Lecture 8

HOW SLEEP CHANGES WITH AGE:

Effects on Memory and Mood

COMPANION WORKBOOK

I CARE
FOR YOUR BRAIN
with Dr. Sullivan

A good night's sleep is right around the corner.

Innovative Treatments for
SLEEP APNEA
INSOMNIA
SLEEP DISORDERS

"Sleep is critical to all aspects of well-being, especially brain health! Sandhills Neurologists offers the highest level of sleep expertise. I know you will be very pleased with their care!"

–Karen D. Sullivan, PhD, ABPP

SIGNS OF SLEEP APNEA:

- Lack of energy
- High blood pressure
- Frequent nighttime urination
- Morning headaches
- Obesity
- Large neck size
- Excessive daytime sleepiness
- Irregular breathing during sleep
- Excessive snoring

Sandhills NEUROLOGISTS

dTMS • SLEEP • BALANCE

CARY
251 Keisler Drive, Ste 100

SANFORD
101 Dennis Drive

PINEHURST
295 Olmsted Blvd | Mellon Bldg Ste 12

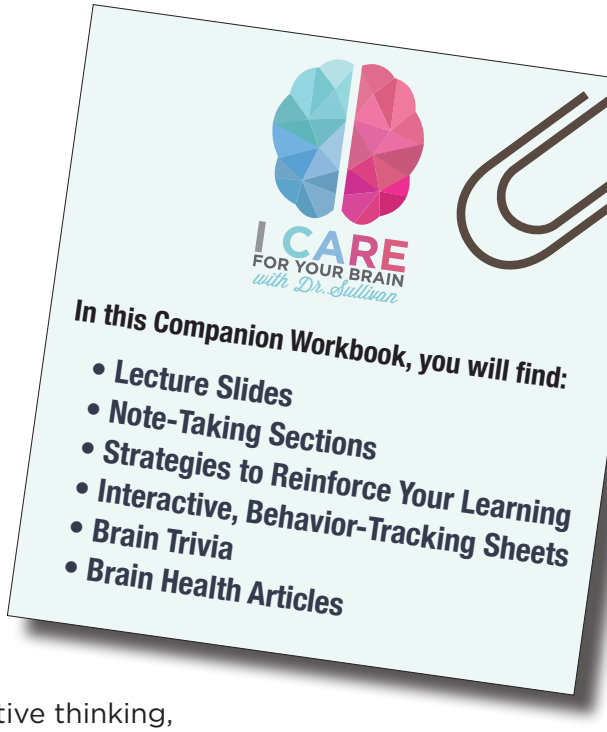
Schedule an appointment today!

www.SandhillsNeurologists.com | **844-435-7867**

Welcome!

Wow, here we are, all the way at Lecture 8! Thank you so much for the opportunity to be with you on this brain health education and empowerment journey! I have really enjoyed our time together, and I hope you have, too.

The I CARE FOR YOUR BRAIN learning experience would not be complete without our topic of "How Sleep Changes with Age." These unique changes in sleep that occur in older adulthood have a particular effect on memory and mood. Without this knowledge, I am afraid you may simply accept your new trouble falling or staying asleep as an inevitable part of aging and not work or advocate for improvements in this important area of your functioning. The health of your brain literally depends on it!



We begin with the fascinating subject of why we sleep. How has this seemingly "unproductive" activity that we spend a third of our lives doing evolved, and why does it exert such a powerful influence on our physical, mental and cognitive health? Without any sleep, we die. Without adequate sleep, we are forgetful, less able to concentrate, more impulsive and have a harder time regulating our blood pressure, blood sugar and weight. Even a few nights of poor sleep set the stage for a poor mood, and this becomes most apparent in negative thinking, irritability and anxiety.

We then transition to a discussion about the six most common reasons—other than aging—sleep changes, including: insomnia, sleep apnea, restless leg syndrome, anxiety, medication effects and alcohol. I will explain my concerns about over-the-counter sleep medications and encourage you to stop using them, except for a rare occasion, and instead, try scientifically supported techniques in my recommendations section.

We will also discuss sleep hygiene, which provides an excellent starting point for taking control of what happens when your head hits the pillow. If after giving these self-directed techniques your best effort, you are still not waking up most days feeling refreshed and re-charged, you likely need a formal review of your sleep via a sleep study—an assessment your primary care doctor can order. We will examine this process, step by step, so you know exactly what to expect. Optimizing your sleep is one of the most important things you can do for your brain health, and after this lecture, you will have the knowledge to do it—starting tonight!

Let's go!

Dr. Karen D. Sullivan

Brain Matters

COMPANION WORKBOOK 8

I CARE FOR YOUR BRAIN with Dr. Sullivan

CREATED BY
Karen D. Sullivan PhD, ABPP

GRAPHIC DESIGN
Carrie Frye

45 Aviemore Drive
Pinehurst, NC 28374
833-423-9237
DrSullivan@ICFYB.com
www.ICFYB.com

I CARE FOR YOUR BRAIN with Dr. Sullivan Companion Workbook is a publication of KDS Productions.

in partnership with

PENICK VILLAGE

500 E Rhode Island Ave
Southern Pines, NC 28387
910-692-0300
www.PenickVillage.org

I CARE FOR YOUR BRAIN

was founded on the belief that successful cognitive aging is more than just brain health. It is a multi-dimensional concept that in addition to being brain-based is also rooted in physical health, social and spiritual connectedness, and vital engagement in life.

It is a state-of-the-art, brain-centric education program for the 50+ crowd delivered in an engaging, easy-to-understand style that is motivating for action!

Through two interactive communities (in-person and online), Neuropsychologist Karen D. Sullivan, PhD, ABPP, provides scientifically-based information on what brain scientists know are the pillars of brain health and evidence-based recommendations in a series of nine lectures. Dr. Sullivan provides you with clear, proven action steps you can take to immediately start to truly care for your brain.

Sign up online today at www.ICFYB.com.

I CARE
FOR YOUR BRAIN
with Dr. Sullivan

"Thank you for the interesting lecture. You are the best lecturer I have heard in years! Your Companion Workbook is informative, and I am sharing it with my siblings."

What *will you* say?

Watch Dr. Sullivan's Facebook LIVE Mini Brain Health Lectures

JOIN our FREE Facebook Community Today!

Let's get started!

Sleep & Aging

BY KAREN D. SULLIVAN, PHD, ABPP

As we age, our ability to get a deep, continuous night's sleep decreases due to the brain's reduced production of human growth hormone and melatonin, and changes in our circadian rhythm (the body's "internal clock"). These changes, combined with more frequent trips to the bathroom due to an enlarged prostate in men or decline in antidiuretic hormones in women, can be frustrating and lead to a fitful, unsatisfying night's sleep.

Research shows that among older adults, interrupted sleep, rather than total amount of sleep, most negatively affects the brain's ability to think clearly and learn efficiently. Cognitive symptoms due to chronically poor sleep can include a decreased ability to concentrate, multi-task, learn new information, reason, process complex information, and engage in critical thinking and decision-making. Interrupted sleep in older adults usually occurs in two different phases: sleep maintenance problems (awakening several times throughout the night) or sleep termination problems (waking up before you have slept enough to feel rested while being unable to get back to sleep).

Beyond the age-related changes that affect sleep, poor quality sleep can be caused by other modifiable factors that can be improved, including a high level of stress (excessive worrying), lack of a routine sleep-wake schedule, medication side effects, lack of exercise, chronic pain or caffeine intake after 3 p.m. Experts say that there is no universal "magic number" for how many hours of sleep older adults should get.

Sleep need is an individual matter that varies from person to person. Your magic number is the amount of sleep that leaves you feeling rested and "clear-headed" when you wake up in the morning. Research suggests regularly getting 7-8 hours of uninterrupted sleep is optimal, and following these sleep techniques may help you achieve this goal.

10 Rules of Sleep Hygiene

1 Keep a regular sleep schedule by going to sleep and waking up around the same time every day. **(See Page 56)**

2 Reduce caffeine intake, especially after lunch, and limit liquid intake two hours before sleep.

3 Avoid sugar after dinner. Spikes in our blood sugar due to sweets or simple carbohydrates can reduce the amount of time you spend in the deeper, restorative stages of sleep.

