

13TH ANNUAL OHIO

***Employee
Health &
Wellness***
CONFERENCE

**Importance of Sleep – Sleepiness in the
Workplace, Cost of a Sleepy Company,
Current State of America’s Sleepy
Workforce and Best Workplace
Practices to Keep Your Employees
Alert & Productive**

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8:55 a.m. to 9:30 a.m.

Biographical Information

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Dr. Pleister was an assistant professor of clinical medicine at the Wexner Medical Center at The Ohio State University from 2009 and 2010 and again from 2015 to 2018. He worked in the Division of Cardiovascular Medicine, Division of Pulmonary, Allergy, Critical Care, and Sleep Medicine in the Department of Internal Medicine.

During this time, he practiced medicine and conducted research, publishing numerous articles in peer reviewed scientific journals on sleep apnea, heart failure, and cardiovascular disease. He also taught medical students.

Dr. Pleister joined the Ohio Sleep Medicine Institute in June of 2018 where his responsibilities as a clinical and research associate encompass patient care as well as clinical research.

Dr. Pleister is board eligible in internal medicine and sleep medicine. He received his medical degree from the Medical College of Wisconsin in Milwaukee, Wisconsin. He completed his residency in internal medicine at The Wexner Medical Center at The Ohio State University where he subsequently pursued multiple fellowships in Cardiovascular Medicine Research, Cardiovascular Medicine Clinical, Advanced Heart Failure and Cardiac Transplant, in addition to Sleep Medicine.

Importance of Sleep for Employee Health, Productivity, & Well-Being

Annual Ohio Employee Health & Wellness Conference
Columbus, Ohio
August 21, 2018

OHIO **SLEEP MEDICINE** INSTITUTE



Adam Pleister, MD

Clinical and Research Associate

Dublin and New Albany, Ohio

Outline

- ✦ Sleepiness in the Workplace
- ✦ Cost of a Sleepy Company
- ✦ Current State of America's Sleepy Workforce
- ✦ Best Workplace Practices to Keep Your Employees Alert & Productive

Sleep Health & Work

- ✦ Sleepiness can have a serious negative impact in the work place
- ✦ Excessive sleepiness has many causes:
 - ⤵ sleep disorders
 - ⤵ medications
 - ⤵ extended work hours
 - ⤵ chronic sleep deprivation

Consequences of excessive sleepiness at work

- ✦ Excessive sleepiness can lead to:
 - › decreased productivity
 - › difficulty with concentration
 - › irritability
 - › disruption of interpersonal relationships with co-workers
 - › increased errors
 - › an increased risk for serious accidents
(including falling asleep at the wheel while driving a motor vehicle)

Consequences of excessive sleepiness at work

- ★ Certain professions have strict regulations regarding an individual's eligibility to work if they have excessive sleepiness resulting from a sleep disorder
- ★ Truck drivers, airline pilots and workers seeking to obtain a commercial drivers license (CDL) are routinely screened for obstructive sleep apnea or other sleep disorders such as narcolepsy

Why it is important to address sleepiness in the workplace?

- ✦ Addressing sleep issues can increase employee productivity and safety
- ✦ Approximately 25% of the American workforce works on a rotating or shift work schedule
 - › Shift-Work Sleep Disorder is very common in this population and manifests as excessive sleepiness on the job or difficulty sleeping (insomnia) when at home

Why it is important to address sleepiness in the workplace?

- ✦ Driving a motor vehicle while sleepy can have dangerous consequences leading to traffic accidents and falling asleep at the wheel while driving
- ✦ The Department of Transportation (DOT) now requires screening for sleep disorders in DOT physicals

Why it is important to address sleepiness in the workplace?

