



**Stanford**  
MEDICINE

Sleep Medicine Center  
*Sleep Sciences & Medicine*

# Getting Your Best Sleep in Parkinson's Disease

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## Sleep Disorders in PD: Overview

- Almost every patient with PD has a sleep disorder
- All sleep disorders can occur: Insomnia, sleep disordered breathing, RBD, RLS, circadian rhythm disorders

# Stages of Sleep

Duration of Sleep Stages

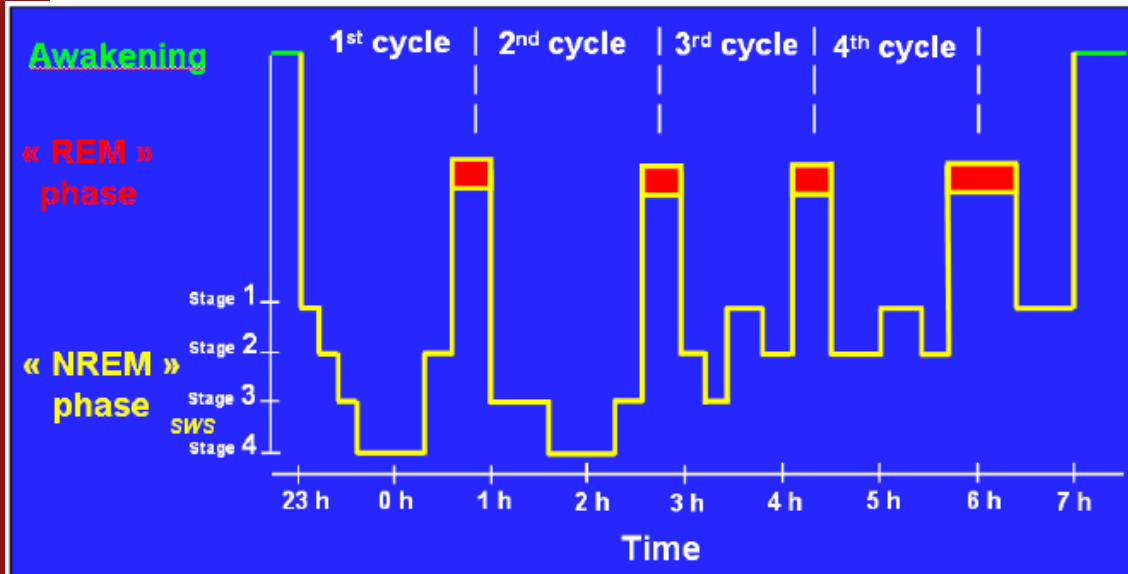
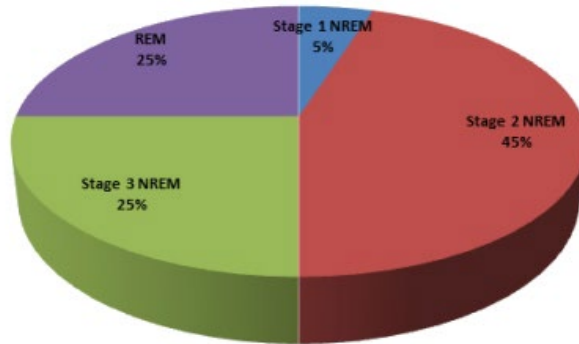