4 Try to get at least 1-2 hours of sunlight each day to help regulate circadian rhythms.

5 Use of the bed should primarily be restricted to sleeping and physical intimacy. Reading, watching TV and other activities in bed can make it harder for the brain to transition to sleep.

6 Develop a pre-sleep ritual. Listening to soothing music, deep breathing, doing gentle yoga or watching a fire in the fireplace are ways to give your body and brain the message that it is time to wind down and stop "doing."

7 If you do not fall asleep within 30 minutes of going to bed, get out of bed, and do something that may increase sleepiness, such as reading a book, and then return to bed. However, do not use devices or watch TV.

8 Avoid over-the-counter medications for sleep with PM in the title (remember the PM part has anti-cholinergic properties known to have a negative effect on memory in older adults).

9 Keep a worry journal to write down and let go of nagging anxieties before bedtime. The key is to face stressors directly in our waking hours with assertive communication and action steps. **(See Page 55)**

10 If none of these recommendations work, discuss your sleep concerns with your primary care physician to see if you should undergo a sleep study. Many sleep problems are caused by underlying but treatable issues. By identifying the root cause of your sleep problem, your care can be personalized.

How Does SLEEP APNEA Affect the BRAIN?

BY KAREN D. SULLIVAN, PHD, ABPP

If you have been diagnosed with sleep apnea, you have likely had a sleep study that recorded you having one or more pauses in your breathing while sleeping. Each pause in breathing (called an "apnea") can last from a few seconds to minutes and may occur anywhere from five to 400 times or more an hour! Sleep apnea has implications for short-term cognitive functioning (i.e., during the next day due to sleeplessness) and long-term brain health (resulting from chronic oxygen deprivation to your brain).

Sleep apnea can affect your brain in two primary ways:

1 **Oxygen loss:** Chronic severe sleep apnea can cause low blood oxygen levels as you are not taking in as much air as your brain requires to work properly. Repeated drops in oxygen can lead to damage to the cells that support your thinking and to your brain over time. Lowered blood oxygen levels are thought to be the most detrimental outcome of sleep apnea, because it results in long-term damage to parts of the brain. Untreated sleep apnea is associated with symptoms of sleep deprivation, restless sleep, excessive daytime sleepiness, morning headaches, irritability and mood-swings, sexual dysfunction, diminished quality of life and productivity, increased accident risk, and cardiovascular disease and stroke, in addition to decreasing your brain's ability to pay attention and remember information.

2 **Less deep sleep:** Immediately following an apnea, the body sends out an alarm message that results in a big breath in to compensate for the falling oxygen levels. This message is jarring to the brain and causes you to often move out of the deepest stages of sleep, particularly REM sleep. This reduces your ability to receive all of the physical, cognitive and emotional benefits of deep sleep.

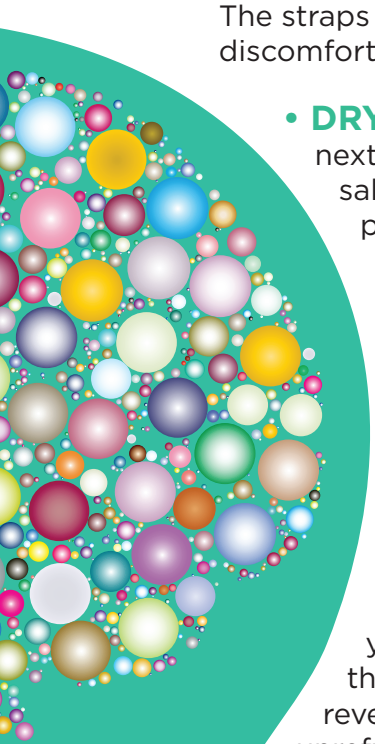
Why you must learn to love your CPAP machine

The great news about sleep apnea is that it is highly treatable! Continuous positive airway pressure (CPAP) therapy is provided in a small bedside machine that applies mild air pressure on a continuous basis to keep your airway open and oxygen levels steady throughout the night. Unfortunately, many people find the CPAP machine difficult and uncomfortable to use and often do not use it as often as their doctor prescribed.

Research shows that you need to use your CPAP machine for at least six hours per night to receive the full cognitive benefits. It is expected that you will need to use your CPAP for 6-8 weeks at a minimum to receive noticeable benefits. You may even feel worse before you feel better, as you slowly "pay off" for sleep debt you have built up prior to treatment.

The most important thing you can do to increase your use of the machine is to determine exactly why you are not currently using it as prescribed and troubleshoot ways to increase your use. Communication with your prescribing physician is critical, and many people have to return to the sleep clinic multiple times for minor adjustments.

Below are the most common reasons people do not use their CPAP machine as prescribed and a few suggestions to increase your use. With time and patience, I promise your CPAP can make a big difference in your quality of life and health!



- **POOR FIT:** (air leaks around the mask): The nasal mask or nasal pillows must be the correct size. You may need to try several types and sizes to find the best fit for you. The straps that connect your head to the machine should not be so tight as to cause discomfort but tight enough to feel snug.

- **DRYNESS:** You may want to consider buying a warm-air humidifier and placing it next to your bed to increase the moisture in the air or applying a few drops of nasal saline solution in each nostril or eye saline solution in each eye before bed. Your prescribing physician may also be able to order you a humidifier that can be connected directly to the CPAP machine or a CPAP machine that has its own humidity adjustment built in. Learning how to tweak the settings can make a big difference.

- **CLAUSTROPHOBIA:** Although it may seem hard to believe, the best way to feel less claustrophobic in the mask is to wear it more and more often each night. This is called "systematic desensitization," and over time, you should feel less and less bothered by feelings of being "trapped" or feeling that you cannot breathe.

- **MISCONCEPTIONS ABOUT ITS IMPORTANCE:** It is essential that you have positive expectations for improvements in your quality of life by using the CPAP machine. This treatment has been shown to significantly reduce or reverse symptoms of sleep apnea, including snoring, excessive daytime sleepiness, unrefreshing or fragmented sleep, and cognitive impairment. In addition, consistent use of the CPAP machine has been shown to significantly decrease risk of accidents associated with sleep apnea, increase productivity and decrease the long-term complications of sleep apnea, including hypertension, heart disease and stroke.

If you are unable to significantly increase your use of the CPAP machine (i.e., more than six hours per night) following these changes, meet with your prescribing physician or CPAP vendor to provide additional treatment recommendations.

SHOULD I CONSIDER A SLEEP STUDY?

BY KAREN D. SULLIVAN, PHD, ABPP

If after trying the sleep improvement recommendations suggested in this lecture, you still are unsatisfied with your sleep quality or quantity, talk with your primary care doctor about considering a sleep study. A sleep study can provide valuable information about the reason or reasons you are having trouble sleeping. With more than 70 types of sleep disorders, a sleep study is often needed after common-sense approaches to improve sleep fail. Once the causes of poor sleep are understood, sleep interventions can be personalized and monitored with a data-driven approach.

To have the most productive conversation about sleep with your medical providers, along with being your own best advocate by asking for a sleep study, bring the following pieces of information with you:

- **When did your sleep changes start?**
- **What is the pattern of your sleep problem? Every night vs. occasional? Trouble falling asleep vs. staying asleep?**
- **What have you tried to date?**
- **What effects do you think poor sleep is having on your physical, emotional or cognitive health?**

What is a sleep study?

A sleep study, also called a polysomnogram, is the gold standard for evaluating sleep. It offers a scientific, non-invasive way to get answers about why you are not sleeping well and instruction of how to return to consistent, high-quality sleep. Most insurances, including Medicare, cover the cost of a sleep study with a primary care physician referral detailing the concerns for a possible sleep disorder. In 2016, the Centers for Medicare and Medicaid Services, whose reimbursement policies are commonly embraced by private carriers, dropped its previous opposition to home studies, making both in-clinic or home based assessment options.

What happens in a sleep study?

