

Dr. Holt-

Thanks again for your help! I may not be able to get that power point. If it's okay, see if these questions cover what we need to discuss.

Please submit your answers back to me by Monday if you can.

Please give me your name, title, and your practice.

Gregory A. Holt, PhD Owner & Director of Tallahassee Sleep Diagnostic Center

Please give me your background with regard to sleep disorders.

PhD in Physiology from Univ.of FL's College of Medicine. Studied neural controls of breathing there with Dr. Paul Davenport. Started in sleep medicine at Temple University Hospital in Philadelphia, PA. That was 1992, as Asst. Professor of Medicine – Pulmonary Medicine Dept. Lots of teaching in pulmonary mechanics. Some research- couple of book chapters and a handful of articles on control of breathing.

Board Certified Clinical Sleep Specialist by the American Board of Sleep Medicine.

How much Sleep do people need?

There's a range for age. 16 hrs/day at birth, 14 hrs/day with 3 naps/5hrs in 3-5 months old, 13 hrs/day with 1-2 naps/3hrs in 6 months-2y/o, 12 hrs/day with 1 nap/1-3hrs in 2-3 y/o, 11 hrs/day with 0-1 nap/1hr in 3-9y/o, 10 hrs/day in 10-13y/o, 9 hrs/day in 13-18 y/o and 7-9 hrs/day in adults. The 8hrs/day, "normal sleepers", can also be divided simply into short and long sleepers, but generally no less than 4 hours and no more than 12 hours. I'm pretty sure the groups <4 and >12 hrs are dying off faster than those at the accepted 8 hrs.

Easily answered, about 1 hour of sleep for every hour awake. Kids need more.

On of the most common sleep disorders is self-imposed sleep deprivation experienced by most high school, college aged people.

How do you define sleep disorders?

As one of the 80 or so designated by the American Academy of Sleep Medicine – Governing body of the field.

Sleep disorders are abnormalities in accepted sleep patterns that result in diminished daytime function. Excessive daytime sleepiness and fatigue are common symptoms. That's what I'd say.

How do you know if you have a sleep disorder?

In my opinion, a subjective feeling of non-restorative sleep. Acute or chronic decrease in anticipated state of alertness.

Symptoms of sleepiness, fatigue, diminished cognitive abilities, lack of motivation, memory effects, hypertension control problems, restless sleep, nocturia (increased trips to the bathroom during regular sleep periods), snoring, chronic nasal congestion related to snoring, dry mouth in the morning, headaches in the morning, family history, more than ½ hour to fall asleep, naps more refreshing than all night in bed, uncomfortable sensations in legs prior to sleep onset that is relieved by movement or massage, waking up with bruises or food, etc.

What are the types of sleep disorders and describe them

snoring might be a non-specific finding and benign for the most part, but also considered a cousin of the more problematic obstructive sleep apnea. Environmental sleep disorder if you are in annoying proximity to significant snoring.

sleep apnea- no inspired airflow for >10 seconds in the adult, usually associated with an arousal defined by EEG and a transient reduced in blood oxygen. Less than 5 apneas per hour are considered normal. Some patients with events <5/hr may, however, develop sleep apnea symptoms due to snore or Respiratory Event Related Arousals (RERAs). There have been patients having more than 400 apneic periods during the night. People can die from sleep apnea – usually a heart attack, stroke or even motor vehicle accidents related to sleepiness. One of the more famous to unfortunately have that happen was Reggie White of the Green Bay Packers. Sleep apnea 1st described in the Pickwick Papers, Joe the Fat Boy.