- ✦ Sleep disorders can lead to numerous chronic health consequences, including high blood pressure, stroke, heart failure, & heart attack
- ✦ Best practice includes a long-term treatment management plan for all patients with sleep disorders to maximize their overall general health and sense of well-being
 - ☾ A good night's sleep is not a luxury, it is a necessity



Sleepiness in the Workplace

- ✦ Healthy sleep is now recognized as a vital element to our general sense of well-being
- ✦ A healthy and productive workforce can make a difference in staying competitive, optimizing innovation and productivity
- ✦ To develop such a competitive mindset, employees need to feel and be healthy, starting with a good night's sleep



The Cost of a Sleepy Company

- ✦ According to a 2005 National Institutes of Health consensus statement:
 - ✦ 30% of Americans suffer from disrupted sleep
 - ✦ 10% suffer from daytime impairment or sleepiness
 - ✦ Consistent with insomnia



The Cost of a Sleepy Company

- ✦ The 2009 National Sleep Foundation poll reported that:
- ✦ 1 out of 4 workers with a sleep problem is unable to work well and efficiently due to sleepiness

The Cost of a Sleepy Company

- ✦ Addressing detection, diagnosis and treatment of sleep issues to counter the lack of productivity is critical
- ✦ Especially when results from a study conducted among four U.S. corporations report that fatigue related drop in productivity costs those companies an astounding \$1,967/employee annually

The Current State of a Sleepy Workforce

- ★ The 2008 Sleep in America poll conducted by the National Sleep Foundation on sleep and performance in the workplace found that among working respondents:
 - › 49% woke up feeling unrefreshed at least a few nights a week in the past month
 - › 44% report experiencing a sleep problem every night or almost every night

The Current State of a Sleepy Workforce

- ★ The 2008 Sleep in America poll:
 - › 29% have fallen asleep or became very sleepy while they were at work because of sleepiness or because they have a sleep problem in the past month.
 - › 12% were late to work due to sleepiness or a sleep problem in the past month
 - › 32% have driven drowsy at least once per month during the past year

The Current State of a Sleepy Workforce

- ★ The 2008 Sleep in America poll:
 - › 33% snored at least a few nights a week in the past month
 - › 15% reported having unpleasant feelings in their legs at least a few nights
 - › 25% of those reporting sleepiness (reported being sleepy) are unable to work well and efficiently because they are too sleepy

Who Should be Concerned?

★ Shift workers

- › One out of every three Americans working on shifts report that sleepiness interferes with their daily activities
- › More than half of all shift workers admit to falling asleep on the job at least once a week (2000 National Sleep Foundation Poll)

Who Should be Concerned?

★ Workers with untreated sleep disorders

- › Such as sleep apnea, insomnia, restless leg syndrome, narcolepsy
- › Sleep disorders can cause sleep fragmentation, which prevents quality restorative sleep and results in an accumulated sleep debt

Who Should be Concerned?

★ Workers with long hours or shift work

- › A demanding work schedule often prevents workers from getting enough sleep and frequently causes a chronic sleep deprivation

Who Should be Concerned?

★ Employers

- › A sleepy workforce affects the bottom line and is associated with many hidden costs for a company in terms of decreased productivity, work errors, and absenteeism
- › One-half of the American work force reports that sleepiness on-the-job interferes with the amount of work they get done (2000 National Sleep Foundation poll)

The Causes

- ✦ Sleep issues among employees are pervasive and overlooked for multiple reasons:
 - › Sleep problems in the work force are under-appreciated
 - › Sleep-health education is almost non-existent
 - › Sleep disorders are under-recognized or often misdiagnosed
 - › Sleep-health management or care is inadequate

Optimal Sleep Hygiene

- ✦ Keep a consistent sleep schedule. Get up at the same time every day, even on weekends or during vacations
- ✦ Set a bedtime that is early enough for you to get at least 7 hours of sleep
- ✦ Don't go to bed unless you are sleepy

Optimal Sleep Hygiene

- ✦ If you don't fall asleep after 20 minutes, get out of bed
- ✦ Establish a relaxing bedtime routine
- ✦ Make your bedroom quiet and relaxing. Keep the room at a comfortable, cool temperature
- ✦ Use your bed only for sleep and sex

Optimal Sleep Hygiene

- ✦ Limit exposure to bright light in the evenings
- ✦ Turn off electronic devices at least 30 minutes before bedtime
- ✦ Don't eat a large meal before bedtime. If you are hungry at night, eat a light, healthy snack

Optimal Sleep Hygiene

- ✦ Exercise regularly and maintain a healthy diet
- ✦ Avoid consuming caffeine in the late afternoon or evening
- ✦ Avoid consuming alcohol before bedtime
- ✦ Reduce your fluid intake before bedtime