- If your primary care physician agrees that a sleep study is warranted, he or she will send a referral to a local sleep clinic often run by a neurologist or pulmonologist.
- The sleep clinic will contact you, review your insurance benefits and schedule your appointment.
- You will arrive the evening of your appointment, typically around 8 p.m., bringing whatever clothes you wish to sleep in or other things to make yourself more comfortable, such as music to listen to, or a book or magazine to read.

- You will meet with the sleep technician and be taken into an observation room that is set up as a bedroom to help make for the best possible experience.

- You will change into the clothes in which you wish to sleep, and the technician will attach leads for the sleep monitoring system, typically on your head, chest, arms and legs.

- Once you are settled into the monitoring bed, as you sleep, the technician will monitor your sleep and vital signs throughout the night.

- Upon waking on your own or being wakened by the technician, typically between 5 and 6 a.m., you can dress and return home after the sleep study, typically receiving the results at your next scheduled appointment.

How can I prepare myself for a sleep study?

- Pack an overnight bag with something you feel comfortable with the sleep technicians seeing you wearing and a change of clothes for the next day.

- You can bring your own pillow or anything else of a personal nature that you feel will comfort you and help you sleep.

- Bring your nighttime medications.

- Be sure to bring along a positive attitude! Adopting a positive and curious mindset is recommended, knowing that a team of professionals will soon understand your sleep problems.

What happens after the sleep study?

- Your referring physician will receive a report containing details of your night's sleep along with any and all sleep disorders for which you meet criteria, and then recommendations will be provided to you.

- The next step differs across providers, but typically, the sleep clinic will schedule you for another appointment to discuss treatment options in detail and fit you for any devices, like a continuous positive airway pressure (CPAP) machine, that may help.

- Although it may take time and patience, you should see improvements in your sleep soon, and you can rest assured (you see what I did there?) that this risk to less than optimal brain health with age has been significantly reduced or eliminated.

Lecture 8

HOW SLEEP CHANGES WITH AGE:

Effects on Memory and Mood

- Lecture series focused on the brain health of older adults
- Evidence-based information and recommendations
- Supported by science and unbiased clinical expertise
- Motivating you to action!

Slide Presentation Begins

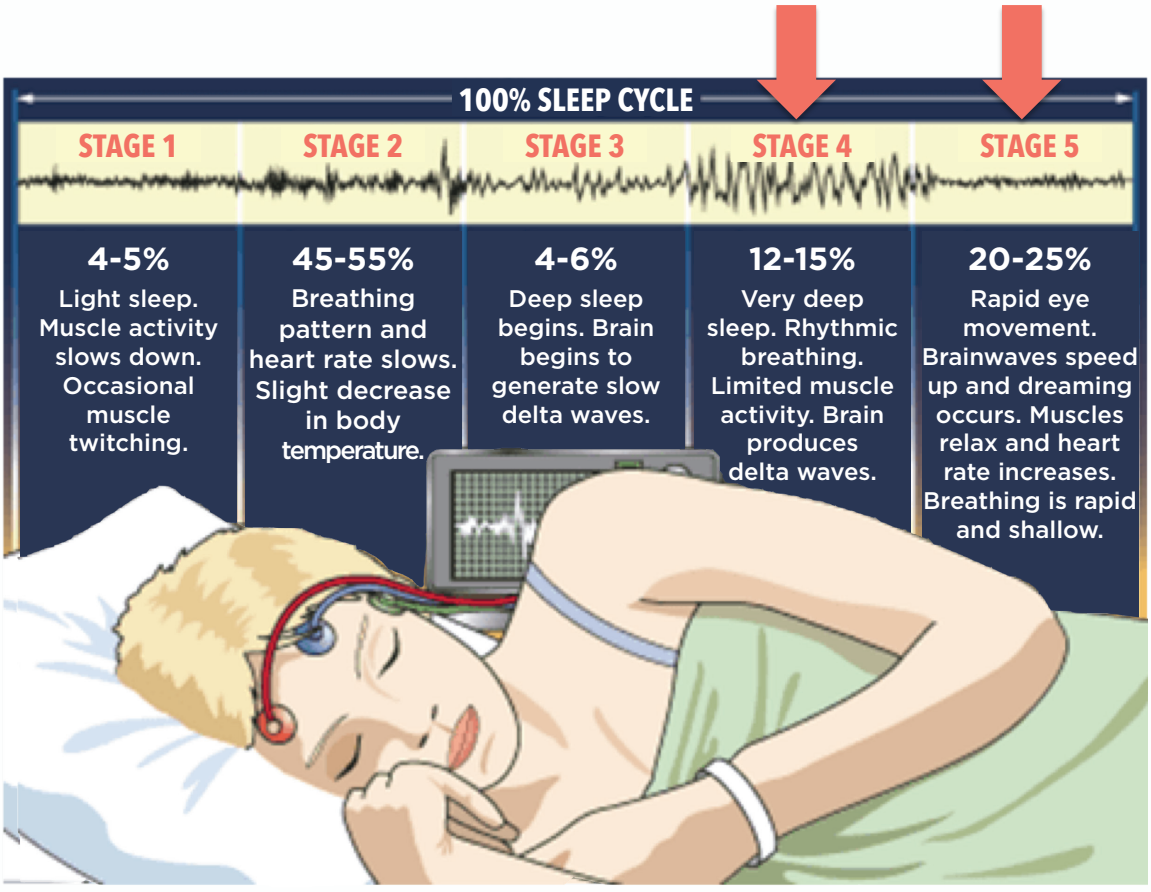
LEARNING TOPICS

- Sleep explained
- How sleep changes with age
- Consequences of a tired brain
- Common sleep problems in older adulthood
- I CARE FOR YOUR BRAIN recommendations

WHY IS THIS TOPIC IMPORTANT

- **Sleep is a staple of physical and mental health including brain health.**
- **Sleep changes with age and has a big impact on memory and mood.**
- **50% of US seniors report sleep difficulties *(Fok, et al, 2010)*.**
- **There are free, scientifically-based solutions to help you start sleeping better tonight!**

NOTES

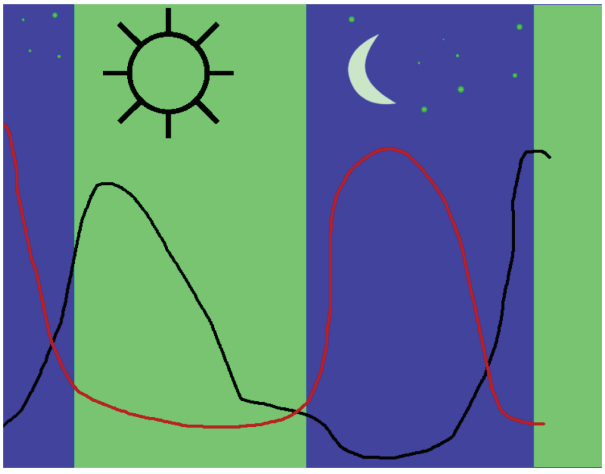

100% SLEEP CYCLE
STAGE 1
STAGE 2
STAGE 3
STAGE 4
STAGE 5
4-5%
Light sleep. Muscle activity slows down. Occasional muscle twitching.
45-55%
Breathing pattern and heart rate slows. Slight decrease in body temperature.
4-6%
Deep sleep begins. Brain begins to generate slow delta waves.
12-15%
Very deep sleep. Rhythmic breathing. Limited muscle activity. Brain produces delta waves.
20-25%
Rapid eye movement. Brainwaves speed up and dreaming occurs. Muscles relax and heart rate increases. Breathing is rapid and shallow.

NOTES

CIRCADIAN RHYTHM

An approximate 24-hour cycle in the physiological processes of all living beings, including animals, plants, fungi

Generally regulated by internal cues, like hormones, especially melatonin and cortisol but can also be affected by external cues, such as sunlight, temperature and eating



NOTES

A BRIEF HISTORY OF THEORIES ON WHY WE SLEEP

The adaptive or evolutionary theory: Inactivity at night is an adaptation that keeps us safe at times when we would be particularly vulnerable to predators if we were out wandering.

Energy conservation theory: To reduce an individual's energy demand and expenditure during part of the day (i.e. night), especially at times when it is least efficient to search for food.

