



SLEEP AND DREAM HEALTH

1. What is sleep?
 - a. Sleep is characterized by
 - i. Loss of awareness: Sensory inputs are blocked. (the thalamus doesn't let them in for processing.)
 - ii. Time distortion: A sense that no time has passed (deep sleep) or a sense that time is elongated (dream sleep)
 - iii. Distinctive brain wave and muscle activity patterns.
 - b. Structure of sleep
 - i. 2 types: Non-REM and REM.
 1. Non-REM sleep is "deep sleep", brain waves become slow and coordinated allowing recent memories to be moved from short term to long term storage. There is also a "weeding" of unnecessary neural connections.
 2. REM (rapid eye movement) is "dream sleep", brain waves are similar to the waking state, body is paralyzed, eyes move rapidly. Neural connections are strengthened, and memories integrated into useful networks.
 3. Humans experience 3-5 approximately 90-minute cycles of non-REM and REM sleep during a typical 7-9 hour night. The cycles at the beginning of the night are rich in non-REM. Cycles towards the end of the night are rich in REM.
 4. There is a genetic basis for "morning larks" (40%) and "night owls" (30%)
 - c. Sleep/wake patterns.
 - i. Circadian rhythm (Process-C or wake drive) is generated by the suprachiasmic nucleus of the brain and drives alertness. The natural rhythm is usually a little longer than 24 hours and is reset to a daily pattern by light.
 - ii. Adenosine buildup over the course of the day is the signal for sleepiness. (Process-S or sleep pressure). Adenosine is cleared from the body during sleep relieving the sleep pressure. Caffeine works by blocking the adenosine receptors in the brain allowing it to temporarily ignore this signal.
 - iii. Melatonin is a mediator of process-C. Its function is to signal the start of the sleep process. It rises rapidly at dusk, peaking at 4AM and then rapidly declines until dawn. It is suppressed by light and triggered by darkness and drop in body temperature. Melatonin does not make you sleepy.
 - d. How much sleep do you need?

- i. Humans **NEED 7-9 hour of sleep per night**. The research supporting this is overwhelming.
 - ii. Sleep deficiency causes lapses of attention (microsleeps) which lead to high motor vehicle crash rates. Drowsy driving kills more people than drugs and alcohol combined.
 - iii. Sleep deficiency impairs memory, emotional stability, genetic modulation and immune function
 - iv. Sleep deficiency is related to chronic illness including obesity, diabetes, cardiovascular disease, and Alzheimer's Disease.
 - v. Do YOU sleep enough?
 - 1. After waking up in the morning could you fall back asleep at 10 or 11AM?
 - 2. Can you function optimally without caffeine before noon?
 - 3. If you didn't set an alarm clock would you sleep past your wake-up time?
 - 4. Do you have lapses in concentration?
 - vi. It is difficult if not impossible to compensate for short sleeping by "catching up" with naps or longer sleep periods.
 - e. Sleep and aging
 - i. **The need for sleep does NOT decrease with age.**
 - ii. Deep sleep decreases 80-90% by the age of 70.
 - iii. Sleep efficiency decreases from 95% in youth to 70-80% by the 7th decade of life due to sleep fragmentation. (disrupted sleep)
 - iv. Sleep patterns regress with tendency for earlier bedtimes and awakenings (melatonin mediated).
 - f. Napping
 - i. Biphasic sleep is genetically hardwired. There is a natural short dip in alertness in the early afternoon promoting the impulse to nap.
 - ii. Napping is associated with longevity and decreased rates of cardiovascular disease.
 - iii. Avoid napping late in the afternoon or early evening.
2. Promoting healthy sleep
- a. Go to bed and get up the same time every day as much as possible.
 - b. Exercise at least 30 minutes daily but not within 2-3 hours of bedtime.
 - c. Avoid caffeine, nicotine and other stimulants.
 - d. Avoid alcoholic beverages and heavy meals before bed.
 - e. Review timing and need for medications that disrupt or delay sleep.
 - f. Don't nap after 3 PM.
 - g. Engage in relaxing activities before bed.
 - h. Keep your bedroom cool and dark and electronic free.
 - i. Take a hot Epsom salt bath before bed (2 cups Epsom, ½ cup baking soda, a few drops of relaxing essential oil: Lavender, Clary Sage, Bergamot, etc)
 - j. Get bright sun exposure in the morning (afternoon if you are experiencing sleep regression). Let yourself "go dark" in the evening.