Optimal Sleep Hygiene: Driving Tips

- ✦ Do not drive a motor vehicle if excessively sleepy
- ✦ Nap before driving home, if possible, if you are excessively sleepy
- ✦ Car pool, if possible, and have the most alert person do the driving

Optimal Sleep Hygiene: Driving Tips

- ✦ Consider taking public transportation if available
- ✦ Wear sunglasses at the end of the shift when driving home if there is sunlight and you wish to sleep when getting home

Optimal Sleep Hygiene: Tips for Work

- ✦ Take short breaks throughout your shift to break up monotony
- ✦ Exercise during breaks if possible

Optimal Sleep Hygiene: Tips for Work

- ✦ Try to work with a partner since conversation can keep you more alert
- ✦ Don't leave the most boring tasks for the end of your shift since this is when you feel most drowsy

Shift Work Disorder

- ✦ Approximately 25% of the American work force works on a rotating or night shift schedule
- ✦ Shift work sleep disorder is characterized by excessive sleepiness when you wish to be awake (often during the night shift) and difficulty sleeping when you wish to be in bed

Shift Work Disorder

- ✦ Of those who work the night shift, 40-80% have sleep complaints, and 5-20% report moderate to severe sleep problems
- ✦ Excessive sleepiness while working on the night shift not leads to decreased productivity

Shift Work Disorder

- ✦ The Chernobyl (1986) and 3-Mile Island (1979) nuclear disasters, as well as the Exxon Valdez oil tanker grounding (1989), all occurred between the hours of 12:00 and 4:00 AM
- ✦ Found to be caused errors made secondary to excessive sleepiness while working on the night shift

Shift Work Disorder

- ✦ Although the space shuttle Challenger explosion (1986) occurred at 11:38 AM, the erroneous decision to launch the shuttle was made by the team working during the night shift

Shift Work Disorder

- ✦ Sleep deprivation can lead people to think and move more slowly, make more mistakes, and become more forgetful
- ✦ Lack of sufficient sleep can cause irritability, impatience, anxiety, depression and lowered productivity

Shift Work Disorder

- ✦ Sleep deprivation costs U.S. businesses \$150 billion a year in accidents and decreased productivity
- ✦ Shift workers are also more likely to experience stomach problems, menstrual irregularities, illness, weight gain, heart problems, high blood pressure, and a higher risk for diabetes than day workers

Shift Work Disorder

- ✦ As much as possible, you should try to maintain a strict sleep-wake schedule
- ✦ Keeping the same schedule, even on days off from work, is the ideal way to synchronize your brain's internal clock with the desired external schedule

Shift Work Disorder

- ✦ Although it is sometimes not possible to maintain the same schedule on days off, you should avoid frequently rotating shifts
- ✦ The more the schedule shifts, the more difficult your brain's internal circadian clock will have in adapting to the schedule, and the more insomnia or excessive sleepiness you will experience

Shift Work Disorder

- ✦ While working the night shift, it is important to minimize or avoid caffeine-containing products
- ✦ Especially during second half of the shift before going home, since any stimulant consumption will prevent you from being able to initiate or maintain sleep once going to bed at the end of the shift

Shift Work Disorder

- ✦ Although keeping the work environment well lit with bright light can help maintain alertness while working at night –
- ✦ You should also avoid bright light exposure prior to going to bed since it will decrease your ability to sleep.

Shift Work Disorder

- ✦ If there is daylight at the end of the shift and you plan on sleeping once you get home, it is recommended to wear sunglasses during the drive home.
- ✦ It is also very important to keep the bedroom dark and quiet by using heavy curtains to keep out sunlight and turning off or unplugging the telephone so that sleep will not be disrupted.