Restorative theory: The major restorative functions in the body (muscle growth, tissue repair, protein synthesis, and growth hormone release) occur mostly, or in some cases only, during sleep. Sleep is a biological necessity; we need it to survive. Without sleep, we die.

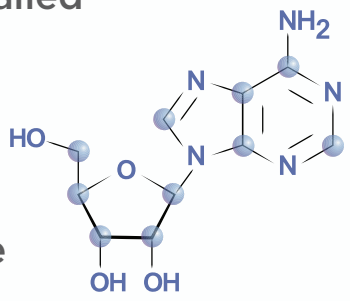
NOTES

THE RESTORATIVE ASPECTS OF SLEEP ARE UNIQUE TO THE BRAIN

Sleep helps us clear away waste products from our brain cells.

When we are awake, neurons produce a chemical called "adenosine," a by-product of the cells' activities.

The build-up of adenosine in the brain is thought to be one factor that leads to a feeling of being sleepy. As long as we are awake, adenosine increasingly accumulates. During sleep, the immune system clears adenosine, and, as a result, we feel more alert when we wake.



Adenosine

Incomplete clearing = inflammation

Genes play a role in adenosine build up and removal.

Caffeine blocks this chemical,making us feel more alert.

NOTES

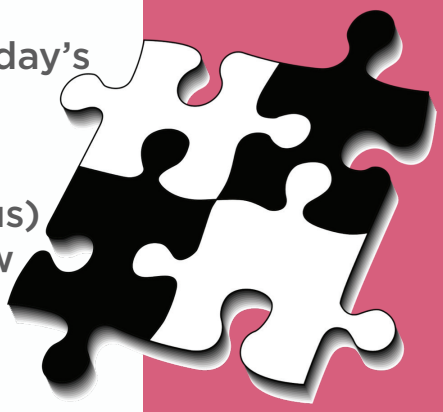

SLEEP
is essential for
MEMORY

WE SLEEP TO LEARN, REMEMBER AND FORGET

During the day, memories are temporarily stored in the brain.

During slow wave sleep, the brain replays the day's events and decides what to keep and what to throw away.

The memory centers in the brain (hippocampus) and the frontal cortex "compare notes," review threats closely and deduce "lessons learned."

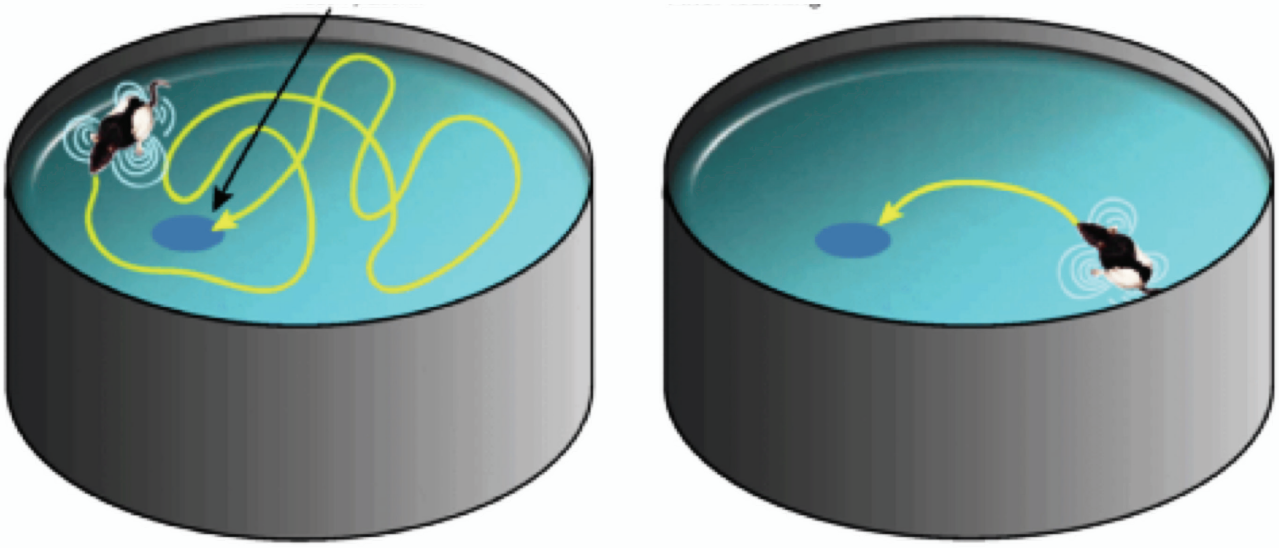


Different types of memory are reviewed in different stages of sleep:

- REM sleep: Emotional/traumatic memories
- Slow wave: Motor memories
- Perceptual memories: Both REM and slow wave

NOTES

Animal studies have taught us a lot about sleep and memory



NOTES

HOW SLEEP *changes with age*

SLEEP CHANGES START IN OUR MID-50S

- ✓ Less total sleep time
- ✓ Sleep cycles shift: Fall asleep earlier and wake up earlier
- ✓ More time in light sleep, less deep slow wave sleep, less REM
- ✓ More awakenings (3-4 is average)
- ✓ More trouble going back to sleep
- ✓ Nap more during the day, resulting in less sleep at night

NOTES

SLEEP CYCLES CHANGE WITH AGE

	Age 20	Age 40	Age 60	Age 70	Age 80
Time to fall asleep	16 minutes	17 minutes	18 minutes	18.5 minutes	19 minutes
Total sleep time	7.5 hours	7 hours	6.2 hours	6 hours	5.8 hours
Time in regular sleep	47%	51%	53%	55%	57%
Time in slow wave sleep	20%	15%	10%	9%	7.5%
Time in REM sleep	22%	21%	20%	19%	17%
Time asleep while in bed	95%	88%	84%	82%	79%

JamesClear.com

Source: Sleep, Nov. 1, 2004, pp. 1255-73

NOTES

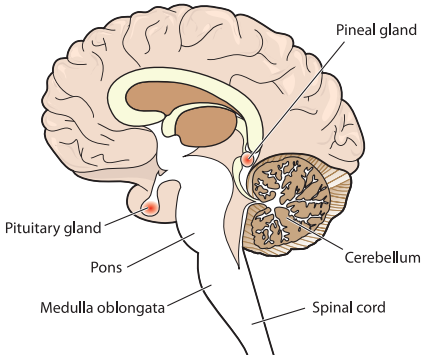
WHY?

Changes in brain areas that control sleep

Body's circadian rhythms weaken due to less growth hormone, especially less melatonin

Medical conditions, including bladder changes

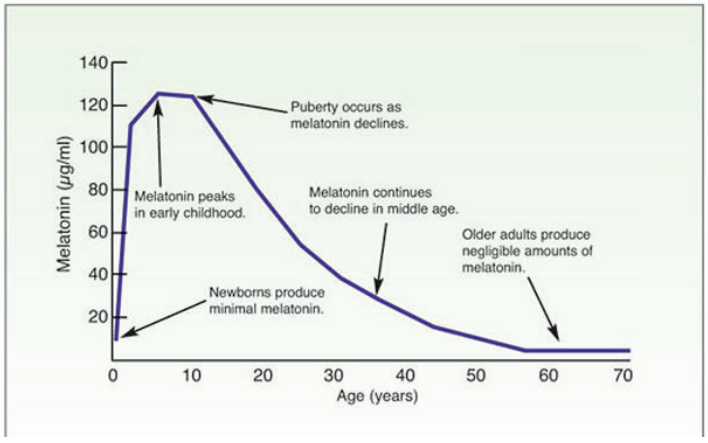
NOTES



MELATONIN

The principal sleep hormone produced by the pineal gland during the hours of darkness

Melatonin is a hormone and antioxidant produced by the pineal gland of which four neurobiological roles have been claimed in the aged population: anti-aging agent; free-radical scavenger; regulator of circadian rhythm; sleep-inducer.



https://sleepfoundation.org/

NOTES

CONSEQUENCES OF A TIRED BRAIN

Chronic health problems: If you get less than seven hours of sleep a night, you are more likely to have obesity, heart disease, diabetes, high blood pressure, stroke, depression and premature death. Thought to be due to inflammation and reduced immunity.