Figure 1: EEG brain wave patterns during sleep

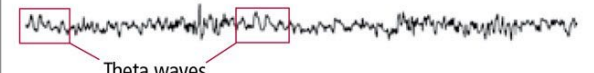
## RELAXED WAKEFULNESS

Alpha waves



## STAGE N1

Theta waves



## STAGE N2

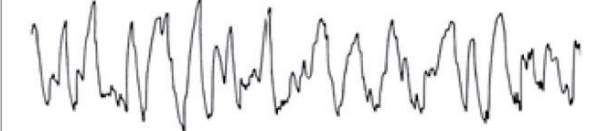
Sleep spindles

K-complex

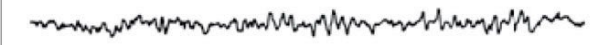


## STAGE N3 or DEEP SLEEP

Delta waves

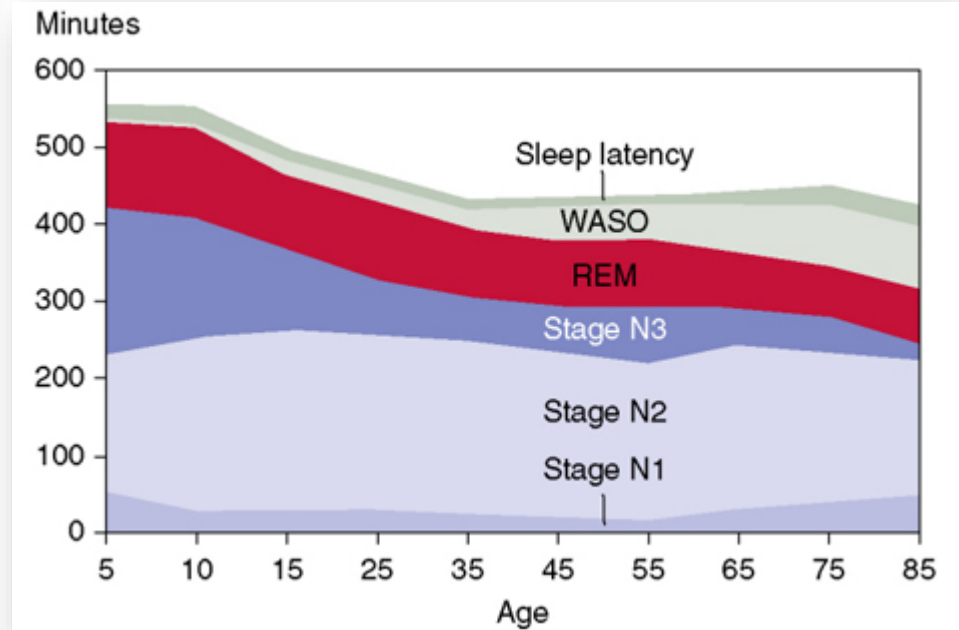
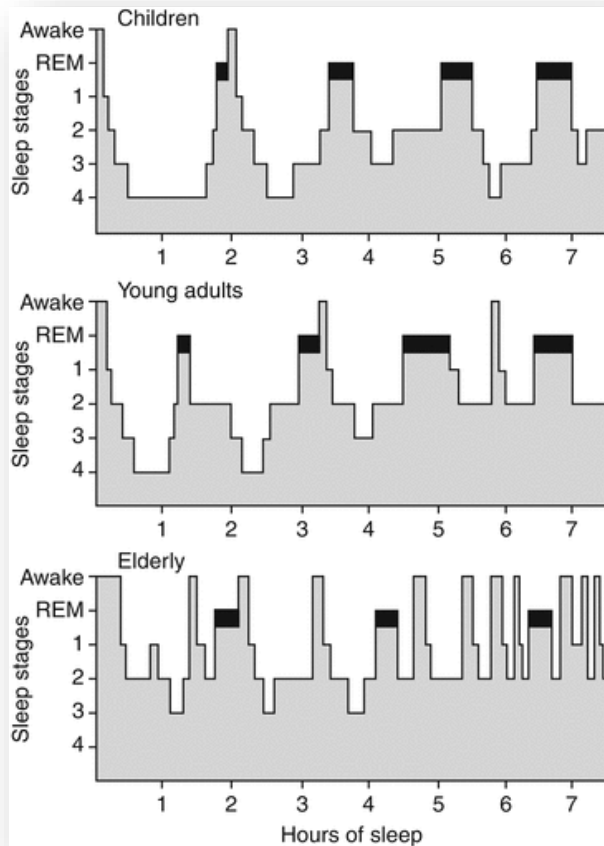


## REM or DREAMING SLEEP



Brain waves change dramatically during the different stages of sleep.