Insomnia- Difficulty falling asleep or staying asleep. People usually fall asleep in 10-20 minutes. Falling asleep in less than 5 minutes is an indication of excessive daytime sleepiness. More than 30 minutes is insomnia. Lots of things can cause insomnia. Stress, medications, increased state of alertness as bedtime approaches, etc.. Insomnia may be acute from a stressful episode (usually days to a few weeks) or become chronic as the initial stressor gives way to perpetuating factors (ex. rumination)– People should be aware that 2 things put you to sleep naturally: 1) the amount of time from the last awakening and 2) the body's normal circadian rhythm (timed by sunlight for most of us) where twice a day, we are more tired and sleepy divided by periods of being more awake and alert. People are more alert after awakening and then again late evening. You need to be on the back side of your circadian rhythm (sleepy by sunlight/activity timing) with sufficient sleep pressure built up to fall asleep naturally. Insomnia is the most common sleep disorder affecting 20-30% of the population at some point in their lives. Some estimates are higher than that.

Narcolepsy- Tetrad of symptoms. Incidence < 0.05% of population. One patient I know came in after his bobber went under and he almost dropped out of the boat with an episode of cataplexy. Currently treated with medication and he wears a seat belt.

Excessive Daytime Sleepiness. Just super sleepy. Fighting sleep with an irresistible urge to fall asleep.

Sleep Paralysis (Conscious but unable to move, the individual regains consciousness while the body is still under the normal paralysis induced during REM sleep. Scary feeling, but usually no problem).

Hypnagogic Hallucinations (dream onset in the beginning of the sleep period. Dream state or REM sleep usually begins 1 ½ hours after sleep onset and cycles with increasing duration every 90 minutes). If you enter REM sleep early, and you're not a newborn, that's a problem. Easily described as vivid dreaming soon after falling asleep.

Cateplexy - loss of muscle tone, related to REM sleep onset, brought on by strong emotions, especially laughter. Individuals appear to be unconscious, but are aware of their surroundings. Usually onset of symptoms by early adulthood.

Narcolepsy is certainly one of the most exotic sleep disorders. I think that and REM Behavior Disorder are my personal favorites. You get a real sense of the importance of sleep when you see the influence they have on people. I should say something here about sleep apnea, since that's probably 95% of the business in sleep medicine. Sleep Disordered breathing affects 15% of the population.

Idiopathic Hypersomnia – Daytime sleepiness and prolonged periods of sleep without specific cause. Not terribly common. These individuals may sleep 14 hours a day, but still feel sleepy. Generally irritable. Depressive symptoms. Rule out other possibilities. Try stimulants, sleep hygiene, scheduled naps and cross your fingers. Nothing seems to fix the problem.

Parasomnias- Interesting problems in sleep including nightmares, night terrors, talking, walking, bruxism (teeth grinding), enuresis (bed-wetting), REM Behavior Disorder, Nocturnal Eating Disorders, etc. Lots in here that you can get into. The historical picture of interest is the demon sitting on someone's sleeping chest.

Restless Legs and Periodic Limb Movements in Sleep. RLS and PLMS can either occur as separate sleeping disorders or in combination. RLS can be diagnosed in the physician's office by a fairly specific set of questions. Basically, do you experience a strange sensation in your legs when still or 1st lying down to sleep that is relieved by movement or massage? PLMS can only be diagnosed during the overnight polysomnogram. PLMS are periodic twitches in the arms, legs or both during sleep that may or may not result in arousal. Usually about 30 seconds apart and the individual may have hundreds of these per night and not be aware of it. Medications to treat, including dopamine receptor agonists (Requip, Mirapex), benzodiazepines (Klonopin), opiates (Darvocet, Stadol). Need to rule out anemia or iron deficiency as a cause. Dialysis patients, elderly and pregnant women are predisposed.

Why is sleep necessary?

Stay alive. You will die without sleep. Theory is 3 months without sleep, but knuckleheads have suffered long term effects by forced sleep restriction in much less time. Restoration of daily function and abilities should be the accepted answer by most people (you've got to be able to

control your automobile). Brain probably sets the need due to movement of ions, neurotransmitters and excitatory amino acids, etc. that build up in extracellular spaces and the supportive glial cells while awake. Also, there is an increasing concentration of adenosine during the day that is thought to promote the need for sleep. A common adenosine receptor blocker is caffeine. Sleep, especially in the 1st third of the night is predominately slow wave or Stage 3 & 4 sleep. Slowed frequency, large amplitude EEGs reflective of population (pyramidal cell) effects are thought to be responsible for the restorative nature of sleep.