Weight gain: Adults who sleep less than 5-6 hours a night are at higher risk of being overweight ***(Beccuti & Pannain, 2011)***. Stress eating? Stress hormones?

More mistakes/accidents: In 2012, The American Insomnia Survey estimated that 274,000 workplace accidents were directly related to sleep deprivation = $31 billion annually ***(Shahly et al, 2012)***.

Drowsy driving presents as much of a safety risk as drunk driving. If you drive after 24 hours awake or after less than six hours of sleep at night, you're at a blood alcohol equivalent of 0.1 percent, which is higher than the legal limit in all states ***(Williamson & Feyer, 2000)***.

NOTES

IMPACT ON MOOD

Two-way relationship

Chronic sleep problems affect 50%-80% of patients in a typical mental health practice, compared with 10%-18% of adults in the general population ***(Harvard Mental Health Letter, 2009).***

Chronic sleep disruption sets the stage for negative thinking and emotional perseveration (can't let it go).

Taking more than 30 minutes to fall asleep is associated with the likelihood of meeting diagnostic criteria for an anxiety disorder ***(LeBlance et al, 2015).***

Even just 1 week of poor sleep = we feel more stressed, angry, sad, and mentally exhausted. ***(Dinges, D. et al, 1997).***

NOTES

A SLEEPY BRAIN IS A SLOWER AND MORE IMPULSIVE BRAIN

- **When we don't sleep, our ability to learn new information drops by about 40%** ***(Walker & Stickgold, 2004)*****.**
- **Biggest impact on:**
  - Concentration
  - Response time
  - Word finding
  - Memory mistakes
  - Impulsivity
  - Judgment

NOTES

Common Sleep Disorders

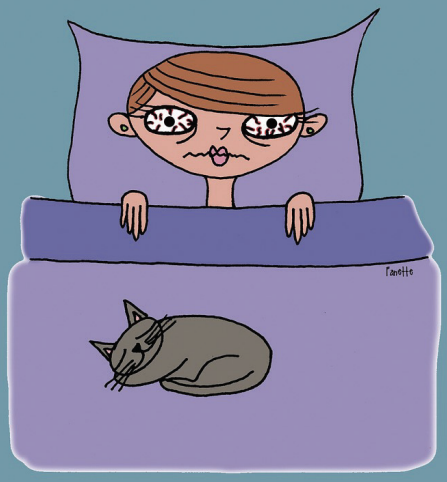
in older adulthood

THE BIG SIX

- Insomnia
- Sleep apnea
- Restless leg syndrome
- Anxiety
- Medication effects
- Alcohol

NOTES

WHAT IS INSOMNIA?



- Difficulty falling asleep (initial insomnia)
- Difficulty staying asleep (middle insomnia)
- Results in daytime sleepiness
- 30-50% of people over 60 report difficulty staying asleep
- More older women than men report sleep difficulties

Causes:

- Changes in circadian rhythms related to decreased ability of the bladder to store urine with aging = getting up frequently in the night to urinate
- Hormonal changes (less melatonin)
- Stress
- Chronic pain
- Lack of daily sleep/wake routine

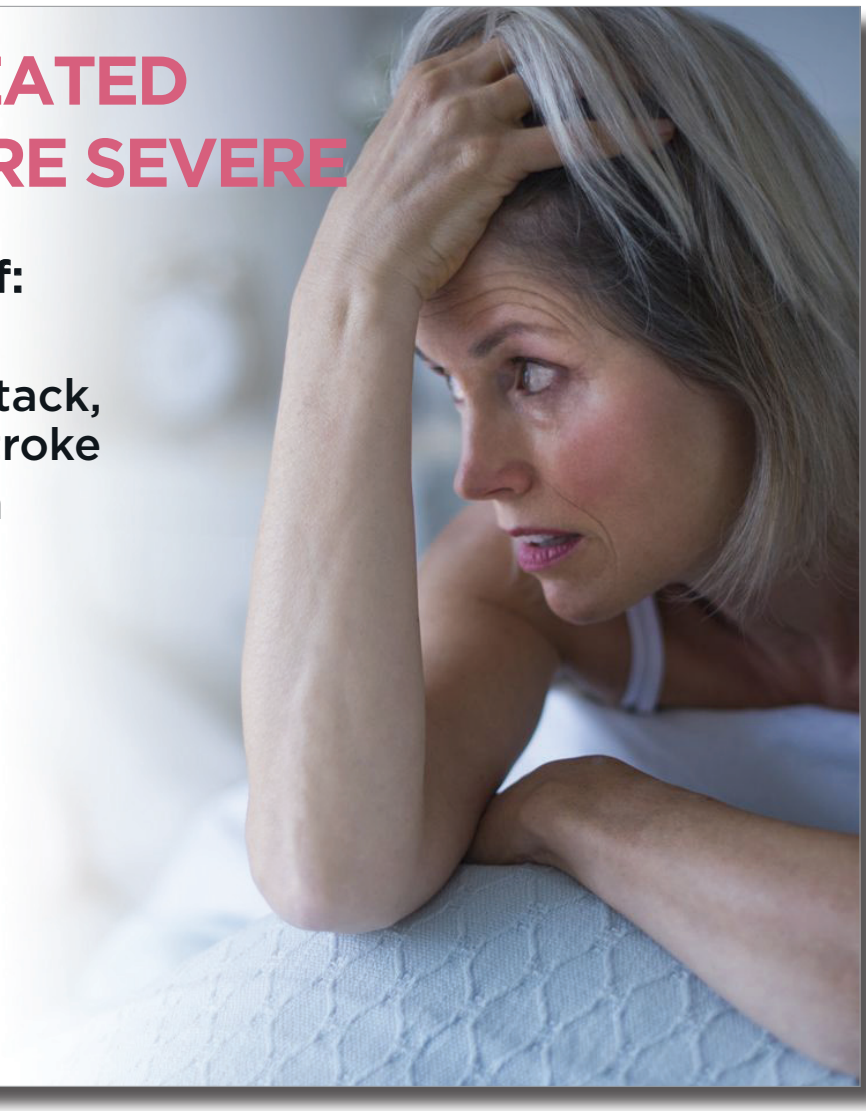
NOTES

WHAT IS SLEEP APNEA?

- 1:4 older adults have it
- Stopped breathing and/or very shallow breathing that last a few seconds to minutes
- Diagnosed via sleep study
  - Apnea Index:
    - ≥ 5 episodes/hour is abnormal
    - 5 to 15 is mild
    - 15 to 30 is moderate
    - Severe is 31+
- Affects oxygen levels and interrupts sleep cycle
- Loud snoring, snorts and gasps, large neck circumference, overweight
- Two types: Obstructive and Central
- Laugh and the world laughs with you, snore and you sleep alone. (Anthony Burgess)

NOTES

RISKS OF UNTREATED SLEEP APNEA ARE SEVERE



Can increase chances of:

- Death
- Hypertension, heart attack, cardiac arrhythmias, stroke
- Diabetes (lower insulin sensitivity)
- Daytime sleepiness impacting driving
- Anxiety, irritability
- Concentration issues, memory decline, word finding difficulties

(Colten & Altevogt, 2006)

NOTES

WHAT IS RESTLESS LEGS SYNDROME?

1:8 older adults have it

Four symptoms:

- A strong urge to move your legs, sometimes accompanied by a burning sensation
- Your symptoms are worse when you body is at rest
- Symptoms improve when you move
- Symptoms are worse at night

Causes: *Low iron levels, kidney failure, diabetes mellitus, rheumatoid arthritis, antidepressants, antihistamines, and calcium channel blockers*

NOTES

ANXIETY

- Persistent, nagging feelings of worry, apprehension or dread
- Unusually intense or out of proportion to the real level of stress and dangers in our life
- Often interferes with sleep; our problems seem worse at night
- We can avoid stressors that boomerang at night by staying busy during the day.