Obstructive Sleep Apnea (OSA)

★ High Prevalence

› 2-5 percent of general population

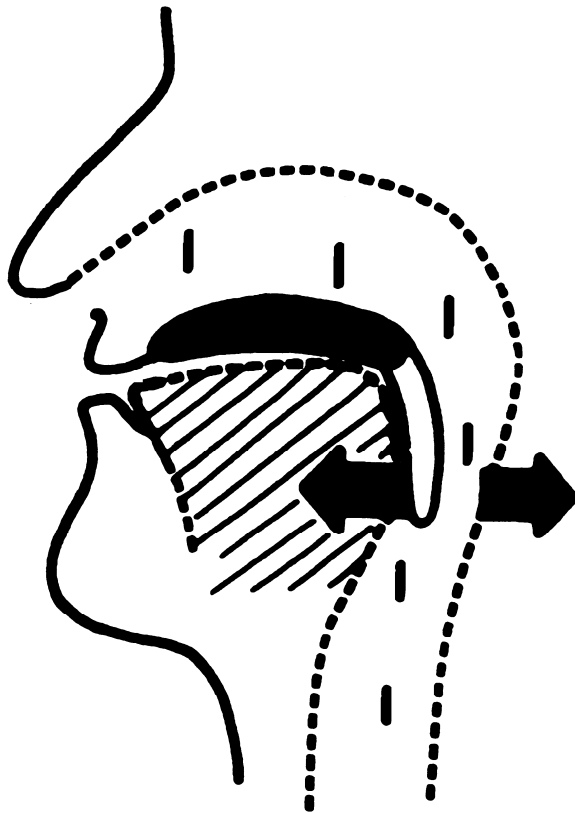
- 15% of middle-aged men

› 24 percent of adults > 65 years of age

★ Chronic disorder

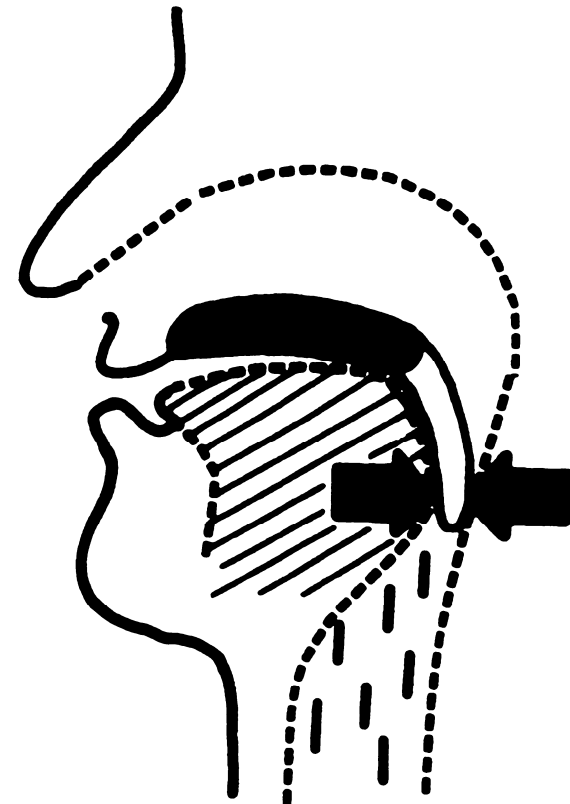
Obstructive Sleep Apnea

Normal



Normal contraction of pharyngeal dilators during inspiration maintains airway patency

OSA



Obstruction generally at level of retrolingual posterior airway space or from palatal tissue

Intermediary Mechanisms of Cardiovascular Disease in OSA

Increased Coagulation

- ✦ Platelet aggregability increases in OSA.
 - › Platelet function normalizes following CPAP.
 - › Role of \square nocturnal catecholamines?
 - Bokinsky et al. *Chest*. 108:625-630, 1995.
- ✦ Hematocrit, fibrinogen and blood viscosity are increased in OSA patients and decrease following CPAP.
 - › Predisposition to clot formation.
 - Wessendorf et al. *Am. J. Respir. Crit. Care Med.* 162:2039, 2000

Intermediary Mechanisms of Cardiovascular Disease in OSA

Metabolic Dysregulation

- ✦ Leptin is an adipocyte-derived hormone that suppresses appetite and promotes satiety.
- ✦ OSA associated with leptin resistance.
 - ⤵ Men with OSA have higher leptin levels than similarly obese men without OSA.
 - Phillips et al. *Am J. Physiol. Heart Circ. Physiol.* 279:H234, 2000.
- ✦ Treatment with CPAP reduces leptin levels.
 - Chin et al. *Circulation.* 100:706-712, 1999.

Metabolic Dysregulation

✦ Insulin resistance

› Role of sleep deprivation, sympathetic activation, and leptin resistance?