Can short naps be refreshing?

Certainly, but naps may be an indication of a lack of restorative sleep or inadequate sleep time. Power naps are interesting, but it should always be kept in mind, that there is no substitute for sleep. You need to move through the normal sleep stages and the number of periodic shifts to give yourself the best chance at being “restored”. I think the most effective method of regaining your ability to drive due to sleepiness is to drink a cup of coffee, take some alerting agent (as prescribed by your physician after eliminating underlying sleep disorders, of course) and closing your eyes and dozing for 20 minutes. Never drive sleepy. Also, check the normal naps listed for pediatrics.

How do alcohol and drugs affect sleep?

Alcohol can get you to sleep faster, but as the liver metabolizes the alcohol, there is an increase in the number of nocturnal awakenings. Oddly enough, alcohol increases the volume of restorative sleep, Stage 3&4, but because of later sleep fragmentation, those benefits are more than offset. Drugs can affect sleep in plenty of ways, but which ones do you want to know about? Marijuana- decreased REM sleep. Crystal Meth or cocaine- reduction in all stages of sleep. SSRIs and various antidepressants- decreased REM sleep, etc.

What does yawning have to do with sleep?

It probably has to do with diminished lung volumes with increased relaxation, sedentary state to some degree. Stretch receptors in the lungs can cause an inflation reflex, similar to a sigh. A behavioral response might play a role, since there is an association with observation of others, sleepiness and yawning. Possibly increasing blood CO₂ stimulates increased lung volume and rate. The best answer is probably I don't know.

What are the different stages of sleep?

Divided into Awake, REM and Non-REM sleep. There are 4 stages of NREM sleep. Stage 1 is light sleep and accounts for 5% of sleep. Stage 2 has thalamic components that reduce sensory awareness and accounts for 55% of sleep. Stage 3 and 4 are similar and often combined. Stage 3 / 4 sleep (deep sleep) accounts for 20% and REM sleep makes up roughly the other 20%. The Awake part is “Wake After Sleep Onset”. Not good and self explanatory.

Why do we feel sleepy?

See the above on adenosine and brain cell metabolites. Can't burn out like a candle.....Wish we were perpetual machines..... Yin Yan.....or best would be that all successful systems are balanced.

Why do we get tired without a good night's sleep?

A good night's sleep implies feeling refreshed. Anything less, should be transient or corrected.

In the most severe cases of sleep apnea, there is an incredible reduction in the amount of restorative sleep and increase in light sleep with arousals. The arousals are analogous to someone shaking you every minute while you are in bed. Apnea also increases sympathetic drive (fight or flight and adrenaline output) during sleep when you should be resting. In essence, you're running a road race all night long when you should have been sleeping.

Why do we dream?

Don't know. Those books make me chuckle. I gave a lecture in Philadelphia 12 years ago to a group of art students. They had a bunch of those questions on dream interpretation. I told them that to me, if you're dreaming about pumping gas, you're not low on energy but just pumping gas. Patients with sleep apnea, on the other hand, may experience dreams of conflict and frustration because of REM dependent sleep apnea. Remember that you lose muscle tone in REM. You also lose muscle tone to the upper airway and may be susceptible to increased apnea in REM. To me, the brain tries to make sense out of this suffocation and "I'm lost, I can't get to the top, someone's choking me", etc. Treating sleep apnea can have a positive influence on dreams as far as recall and content. Sexual dreams are interesting. Most people don't know that males normally experience an erection during REM sleep or 3-6 times per night. An unconscious form of sexual awareness probably accounts for most sexual dreaming, at least in males. As sleep medicine business goes, we lost a lot of revenue when tests of organic -vs- psychological impotence diagnostics went by the wayside with Viagra.