NOTES

MEDICATIONS CAN AFFECT SLEEP

Prescribed for:

- High blood pressure (alpha and beta blockers, calcium channel blockers)
- Inflammation or arthritis (corticosteroids)
- Asthma, bronchitis, or other breathing problems
- Memory
- Chemotherapy
- Over-the-counter medications that contain caffeine, decongestants and relieve join paint (glucosamine and chondroitin)

NOTES

ALCOHOL CHANGES THE SLEEP CYCLE

- Any alcohol within six hours of your bedtime affects sleep quality.
- You may fall asleep quicker after drinking, but it disrupts slow wave sleep and the second half of your night's sleep.
- A 2013 study suggested having four or more drinks on one occasion is linked with insomnia in adults age 55 and older ***(Canham et al).***
- More likely to have shallow breathing after drinking
- Spikes blood sugar

NOTES

TREATING SLEEP PROBLEMS WITH MEDICATION

A third of older adults take medication for sleep, but they may not even help and present serious risks.

- **Benzodiazepines:** High fall risk (nearly 4-fold risk of hip fracture), greater cognitive side effects, increased risk of developing dementia when used heavily over time
- **Ambien:** Can cause confusion and increase risk for falls
- **Antihistamines/Benadryl/ Anything PM-** Anti-cholinergic side effects

NOTES

I CARE FOR YOUR BRAIN

with Dr. Sullivan

Recommendations

ARE YOU SLEEPY?

Ask yourself this question to determine if you're getting enough quality, uninterrupted sleep. Are you yawning? Do you feel groggy? If you wake up tired, chances are you're not getting enough sleep.

Sleep needs vary greatly by individual. Age, genetics, lifestyle and environment all play a role.

If you're getting 7-8 hours of sleep a night but still feeling tired, you may be suffering from interrupted sleep or a sleep disorder.

NOTES

MONITOR YOUR SLEEP WITH A DIARY

Keep a sleep diary for one week:

1. Track the time you go to bed and the hour you wake up.
2. Determine how many times you woke up and the total number of hours you sleep. Note the time and length of any naps.
3. Note how you feel in the morning and after naps. Refreshed? Still tired?

See Sleep Diary on Page 56

NOTES

Or consider a

SLEEP TRACKER

NOTES

PRACTICE THE SIX PILLARS OF SLEEP HYGIENE

Sleep and wake at the same time every day: Go to bed at about the same time every night and keep your wake-up time consistent.

Naps: Avoid late afternoon naps. If you must take a nap, set the alarm so you don't sleep for more than an hour. And none after 3 p.m.

Avoid screens: The blue light in screens has the same effect on our brain as sunrays, stimulates the brain to wake up. Turn off the tablet, iPad, television and phone at least 2 hours before bed.

Reduce non-essentials in the bedroom: Get rid of exercise equipment, televisions, etc.

Don't eat or watch TV in bed: No television, eating or drinking in bed.

Do not lay in bed longer than 20-30 minutes if you are having trouble falling asleep. Get up and do something relaxing and distracting. No screens!

NOTES

DEVELOP A PRE-SLEEP RITUAL

- About an hour before sleep, prepare your brain for the transition to sleep by avoiding stimulating tasks.
- Reading or listening to music before bed is ideal.
- Physically and psychologically stressful activities cause the body to release stress hormones, which make us more alert (don't let your cortisol levels rise!).
- Write down your worries or plans for the next day to get them off your mind.

NOTES

RE-ESTABLISH YOUR CIRCADIAN RHYTHM

- Sleep with the blinds open and go outside soon after you wake up and spend at least 20 minutes in the morning sun.
- Avoid stimulating substances, such as alcohol, caffeine, and nicotine after the afternoon.
- Avoid bright lights (i.e. screens) in late afternoon or early evening.

NOTES

CONSIDER MEDITATION

- Suggestions that meditation could reduce the age associated reductions in slow wave sleep
- Senior meditators spent more time in the slow wave sleep (10.63% vs. 3.94% more slow wave sleep; Ravindra et al, 2010) and REM sleep was enhanced (Mason et al, 1997).
- Meditation practices enhance melatonin levels (melatonin levels were found to be significantly high in Vipassana meditators, approximately 300 pg ml than non-meditating controls 65 pg ml; unpublished data).

https://www.youtube.com/watch?v=HXXJRCCtoCk

NOTES

IS THERE A ROLE FOR MELATONIN SUPPLEMENTATION IN OLDER ADULTS?

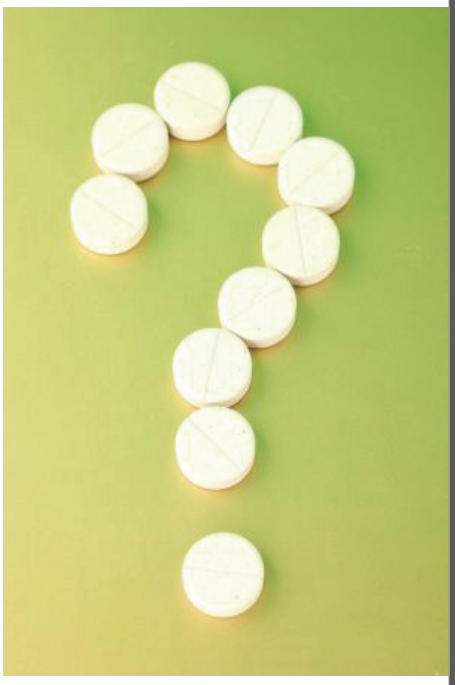
Sufficient evidence that low doses of melatonin improve initial sleep quality in older insomniacs ***(Rikkert, et al, 2001)***

2014 meta analysis (Vural, et al): "We advise the use of the lowest possible dose of immediate-release formulation melatonin to best mimic the normal physiological circadian rhythm of melatonin."

1mg or lower is recommended for short-term use.

One to two hours before desired sleep time

Long-term effects of melatonin in older adults are not well understood.



NOTES

COGNITIVE BEHAVIORAL THERAPY

Approximately 60-70% of long-term insomniacs can get a benefit from four to five hours of cognitive behavioral therapy.

NOTES

TREAT ANY UNDERLYING MEDICAL DISORDERS

- Reflux/Heartburn
- Diabetes (rising/falling blood sugar, night sweats, increased urination)
- Heart conditions (increased shortness of breath when extra body fluid accumulates around the lungs when lying down)
- Arthritis
- Kidney disease
- Anxiety

NOTES

TREAT SLEEP APNEA: FOR YOU AND YOUR PARTNER!

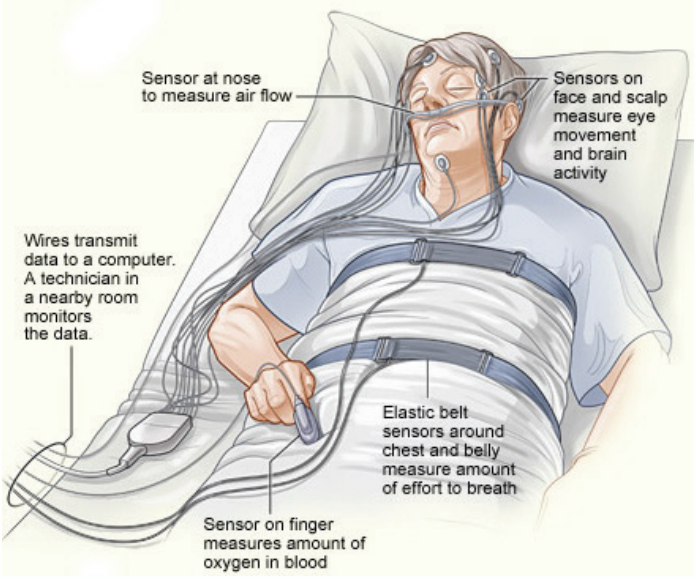
MILD	MODERATE-SEVERE
	Continuous Positive Airway Pressure (CPAP)- Pressurized air prevents airway closure during sleep
Lose weight Avoid alcohol Avoid sedatives for sleep Nasal sprays Breathing strips Avoid sleep deprivation	Automatically-Adjusting Positive Airway Pressure/Auto-CPAP (APAP)- automatically adjusts the pressure as needed during sleep (changes with position, stages of sleep) Within 2 weeks of more than 5 hours per night = improvements

NOTES

IF YOU ARE STILL TIRED, TALK TO YOUR PCP

The best care starts with a thorough assessment!