✦ Patients with OSA have higher levels of fasting glucose, insulin, and glycosylated hemoglobin, independent of body weight.

› Severity of OSA correlates with degree of insulin resistance.

• Ip et al. *Am. J. Respir. Crit. Care Med.* 165:670-676, 2002.

✦ Severe OSA associated with 5-fold increased risk of overt diabetes mellitus.

• Elmasry et al. *J. Intern. Med.* 249:153-161, 2001.

Hypertension and OSA

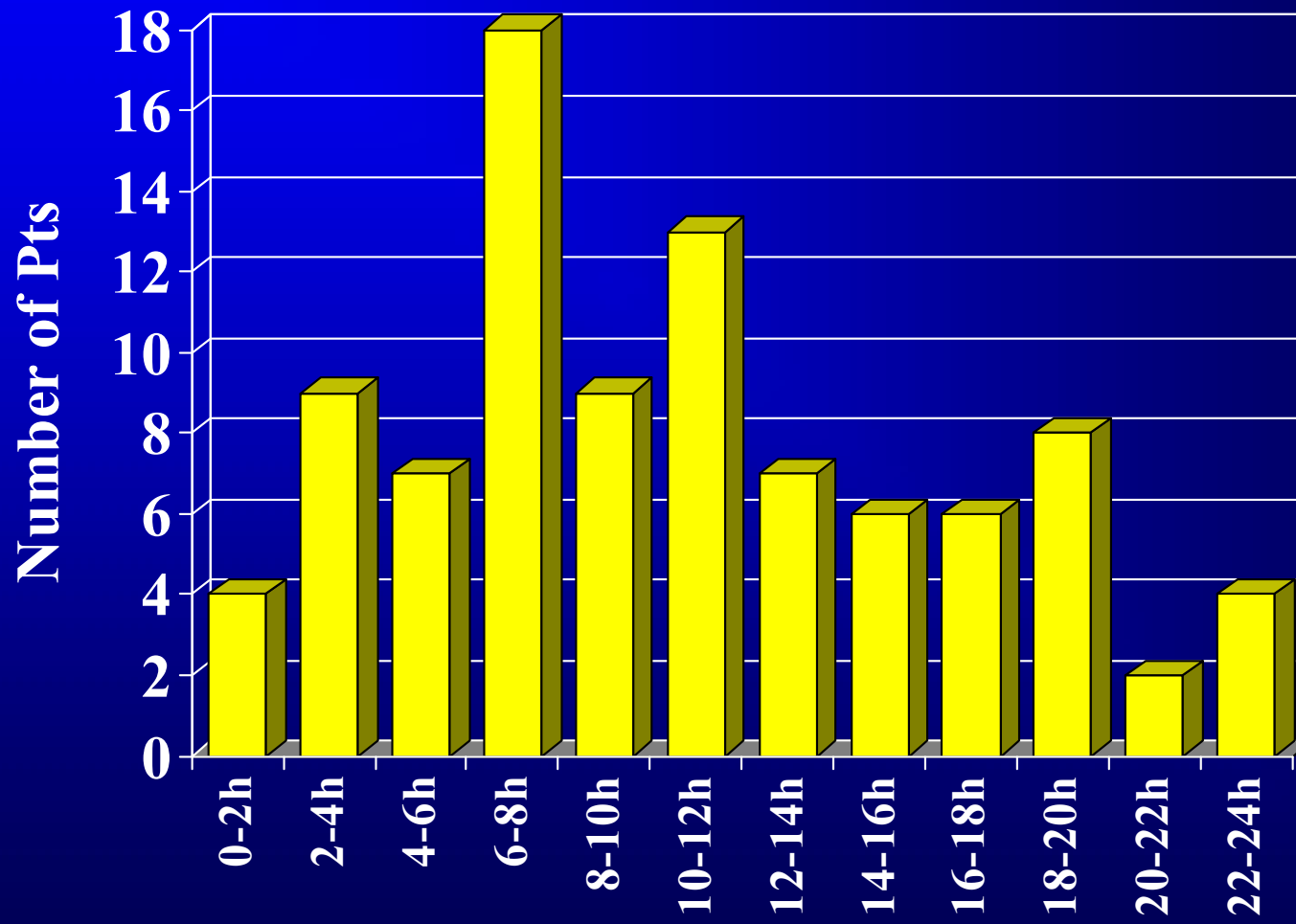
Hypertension

- ✦ Present in 40-60% of OSA patients.
- ✦ OSA independent risk factor for developing HTN (2-3 fold)
 - › Prospective *Wisconsin Sleep Cohort study* (N Engl J Med, 342:1378-1384, 2000)
 - › Retrospective *Sleep Heart Health Study* (JAMA. 283:1829-1836, 2000)
 - › Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure
 - Published in 2003: have now included OSA as first on list of identifiable causes of HTN.

