CPAP MAY IMPROVE YOUR MEMORY!
(extracted from CHEST Magazine, 12/2014)

Patients with obstructive sleep apnea (OSA) may improve their memory by using Continuous Positive Airway Pressure (CPAP). A study published in the December issue of CHEST shows that the majority of patients with OSA, who were memory-impaired prior to treatment, demonstrated normal memory performance after 3 months of optimal CPAP use. The study also showed that memory improvement varied based on CPAP adherence. Patients who used CPAP for at least 6 hours a night were nearly eight times as likely to demonstrate normal memory abilities compared with patients who used CPAP for 2 or fewer hours a night. "Patients with OSA often complain of daily forgetfulness, e.g., losing their keys, forgetting phone numbers, or forgetting to complete daily tasks," said author Mark S. Aloia, PhD, National Jewish Medical and Research Center in Denver, "Where memory is concerned, we may have the ability to reverse some of the impairments by providing effective and consistent use of CPAP treatment."

Dr. Aloia and colleagues examined the degree to which varying levels of CPAP adherence improved memory in 58 memory-impaired patients with clinically diagnosed OSA. All patients underwent cognitive evaluation involving verbal memory testing prior to initiation of CPAP and at a 3-month follow-up visit. Patients were prescribed CPAP machines, and adherence was monitored using internal microprocessors within each device. After treatment, patients were divided into three groups based on their 3-month CPAP adherence: (1) 14 poor users, patients who averaged fewer than 2 hours/night of CPAP use; (2) 25 moderate users, patients who averaged 2 to 6 hours/night of CPAP use; and (3) 19 optimal users, patients who averaged more than 6 hours/night of CPAP use.

At baseline, all patients were found equally impaired in verbal memory. Following 3 months of CPAP treatment, 21 percent of poor users, 44 percent of moderate users, and 68 percent of optimal users demonstrated normal memory performance. Compared with poor users, optimal users of CPAP were nearly eight times as likely to demonstrate normal memory abilities.

"Moderate use of CPAP may help, but it might not allow patients to reach their full potential recovery where memory is concerned, especially if memory is impaired at baseline. For patients with OSA, the more regularly and consistently they use CPAP, the better off they will be," Dr. Aloia said.

SLEEP APNEA TERMS
(Courtesy of Wake Up To Sleep)

What do certain sleep apnea treatment terms mean?

What is AHI?

apnea–hypopnea index is the number of apneas and hypopneas experienced by a person per hour of sleep. An AHI of:

- 0–4 is normal
- 5–14 denotes mild sleep apnea
- 15–29 denotes moderate sleep apnea
- 30+ denotes severe sleep apnea

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Types sleep apnea

Obstructive sleep apnea (OSA): Stopped airflow for at least 10 seconds due to a “mechanical” obstruction such as a tongue relaxed to the back of the throat, a semi-collapsed pharynx or a large amount of tissue in the uvula area (84% of sleep apnea patients)

Central sleep apnea (CSA): Stopped airflow for at least 10 seconds due to an irregularity in the brain’s control of one’s breathing (15% of sleep apnea patients)

Complex sleep apnea (CompSA): when a person’s OSA becomes CSA after they begin CPAP treatment (1% of sleep apnea patients)

Sleep Tests

Polysomnography (PSG): An overnight sleep study, with sensors placed on the body to record physiologic signals and diagnose many types of sleep disorders

CPAP titration study: When a sleep technician uses a CPAP machine to find the minimum air pressure needed to help a person eliminate all apneas, hypopneas and snoring

Split-night study: A single overnight test that includes a PSG and a CPAP titration

Home sleep test: A device to diagnose sleep apnea at home

CPAP Machines

CPAP (continuous positive airway pressure): Delivers air at a single, constant pressure that keeps your airway open

Bilevel: Delivers a higher air pressure when you inhale and a lower one when you exhale, so you can breathe out easier

APAP (automated positive airway pressure): Detects and provides the minimum amount of air pressure a person needs to avoid an apneic event. This pressure changes throughout the night, based on his/her needs

ASV (adaptive servo-ventilation): Learns your normal breathing volume while you’re awake and provides the needed pressure support to maintain that pattern while you sleep. ASV has shown to be effective for CSA (central sleep apnea) patients

Other terms

Apnea: When a person stops breathing in his/her sleep for at least 10 seconds

EEG (electroencephalogram): Measures brain activity; used during an in-lab sleep study

EKG (electrocardiograph): Measures heart activity; used during an in-lab sleep study or home sleep test

EMG (electromyogram): Measures muscle activity; used during an in-lab sleep study