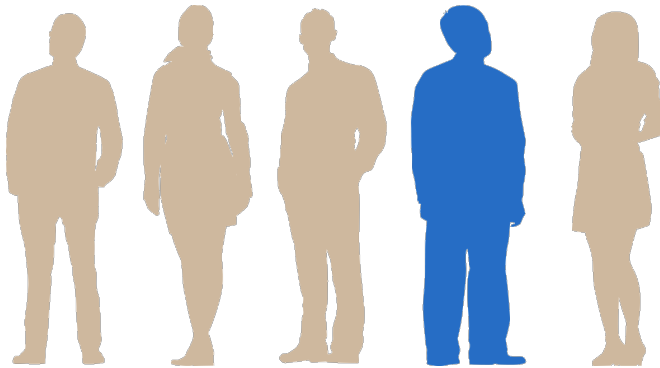
# Sleep Architecture





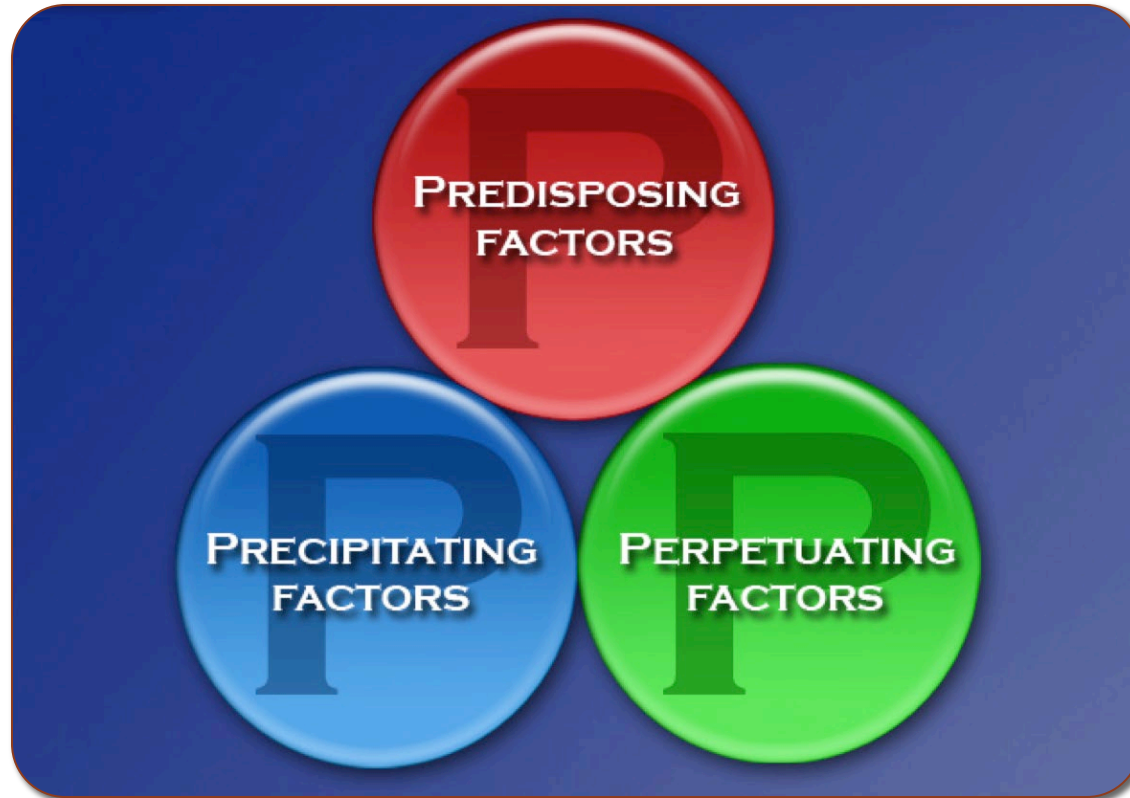
# What is Insomnia?

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- Difficulty falling asleep, staying asleep and/or waking up too early.
- Occurring at least 3x/week for at least 3 months.
- Unable to sleep despite adequate opportunity and circumstances.
- Perceived daytime distress and/or problems with daily functioning.

# Model of Insomnia: "3Ps"



## Additional Factors unique to PD that can contribute to insomnia

- Pain, Rigidity and Dystonia can cause insomnia
- The disease itself can cause more fragmented sleep
- Higher risk of RLS, OSA and RBD
- Breakdown of melatonin releasing centers in brain lead to less robust circadian rhythm
- Excessive daytime sleepiness can lead to napping during the day which makes it harder to fall asleep at night
- Nocturia is common

## Treatment: Cognitive behavioral therapy > meds

Stimulus control, progressive muscle relaxation, biofeedback, sleep restriction, cognitive behavioral therapy and combination therapy are effective therapies in the treatment of chronic insomnia