Hypertension and OSA

- ✦ Role of sympathetic activation.
- ✦ Treatment with CPAP significantly lowers daytime blood pressure in moderate to severe OSA.
- ✦ Unclear benefit of CPAP in mild OSA.

Circadian Temporal Pattern of Stroke



Bassetti C. and Chervin R. Cerebrovascular disease. In: Kryger et al. (Eds).
Principles and Practice of Sleep Medicine 3rd Edition. 2000

Effects of CPAP Treatment

- ✦ Normalization of Cerebral blood velocities
- ✦ Elimination of hypoxic episodes
- ✦ Improvement in hypertension
- ✦ Reduction in sympathetic activity
- ✦ Normalization of morning blood viscosity
- ✦ Normalization of morning fibrinogen levels

Cardiac Ischemia and OSA

- ★ ST-segment depression common during apneic events in sleep of OSA patients
 - › More frequent in more severe OSA
 - Philip et al. *Sleep*. 16:558-559, 1993
 - › Correlate with oxygen desaturation and complaints of nocturnal angina.
 - › CPAP therapy normalizes ST depression in sleep.
 - Peled et al. *J. Am. Coll. Cardiol.* 34:1744, 1999.
- ★ In a five year follow-up of patients with established CAD, higher mortality in patients with OSA (38%) compared to those without OSA (9%)
 - Peker et al. *Am J. Respir. Crit. Care.* 162:81-86, 2000.

Mechanisms of Cardiac Ischemia

★ Acute

- › Hypoxemia
- › Hypercapnia
- › Sympathetic activation
- › Surges in blood pressure during sleep

★ Chronic

- › Hypertension
- › Endothelial dysfunction
- › Oxidative stress
- › Inflammation (role of adhesion molecules)
- › Increased coaguability

CHF and OSA

- ★ Strong epidemiological association between OSA and CHF (congestive heart failure)
- ★ Patients with CHF and diastolic dysfunction are especially likely to have OSA.
 - ☾ 50% have A+HI >10.
- ★ Central sleep apnea (CSA) is associated with poorer outcome (Cheyne-Stokes respiration).

CHF and OSA

- ✦ CPAP decreases afterload.
 - Decreases pressure gradient between LV and aorta
- ✦ LV ejection fraction improves in CHF patients following CPAP therapy.
 - Kaneko et al. *N. Eng. J. Med.* 348:1233-1241, 2003.
- ✦ CPAP therapy improves transplant-free survival times of CHF patients with OSA.
 - Role of decreasing sympathetic activation?
 - Sin et al. *Circulation.* 102:61-66, 2000.

Cardiac Arrhythmias and OSA

★ Severe bradycardia and AV block

- › Secondary to “dive reflex” response to apnea and hypoxia.
- › Bradyarrhythmias typically resolve with CPAP therapy.
- › Need to exclude OSA as cause of bradyarrhythmia prior to pacemaker placement.

★ Atrial fibrillation

- › In patients cardioverted for A-fib, untreated OSA doubles likelihood of recurrence of A-fib within 12 months.

- Kanagala et al. *Circulation*. 107:2589, 2003

★ Ventricular ectopy

Sleep Disorders

★ Narcolepsy with/without cataplexy

› Also: idiopathic hypersomnia

› Treatment: medication

- Both to improve sleep and improve wakefulness

★ Insomnia

› Difficulty falling asleep and/or staying asleep

› Treatment: behavior therapy and/or medication



Sleep Disorders

★ Restless leg syndrome

› Treatment: medication and/or iron supplementation

★ Parasomnias

› Abnormal behaviors of sleep

› Treatment: lifestyle modifications and/or medication

QUESTIONS ?

★ Thank you !!

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