brain automatically sends a wake-up call after about 10 seconds, and you wake up, gasping for air. Multiple time zone changes and alcohol consumption both inhibit arousal mechanisms and may result in oxygen deprivation of 30 seconds or longer before you heed the wake-up call. When you add up the oxygen starvation resulting from many occurrences per night, along with the subsequent arousals, the effect is significant fatigue.



Recognizing OSA

TYPICALLY, a person suffering from OSA is not aware of the condition. The only way it can be detected is through a *sleep study*. A complaint of loud and excessive snoring may be an important clue, since that is characteristically the first sign of OSA. Other symptoms suggesting OSA include:

- Difficulty in concentrating, thinking, or remembering.
- Daytime sleepiness, fatigue, and the need to take frequent naps.
- Headaches.
- Irritability.
- Short attention span.



Treating OSA

Once recognized and identified, OSA is highly treatable, either with surgery or non-surgical approaches. Obviously, non-surgical methods should be tried first -

- BEHAVIORAL CHANGES

- Change sleeping position (sleep on side or stomach).
- Change sleeping environment (mattress, light level, temperature, etc.).
- Lower body fat (10% weight loss will decrease the OSA index by 25%).

- DENTAL APPLIANCES

- Dental appliances that thrust the lower jaw forward or otherwise open the airway are an excellent treatment for mild-to-moderate OSA and are about 75% effective.



- CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) MACHINE

- Probably the best, non-surgical treatment for any level of OSA.
- Uses air pressure to hold the tissues open during sleep.
- Decreases sleepiness, as measured by surveys and objective tests.
- Improves cognitive functioning on tests.



- MEDICATIONS

- Any medication taken for OSA must be approved by the FAA.
- Nasal steroid sprays are effective.
- Medications that have been studied include medroxyprogesterone, acetazolamide, and theophylline.

- SURGICAL METHODS

These can be very significant (painful) surgeries that don't always succeed. They should be used only after non-surgical methods have failed.

- *Nasal airway surgery:* Corrects for swelling of the turbinates, septal deviation, and nasal polyps.
- *Palate implants:* Stiffen the palate to prevent it from collapsing
- *Uvulopalatopharyngoplasty:* Prevents collapse of the palate, tonsils, and pharynx.
- *Tongue reduction surgery:* Decreases the size of the base of the tongue.
- *Genioglossus advancement:* Pulls the tongue forward to enlarge the airway.

The Bottom Line

If you experience one or more symptoms of obstructive sleep apnea, it is recommended that you consult a physician, since OSA treatment scores a very high success rate. What about your medical certificate? If your OSA is treatable, you can maintain your airman medical certificate and continue to enjoy your aviation career. However, flying with untreated OSA constitutes an unnecessary risk and can become a safety-of-flight issue.

It's up to you! So...*sleep on it!*

Medical Facts for Pilots

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