Full face mask: A CPAP mask that covers the nose and mouth

Hypersomnia: Excessive daytime sleepiness, a common symptom of sleep apnea

Hypopnea: When a person’s upper airway is reduced by 30% or more for at least 10 seconds, coupled with a 4% drop in blood oxygen

Nasal mask: A CPAP mask that covers the nose

Nasal pillows: The smallest, lightest type of CPAP mask, which rests at the base of the nose

Oximeter: Measures the level of oxygen in a person’s blood stream, placed on the fingertip or ear

REM (rapid eye movement): A cycle of sleep staging characterized by rapid, shallow or irregular breathing, rapid eye movements and temporary muscle paralyzing when the brain waves are very active

Sleep architecture: Your entire sleep (how long it takes you to fall asleep, how long you’re in each sleep stage, when you wake up during the night and for how long, etc.), determined by analyzing a person’s EEG and EOG

Sleep stages: Wakefulness, non-REM stages 1, 2, 3 (with increasing depth), and REM (the deepest stage)

Snoring: The sound produced when air forces itself through a narrowed airway, vibrating the soft palate at the back of the throat. While not everyone who snores has sleep apnea, it is still “the most sensitive and strongest predictor of sleep apnea.”

Different types of CPAP humidifiers

Types of humidifiers: Passive, semi passive, heated

Why use a CPAP Humidifier?

(courtesy of ResMed)

WHAT FULL-FACE CPAP HUMIDIFIERS DO

The first CPAP machine was invented in 1980. In the late 80s, sleep specialists began humidifying CPAP air by sending it through a chamber of room-temperature water wherein it would pick up what little moisture evaporated as it entered the patient’s tubing. This method was called passive or passover humidification, and was not very effective.

The logical next step was to heat the water itself to create more vapor for the air to absorb. And so heated humidification began in the mid-1990s. In 2001, Chest published a study that showed humidification “significantly improves patients’ CPAP compliance, and that its need may be predicted” if patients are over 60, taking oral medications that list dry mouth as a side effect, or had prior surgery to remove tissue from their throat. Of course, we now know that humidification can make sleep apnea treatment more comfortable, especially for patients on higher pressures, which is why more CPAPs come with an attached humidifier today. You can remove it if you want and insert a cap on that end of your machine.

Two side effects and how to avoid them

Humidification has two main side effects: One is that you may still experience dryness-related symptoms if your humidifier’s temperature is set too low. The second, more common side effect is called rainout. It occurs when heated air cools in your tubing and reaches your mask as water, causing you to get a damp face. “Rainout” can be avoided by using a heated tube and adjusting the temperature of the tubing and/or the level of humidification that your water chamber is producing.

THE PHYSICIAN’S CORNER

by Harry J MacDunn MD

WHY USE A CPAP HUMIDIFIER?

What exactly does a CPAP humidifier do and how can you get the most out of it? It’s always helpful to revisit basic sleep apnea treatment questions like these to make sure we have the best information about our own treatment, and to make note of tips and tricks we haven’t tried yet.

A CPAP humidifier helps you avoid dry mouth (which nearly 40% of CPAP patients experience) along with dry nose, running nose, chapped lips, sinus-type headaches and nose bleeds – all by doing a simple job that our noses usually perform on their own.

When we breathe naturally, our noses act as humidifiers, warming up the inhaled air to our bodies’ own temperature so that it’s more comfortable to breathe, won’t damage the delicate tissues of our upper airway and lungs, and won’t wake us up, as cold air might. Air coming through a CPAP machine needs its own humidification because it’s entering our upper airway faster than our noses can warm it. This is especially true for those who live in colder or drier climates and/or require high pressures.

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Ball Auditorium, John Muir Medical Center, Walnut Creek
e-READERS MAY DISRUPT SLEEP
(extracted from HealthDay News, 1/02/15)
Light emitted by a tablet like an iPad can disrupt sleep if the device is used in the hours before bedtime, according to a new study published in the Proceedings of the National Academy of Sciences.

In the study, 12 adults read for about 4 hours before bedtime on 5 consecutive evenings, in a very dimly lit room at the hospital. Half read e-books and the rest read printed books. After that, they spent another 5 evenings reading at the hospital, only they traded their books for e-readers and vice versa. Participants reading an e-book took longer to fall asleep than when they read a printed book. The e-readers also rated themselves as feeling less sleepy and spent less time in rapid eye movement (REM) sleep.

Blood drawn from the participants revealed that using an e-book reader delayed the natural nightly increase in their melatonin levels by more than an hour and a half, compared with when they read a printed book. The following day, participants who read an e-book said they woke up feeling sleepier and took longer to fully wake up and become alert, according to the researchers.