You may need a sleep study.



NOTES

DO NOT TAKE
OVER-THE-COUNTER SLEEP AIDS

NOTES

YOUR Sleep Hygiene TRACKER

Practicing these sleep hygiene rules can help you experience a better night's sleep, which is critical for optimal brain health. Try these techniques for the next seven nights and **TRACK YOUR PROGRESS.**

	DAY 1	2	3	4	5	6	7
Keep a regular sleep schedule by going to sleep and waking at the same time every day.							
Reduce caffeine intake, especially after lunch, and limit liquid intake two hours before sleep.							
Avoid sugary snacks after dinner to prevent spikes in blood sugar.							
Try to get at least 1-2 hours of sunlight each day to help regulate circadian rhythms.							
Develop a pre-sleep ritual, like listening to music, deep breathing or doing gentle yoga to wind down.							
Avoid over-the-counter medications for sleep with PM in the title.							
Keep a worry journal to write down and let go of nagging anxieties before bedtime.							

Worry Journal

As part of your sleep hygiene efforts, make yourself a Worry Journal. Use this as a starting point, but any notebook can work. Before bedtime, write down what is causing your worry or anxiety, how it makes you feel, evidence for and against the worry, and action steps to solve or accept the problem.

WORRY 1:	**WORRY 2:**
HOW DOES IT MAKE YOU FEEL?	**HOW DOES IT MAKE YOU FEEL?**
EVIDENCE FOR:	**EVIDENCE FOR:**
EVIDENCE AGAINST:	**EVIDENCE AGAINST:**
ACTION STEPS TO SOLVE OR ACCEPT PROBLEM: **1.**	**ACTION STEPS TO SOLVE OR ACCEPT PROBLEM:** **1.**
2.	**2.**
3.	**3.**

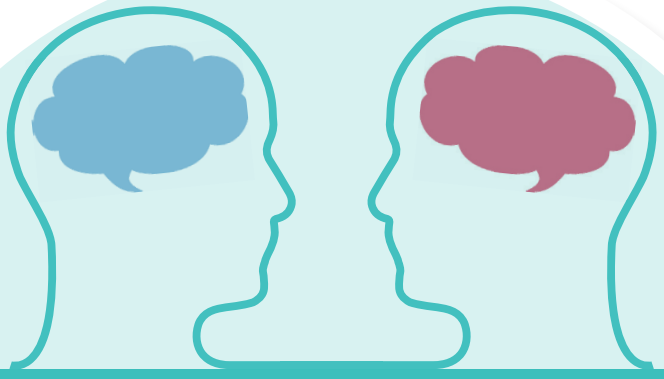
7-DAY SLEEP DIARY

If you are having trouble sleeping, a sleep diary can help track your activities and the quality of your sleep over a period of time. It can help you determine if practicing sleep hygiene habits is helping or if you require professional help.

	DAY 1	DAY 2	DAY 3
TIME WENT TO BED			
TIME AWAKENED IN THE MORNING			
TOTAL HOURS OF SLEEP			
HOW MUCH TIME DID IT TAKE TO FALL ASLEEP?			
HOW MANY TIMES DID I AWAKEN DURING THE NIGHT?			
HOW DID I FEEL AFTER AWAKING IN THE MORNING?			
LIST MEDICATIONS OR SUPPLEMENTS TAKEN BEFORE BED			
LIST ANY ALCOHOL, CAFFEINE OR FOOD BEFORE BEDTIME			
DID YOU EXERCISE TODAY AND FOR HOW LONG?			
DID YOU TAKE ANY DAYTIME NAPS AND FOR HOW LONG?			

You can also share your sleep diary with your doctor to help determine if you might be considered for a sleep study.

DAY 4	DAY 5	DAY 6	DAY 7



SMALL GROUP DISCUSSION TOPICS

1. Are you one of the 50 percent of older adults who has experienced new-onset sleep difficulty? What has changed?

2. What symptoms do you feel when you don't sleep well? In what area do you feel the effects most: physical, mood or cognitive?

3. Which sleep hygiene habits can you implement tonight to help improve the quality of your sleep?

4. Have you had a sleep study? If so, talk about what the experience was like for you, and what benefits did you receive?

5. What surprised you the most after learning about the harmful effects of over-the-counter sleep aids?

NOTES

BRAIN TRIVIA

COMPANION WORKBOOK 8

1. FILL IN THE BLANKS:
Sleep changes with _____ and has a big impact on _____ and mood. Fifty percent of _____ report sleep difficulties.

2. DRAW A LINE TO MATCH DESCRIPTIONS TO THE SLEEP STAGE BELOW:

Stage 1	Very deep sleep
Stage 2	Light sleep
Stage 3	Breathing pattern and heart rate slow
Stage 4	Rapid Eye Movement (REM)
Stage 5	Deep sleep begins

3. What is the circadian rhythm?

_____

_____

_____

4. List four of the internal and external cues that help regulate the circadian rhythm

_____ _____

_____ _____

TRUE OR FALSE:

5. _____ When we are awake, neurons produce a chemical called adenosine. Adenosine build up is believed to be a factor that leads to the feeling of being tired.

6. _____ The immune system clears adenosine from our system during all times of the day.

7. _____ During slow wave sleep, the brain replays the day's events and decides what to keep and what to throw away.

8. What types of memories are reviewed in these stages of sleep?

REM Sleep:_____

Slow wave: _____

Both REM and slow wave:_____

9. List the six ways that sleep changes with age, beginning in our mid-50s. Circle any of the changes that you have personally experienced.

_____ _____

_____ _____

_____ _____

10. Why does sleep change with age?

_____

_____

_____

11. FILL IN THE BLANKS:

_____ is a hormone and antioxidant produced by the pineal gland in our brain. It has four neurobiological roles: anti-aging agent, free-radical scavenger, regulator of _____ _____ and _____ inducer.

12. LABEL THE CONSEQUENCES OF A TIRED BRAIN:

_____ _____: Adults who sleep less than 5-6 hours per night are at higher risk of this consequence.

_____ _____ _____: If you get less than seven hours of sleep per night, you are more likely to have obesity, heart disease, diabetes, high blood pressure, stroke, depression, and premature death.

_____ _____/_____: In 2012, The American Insomnia Survey estimated that 274,000 workplace accidents were related to sleep deprivation. Drowsy driving presents as much of a safety risk as drunk driving.

TRUE OR FALSE:

13. _____ Chronic sleep disruption does not have any effect on thinking, emotional perseveration or mood.

14. _____ Taking more than 30 minutes to fall asleep is associated with the likelihood of meeting diagnostic criteria for an anxiety disorder.

15. _____ When we don't sleep, our ability to learn new information drops by 10 percent.

16. FILL IN THE BLANKS:

Lack of sleep has the biggest impact on _____, response time,

_____ _____, _____ _____,

impulsivity, and judgment.

BRAIN TRIVIA

COMPANION WORKBOOK 8

FILL IN THE BLANKS USING THE WORDS BELOW:

STRESS	**RESTLESS LEG SYNDROME**	**STAYING ASLEEP**
WORRY	**SLEEP APNEA**	**REST**

17. Insomnia is defined as difficulty _____ or difficulty falling asleep. Insomnia has several causes, including hormonal changes, _____, and chronic pain.

18. _____ is characterized by very shallow breathing or a stop in breathing during sleep. Episodes can last between a few seconds to a few minutes. Sleep apnea affects oxygen levels and interrupts sleep cycle.

19. _____ is described as a strong urge to move your legs and is sometimes accompanied by a burning sensation. Symptoms worsen when the body is at _____ and at night time.

20. Anxiety is a persistent, nagging feeling of _____, apprehension, or dread. These feelings often interfere with sleep and can seem magnified at night.

21. List a few examples of medication that can affect sleep. Have you been prescribed any medications on this list?

_____

_____

22. FILL IN THE BLANKS:
After drinking, you may fall asleep more _____; however, alcohol disrupts _____ sleep and the second half of your night's sleep.