- k. If you are having trouble going to sleep (longer than 20 minutes) don't stay in bed. Get up and do something relaxing until you feel sleepy.
3. Sleep disorders
- a. Insomnia: Inability to generate sleep in the face of adequate opportunity to sleep.
 - i. Criteria:
 - 1. Dissatisfaction with sleep quantity or quality. (Trouble falling asleep or trouble staying asleep).
 - 2. Significant daytime distress or impairment
 - 3. Occurs at least 3 nights weekly for more than 3 months.
 - 4. No coexisting medical or mental disorders that cause disrupted sleep.
 - ii. Triggers:
 - 1. Worry: emotional concerns.
 - 2. Anxiety: emotional distress
 - 3. An active sympathetic nervous system increases adrenaline (alertness hormone), increases body temperature (suppresses melatonin), and allows the amygdala and hippocampus to remain active (emotional centers of the brain don't shut down properly). These result in difficulty falling asleep and frequent brief awakening during sleep.
 - iii. Treatment
 - 1. Avoid prescription sleep aids.
 - 2. Good sleep hygiene
 - 3. Cognitive Behavioral Therapy-I reinforces sleep hygiene, supervises a period of restricted sleep to build up sleep pressure, and introduces methods to reduce worry and anxiety.
 - 4. Mindfulness practices before bed.
 - b. Sleep apnea
 - i. Two types, obstructive and central.
 - ii. Frequent pauses in breathing during the night causing a decrease in oxygen levels.
 - iii. Associated with obesity, snoring, and daytime sleepiness.
 - iv. Can be screened for by overnight oximetry and diagnosed with a sleep study.
 - v. Treated with CPAP, oral appliances, sleep position adjustment.
 - c. Jet lag and sleep regression
 - i. Jet lag
 - 1. Going East (more difficult): Morning light exposure and exercise. Melatonin. See below
 - 2. Going West: avoid morning light for the first few days.
 - ii. Sleep regression
 - 1. Avoid early morning bright light (wear sunglasses in the AM)
 - 2. Strong, preferably sunlight, in the afternoon.
 - 3. Avoid late napping.
 - 4. Melatonin one half hour before sleep.
 - d. Some conditions associated with sleep disorder
 - i. Depression
 - ii. Anxiety disorder

- iii. Post-traumatic stress disorder.
 - iv. Neurological Lyme disease and other brain inflammation.
 - v. Fibromyalgia, Chronic Fatigue Syndrome
4. Supplements and medications
- a. Melatonin
 - i. Should be taken under the tongue in liquid or dissolvable tablet form.
 - ii. Dose is 0.5-5 mg taken 30 minutes before sleep.
 - iii. Long acting forms are available.
 - iv. Side effects of melatonin are rare and may include dizziness, headache, vivid dreaming, daytime sleepiness, nausea, and loss of appetite.
 - b. Botanicals
 - i. Passionflower, hops, lavender, kava, among others.
 - ii. Available in teas that are a good bedtime ritual.
 - iii. Essential oils have demonstrated benefit, particularly lavender.
 - c. L-theanine
 - i. An amino acid found in tea that promotes calming neurotransmitters.
 - ii. Dosing is 50-400 mg daily. May be taken all at bedtime or spread out throughout the day.
 - d. Magnesium
 - i. At least 60% of the US population does not get the RDA of magnesium.
 - ii. Symptoms of magnesium inadequacy include sleep issues, anxiety, constipation, and headaches.
 - iii. Elemental magnesium 120-400 mg is safe and effective for most people.
 - iv. Magnesium comes in many forms. Magnesium oxide is most available but may not be well absorbed. Magnesium glycinate or chelated magnesium is preferable. Magnesium threonate has evidence for use in improving cognition.
 - e. Ashwagandha
 - i. For the “tired and wired”, chronically stressed.
 - ii. Works to modulate adrenal/stress hormones.
 - iii. May be taken in capsules, as a tincture, or in a medicinal drink. (email if you would like the recipe.
 - iv. Usual dose is 4-500mg of herb up to 3 times daily.
 - f. Beware of quality issues with botanicals and supplements:
 - i. Contamination with pharmaceuticals is common
 - ii. Often products do not contain what is on the label.
 - iii. Look for independent testing. Consider joining consumerlabs.com.
 - iv. Do not buy supplements on Amazon!! Too many counterfeit products.
 - g. Avoid medication as much as possible.
5. Resources:
- a. [Why We Sleep](#), by Matthew Walker (there is a series of podcast interviews with him at PeterAttiaMD.com #47,48,49)
 - b. Shut-I: CBT course online.
 - c. Send an email to info@truenorthbemidji.com for a link to a more extensive resource list or if you have any questions.

Diane M. Pittman M.D.