Measurements taken by the research team found that iPads emitted heavy doses of blue-wavelength light, which has been shown in previous research to suppress melatonin and increase alertness. Other light-emitting e-readers also display large amounts of blue light, as do laptops, cell phones, light-emitting diode monitors and other electronic devices.

"Bright light tends to make your brain think the sun is up. When you click it [an e-reader] off to go to sleep, you will have trouble getting to sleep," W. Christopher Winter, MD, medical director of the Jefferson Hospital Sleep Medicine Center and president of Charlottesville Neurology and Sleep Medicine, told HealthDay.

The researchers concluded: "Overall, we found that the use of portable light-emitting devices immediately before bedtime has biological effects that may perpetuate sleep deficiency and disrupt circadian rhythms, both of which can have adverse impacts on performance, health, and safety."

DRUGS THAT NEGATIVELY AFFECT SLEEP
(Thomas L. Lenz, PharmD, MA, PAPHS, FACLM
Getting adequate sleep is a healthy lifestyle activity that is important for the body to function optimally both physically and mentally. Unfortunately, 70 million Americans suffer from chronic sleep loss or sleep disorders. Secondary causes of sleep disorders are often overlooked and can occur from the consumption of social or medicinal drugs. Common social drugs that can disrupt sleep include alcohol, caffeine, and nicotine. Certain medications can also have side effects that can induce sleep disruptions. This article briefly reviews common social drugs and prescription medications that can negatively impact sleep.

There are many reasons why 70 million Americans are not getting adequate sleep. At least 40 million are affected by a sleep disorder. The 4 most common sleep disorders are insomnia, sleep apnea, restless leg syndrome, and narcolepsy. Secondary causes of sleep disorders can be easily overlooked. Medications can be a secondary culprit for some sleep disorders and should be evaluated in patients suffering from sleep loss. The purpose of this article is to briefly discuss common drug related causes of sleep loss.

Alcohol and Sleep
Although alcohol is not classified as a medication, it is certainly classified as a social drug. In the United States, approximately 50% of adults drink alcohol on a regular basis and another 14% drink occasionally. Alcohol has been shown to have both a positive effect and a negative effect on health, depending on amount consumed and the timing of the consumption. Sleep has been shown to be negatively affected by alcohol consumption.

Consuming an alcoholic drink prior to bedtime, or "having a nightcap," is a solution that some individuals use to solve sleep disorders. A cocktail or glass of wine may help some to relax and fall asleep more easily. However, alcohol has been shown to disrupt sleep a few hours later.

Alcohol can disrupt certain stages in the sleep cycle (specifically non-rapid eye movement [REM] Stage 3 and REM stage) that are necessary for "restorative" sleep. This often results in keeping these individuals in the "lighter" stages of sleep with more frequent awakenings during the night to urinate. Additionally, an overconsumption of alcohol prior to bedtime can result in excessive muscle relaxation, including those muscles in the pharynx. This can exacerbate snoring and increase the risk for sleep apnea. As a result, individuals who have a "nightcap" prior to bedtime generally do not wake in the morning fully rested.

Caffeine and Sleep
Caffeine acts as a stimulant that can increase heart rate, blood pressure, mental alertness, and temporarily reduce fatigue. Caffeine can be found in many items that we consume on a daily basis. Some of the most common sources of caffeine include coffee, tea, and soda. Caffeine is also commonly found in chocolate, energy drinks, herbal products, and in over-the-counter and prescription medications. People vary widely on their sensitivity to the stimulant effects of caffeine, which can begin within 15 minutes and last up to 7 hours.

The amount of caffeine in the average 8 ounce cup of coffee is about 133 mg. The caffeine content in 8 ounces of tea and 12 ounces soda can range from 40 to 120 mg and 35 to 72 mg, respectively. Chocolate can contain about 9 to 33 mg of caffeine depending on serving size and energy drinks can contain up to 300 mg of caffeine in a 20 ounce serving. Additionally, herbal products can contain varying amounts of caffeine based on the product and quantity in which it is sold.

Caffeine is also included in many over-the-counter and prescription pain relievers, especially those targeted toward headache relief. Caffeine has been shown to speed the

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absorption of analgesics like aspirin and as a result provide quicker headache relief. The amount of caffeine included in pain relievers can range from 16 to 65 mg per dosage form (pill). The dosing regimen for many pain relievers suggests that patients take 2 pills per episode (e.g., headache). This can result in as much as 130 mg of caffeine and, in turn, induce sleep disorders in some patients.