23. List the side effects of the medications below that are often used to help with sleep

Benzodiazepines:_____

Ambien:_____

Antihistamines/Benadryl/Anything with a PM on the label:_____

24. What are six pillars of sleep hygiene?

_____ _____ _____

_____ _____ _____

25. List changes you can make to your bedtime routine for a better night's sleep.

_____

_____

Brain Trivia Answers

1. Sleep changes with age and has a big impact on memory and mood. 50% of seniors report sleep difficulties.
2. Stage 1— Light sleep; Stage 2— Breathing pattern and heart rate slow; Stage 3— Deep sleep begins; Stage 4—Very deep sleep; Stage 5—Rapid Eye Movement (REM)
3. An approximate 24-hour cycle in the physiological processes of all living beings (including animals, plants, and fungi).
4. Any of the following: cortisol, melatonin, temperature, eating or sunlight
5. True
6. False
7. True
8. REM Sleep: Emotional/traumatic memories
Slow wave: Motor memories
Both REM and slow wave: Perceptual memories
9. Less total sleep time; sleep cycle shifting (falling asleep earlier and waking earlier); more time in light sleep, less deep sleep slow wave sleep, and less REM; more awakenings per night (average 3-4); more trouble going back to sleep; nap more during the day
10. Changes in the brain areas that control sleep, body's circadian rhythms weaken, medical conditions
11. Melatonin is a hormone and antioxidant produced by the pineal gland in our brain. Melatonin has four neurobiological roles: anti-aging agent, free-radical scavenger, regulator of circadian rhythm, and sleep inducer.
12. Weight gain: Adults who sleep less than 5-6 hours per night are at higher risk of this consequence.
Chronic health problems: If you get less than 7 hours of sleep per night, you are more likely to have obesity, heart disease, diabetes, high blood pressure, stroke, depression, and premature death.
More mistakes/accidents: In 2012, The American Insomnia Survey estimated that 274,000 workplace accidents were related to sleep deprivation. Drowsy driving presents as much of a safety risk as drunk driving.
13. False
14. True
15. False
16. Lack of sleep has the biggest impact on **concentration**, response time, **word finding**, **memory mistakes**, impulsivity, and judgment.
17. Insomnia is defined as difficulty **staying asleep** or difficulty falling asleep. Insomnia has several causes, including hormonal changes, **stress**, and chronic pain.
18. Sleep apnea is characterized by very shallow breathing or a stop in breathing during sleep. Episodes can last between a few seconds to a few minutes. Sleep apnea affects oxygen levels and interrupts sleep cycle.
19. Restless leg syndrome is described as a strong urge to move your legs and is sometimes accompanied by a burning sensation. Symptoms worsen when the body is at **rest** and at night time.
20. Anxiety is a persistent, nagging feeling of **worry**, apprehension, or dread. These feelings often interfere with sleep and can seem magnified at night.
21. High blood pressure; inflammation or arthritis; asthma, bronchitis, other breathing problems; memory; chemotherapy; over-the-counter medications that contain caffeine, decongestants, and relieve joint pain
22. After drinking, you may fall asleep **more quickly**; however, alcohol disrupts **slow wave sleep** and the second half of your night's sleep.
23. Benzodiazepines: High fall risk, greater cognitive side effects, increased risk of dementia when used heavily over time
Ambien: Confusion and increased fall risk
Antihistamines/Benadryl/Anything with a PM on the label: Anti-cholinergic side effects
24. Sleep and wake at the same time every day; avoid late afternoon naps; avoid screens before bed; reduce non-essentials in the bedroom; don't eat or watch TV in bed; do not lie in bed longer than 30 minutes if you are having trouble falling asleep
25. Any of the following: avoid stimulating tasks an hour before bed; read or listen to music before bed; reduce physical and psychologically stressful activities before bed; write down worries or plans for the next day; consider meditation; re-establish your circadian rhythm

REFERENCES

There is a time for many words,
and there is also a time for sleep.

—HOMER

- Beccuti, G., & Pannain, S. (2013). Sleep and obesity. Current Opinion in Clinical Nutrition & Metabolic Care, 14(4), 402-412.
- Canham, S. L., Kaufmann, C. N., Mauro, P. M., Mojtabai, R., & Spira, A. P. (2016). Binge drinking and insomnia in middle-aged and older adults: The health and retirement study. International Journal of Geriatric Psychiatry, 30(3), 284-291.
- Dinges, D. F., Pack, F., Williams, K., Gillen, K. A., Powell, J. W., Ott, G. E., & Pack, A. I. (1997). Cumulative sleepiness, mood disturbance, psychomotor vigilance performance decrements during a week of sleep restricted to 4-5 hours per night. Sleep, 20(4), 267-277.
- Fok, M., Stewart, R., Besset, A., Ritchie, K., & Prince, M. (2010). Incidence and persistence of sleep complaints in a community older population. International Journal of Geriatric Psychiatry, 25(1), 37-45.
- Institute of Medicine (US) Committee on Sleep Medicine and Research; Colten HR, Altevogt BM, editors. Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem. Washington (DC): National Academies Press (US); 2006.
- Leblanc, M., Desjardins, S., & Desgagné, A. (2015). Sleep problems in anxious and depressive older adults. Psychology Research and Behavior Management, 161-169.
- Mason, L. I., Alexander, C. N., Travis, F. T., Marsh, G., Orme-Johnson, D., Gackenbach, J., & Walton, K. G. (1997). Electrophysiological correlates of higher states of consciousness during sleep in long-term practitioners of the Transcendental Meditation program. Sleep, 20(2), 102-110.
- Olde Rikkert, M. G., & Rigaud, A. S. (2001). Melatonin in elderly patients with insomnia. A systematic review. Zeitschrift fur Gerontologie und Geriatrie, 34(6), 491-497.
- Ravindra, P. N., Sulekha, S., Sathyaprabha, T. N., Pradhan, N., Raju, T., & Kutty, B. M. (2010). Practitioners of vipassana meditation exhibit enhanced slow wave sleep and REM sleep states across different age groups. Sleep and Biology Rhythms, 34-41.
- Shahly, V., Berglund, P. A., Coulouvrat, C., Fitzgerald, T., Hajak, G., Roth, T., & Kessler, R. C. (2012). The associations of insomnia with costly workplace accidents and errors: Results from the American Insomnia Survey. Archives of General Psychiatry, 69(10), 1054-1063.

A
SLEEPY BRAIN
is a
SLOWER BRAIN

I CARE FOR YOUR BRAIN with Dr. Sullivan

DEVELOP A PRE-SLEEP RITUAL

I CARE FOR YOUR BRAIN with Dr. Sullivan

SLEEP

is a **STAPLE** of
PHYSICAL &
MENTAL HEALTH,
including
BRAIN HEALTH

I CARE FOR YOUR BRAIN with Dr. Sullivan

The EAR & BRAIN CONNECTION...

2X

Those with mild hearing loss are TWICE as likely to develop dementia.

3X

Those with moderate hearing loss are THREE TIMES as likely to develop dementia.

5X

Those with severe hearing loss were nearly FIVE TIMES as likely to develop dementia.

"A lot of people ignore hearing loss, because it's such a slow and insidious process as we age. Even if people feel as if they are not affected, we're showing that it may well be a more serious problem."

—Dr. Frank Linn, Johns Hopkins Medicine

Audiology of the Sandhills

KATE TUOMALA
M.A., CCC-A, F-AAA
Owner/Founder

For a Hearing Evaluation & Consultation, Call Us Today!

1902 N Sandhills Blvd | Suite K | ABERDEEN
www.SandhillsHearing.com

910-969-9005

The Backbone of Spinal Care

FirstHealth
NEUROSURGERY

www.firsthealth.org/neurosurgery

Treating disorders of the spine is the backbone of our neurosurgical team's efforts. Our board certified neurosurgeons don't just treat the symptoms of back pain using the state-of-the art technologies we have at our disposal. Here at **FirstHealth,** we share our diagnostic findings as well as our recommendations for treatment and procedures…keeping patients comfortable and well-informed.

43-50-18

FOR MORE INFORMATION, CALL US AT (855) 535-8700