Why does sleep play an important role in our health?

Medical costs are shown to be much higher in patients with sleeping disorders. The immune system suffers. Blood pressure goes up. Memory suffers. Lost earnings, academic ability, etc.

Much could be said here about the question of quality of life.

What is snoring and what can be done about it?

ENT can probably answer this better than me. It's my understanding that the vibration of nasal / oral passages brought on by close approximation of tissues and increased respiratory flow rates cause snoring. It's annoying and is considered a form of environmental sleeping disorder. The congestion and inflammation brought on by chronic snoring can increase the number of upper respiratory tract infections as bacteria/viral particles are allowed easier access to submucosal layers.

Snoring and snore arousals (Respiratory Event Related Arousals) are an indication of Upper Airways Resistance Syndrome (similar to sleep apnea).

CPAP therapy or Continuous Positive Airway Pressure is used to relieve obstructive sleep apnea and also stops snoring. Sometimes, surgical procedures, chin straps or dental devices can reduce snoring. Various pharmaceuticals and remedies are suspect and variable in their intended effects.

What causes insomnia and what's the best way to treat it?

Definition above. There are a few accepted methods of treating Insomnia.

Medications for acute and chronic forms of Insomnia have been fairly successful. Ambien, Sonata and Lunesta all act on similar brain receptors to those used by the valium class of drugs, except they're safer. It should be noted that these newer hypnotics do not possess the anti-anxiety or relaxation effects of the valium type medications and sleep onset can sneak up on you. Hangover effects are an issue. There is an increase fall risk in the elderly.

Sleep Hygiene. Waking at the same time every morning and getting 30 minutes of bright sunlight in the morning and late afternoon are important to setting the body's normal circadian rhythm and melatonin production during sleep (Melatonin is not a hypnotic). Other rules can go here.

Stimulus Control and Sleep Restriction Therapy. Controlling environmental factors (TV, reading in bed, computers in the bedroom, clocks, bed partner, kids, dogs, etc.) Don't stay in bed if not asleep within 30 minutes. Go to another room and return only when sleepy. Still, get up at the same time every morning. No naps. If you take a nap, it's not insomnia.

The most effective form of Insomnia control is a combination of cognitive behavioral therapies and medications. Then discontinuing nightly use of medications when good sleep habits are in practice.

How is sleep affected by health problems like heart disease or depression?

Heart disease and depression both have an effect on sleep quality. If the quality goes down, daytime function is worsened. Some of the medications used to treat heart disease can cause problems in sleep. Sometimes you need to think if the heart disease caused the sleep problems or was it the other way around. Obstructive sleep apnea is known to be a causative factor of hypertension according to the National Heart, Lung and Blood Institute. Depression can be looked at the same way. Did depression cause the sleep problems or were the depressive symptoms a result of a sleeping disorder. Depression is a common symptom in sleeping disorders like obstructive sleep apnea. Depression may clear with treatment of underlying sleep disorders. It is also common to treat depressive symptoms with a component of Insomnia with medications that can induce sleep. Trazadone and seroquel are examples of medications used to treat depression or other psychological problems that can assist with sleep onset.

How many people suffer from sleep disorders? Is it common?

Maybe 35-55% of people depending on who you're reading. Insomnia, Obstructive Sleep Apnea, Restless Legs Syndrome, Delayed & Advanced Sleep Phase Syndrome and self imposed sleep deprivation are probably the most common. Parasomnias of somniloquy (sleep talking), somnambulism (sleep walking), nightmares and bruxism (teeth grinding in sleep) are fairly common.

Thanks so much!

Seemed fairly comprehensive. Just a joke about the exam part. This is most of what I tell the patients and new guys. Sleep seems simple on the surface, but gets complicated pretty fast. I like the questions. Greg Holt

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