**Amotriptyline, Amoxapine, and Clomipramine.**

likely due to their negative effects on sleepiness and morning grogginess, most have also been shown to increase daytime restless leg syndrome and insomnia. They include amitriptyline, amoxapine, and clomipramine.

**Tricyclic Antidepressants**

Medications in this class o

**Prozac**.

**SSRIs** can experience sleep disorder symptoms such as restless leg syndrome, insomnia, nonrestorative sleep, and daytime sleepiness. Examples of medications in this drug class are citalopram (Celexa), escitalopram (Lexapro), and fluoxetine (Prozac).

**Tricyclic Antidepressants**

Medications in this class of drugs have shown to disrupt sleep by increasing the potential for restless leg syndrome and insomnia. They have also been shown to increase daytime sleepiness and morning groginess, most likely due to their negative effects on restorative sleep patterns. Examples of tricyclic antidepressants include amitriptyline, amoxapine, and clomipramine.

**Angiotensin-converting Enzyme (ACE) Inhibitors**

A well-known class side-effect of ACE inhibitors is cough. For many patients, the "ACE cough" worsens at nighttime. This side effect can make it difficult to sleep and may also worsen sleep apnea. Examples of common ACE inhibitors include benazepril (Lotensin), captopril (Capoten), and lisinopril (Prinivil).

**Corticosteroids**

Oral corticosteroids have been linked to sleep disorders such as sleep onset insomnia (difficulty falling asleep), sleep maintenance insomnia (difficulty staying asleep), and abnormal dreams. Examples include: methylprednisolone (Medrol), prednisolone, and prednisone.

**Statins**

The sleep disorders linked with statin medications include sleep onset insomnia, frequent awakening at night, and daytime fatigue. The muscle soreness that can occur with taking a statin medication has also been reported to disrupt sleep. Examples of statin medications include atorvastatin (Lipitor), rosuvastatin (Crestor), and simvastatin (Zocor).

**Conclusion**

Restorative sleep is an important lifestyle activity. Sleep loss affects many Americans and can lead to negative health consequences. Certain social and medicinal drugs have been shown to secondarily cause disruptive sleep in certain individuals. Health care providers should be advised to check for drugs that negatively affect sleep when talking with patients about sleep disorders.

**WHY DOES MY AHI INDEX CHANGE?**

(from “Wake Up to Sleep,” Jan 2015)

A CPAP patient told us that over the previous week her apnea–hypopnea index (AHI) had fluctuated between 1.9 and 5. She said she hadn’t had a “5” in 10 years, but now they were coming every other night even though her CPAP machine was reporting a good mask fit each morning. Concerned, she asked if it’s normal for AHI to go up and down from night to night.

The short answer is: Yes; it is normal for AHI to vary within reason. An AHI less than 5 is considered normal, and some patients with severe sleep apnea may be told by their doctor that they can accept even higher numbers so long as they’re feeling more rested each morning, experiencing fewer symptoms and their AHI is progressively decreasing.

If your AHI was stable, but is suddenly increasing over the past few days or weeks, you should report this to your sleep specialist.

**Causes of rising AHI**

AHIs fluctuating between 1–5 is normal and still within a safe range. If your nightly AHIs are rising above what’s considered safe, you may be experiencing:

**Mask leak:*** If air is escaping your CPAP mask, you’re not getting all the air pressure you need to keep your airway open. The three most common causes of mask leak are a poorly fitting mask, inadequate cleaning or mouth leak (often experienced by patients on bilevel machines and mouth breathers currently using a nasal pillows or nasal mask).

**Mask off events:** It’s common for some people to remove their mask during the night, either consciously or unconsciously, due to the initial foreign feeling or discomfort of wearing a mask. If your CPAP machine is reporting this happening or you suspect that it is, don’t worry, but do talk to your doctor about ways to reduce these events.

**Alcohol, medicine and other drugs:** The periodic use of certain medication, alcohol or narcotics may cause your AHI to go up. Ask your doctor if anything you’re taking could be causing your fluctuation, and how you can compensate for it.

**Central or complex sleep apnea:** A rising AHI could also be a sign that while CPAP is treating your obstructive apneas, your brain might not always be telling your body to breathe. This can cause central sleep apneas, “central” because they’re caused by a dysfunction in the central nervous system, not a physical obstruction. Most newer CPAP machines will report if you’re experiencing central apneas, but it takes a specific type of machine to treat them. If your machine is reporting central apneas or you can’t identify what is causing your rising AHI and reverse the trend, talk to your doctor or equipment provider as soon as possible.