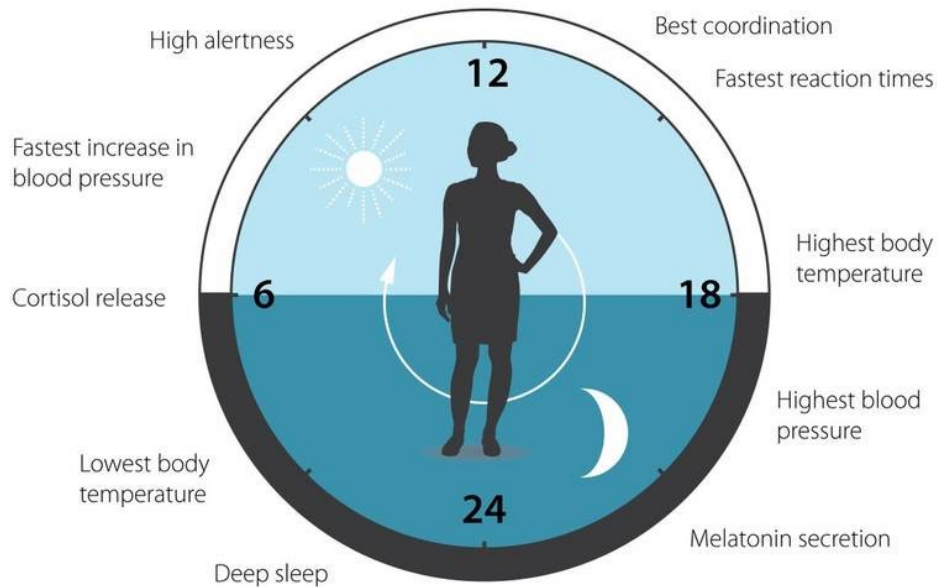
<https://www.behavioralsleep.org/index.php/united-states-sbsm-members>

“Quiet your mind and get to sleep,” Carney and Manber

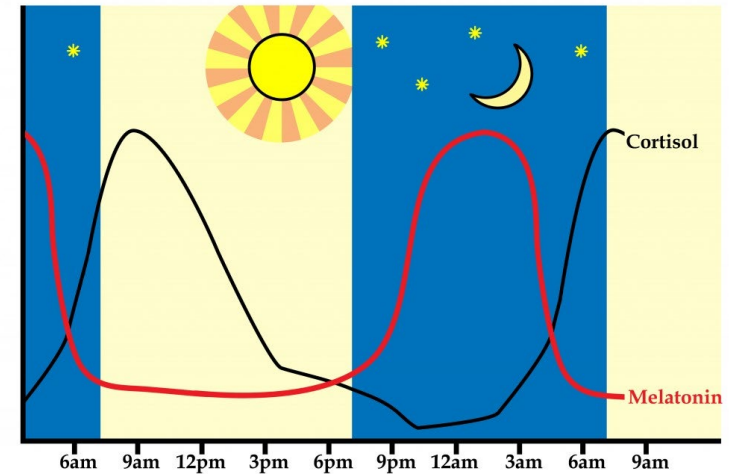
## Which medications do we use?

- Gabapentin
- Trazadone
- Melatonin
- Belsomra
- Try to stay away from benzodiazepines or “Z drugs” (ambien, Lunesta, sonata)

# What is a circadian rhythm?



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# Zeitgebers (time givers)

- Light\*
- Atmospheric conditions
- Medication
- Temperature
- Social interactions
- Exercise
- Eating/drinking patterns

# Restless Legs Syndrome: URGE (Willis-Ekbom disease )

- An unpleasant sensation and Urge to move
- Worse with Rest
- Gets better with movement
- Worse in the Evening (circadian rhythmicity)

“When you try to relax in the evening or sleep at night, do you ever have unpleasant, restless feelings in your legs that can be relieved by walking or movement?”

1/3 PD patients



# RLS does not occur when you are sleeping!

Common misunderstanding

You do not need a sleep study to dx RLS

RLS is a sensory symptom that by definition occurs when a patient is awake

Leg movements during sleep are called periodic limb movements and not RLS, not necessarily clinically relevant

Most patients with RLS have PLMs, however not all patients with PLMs have RLS

# RLS: Exacerbating factors

- Medications (beta-blockers, antihistamines, neuroleptic agents, dopamine-blocking antiemetics, neuroleptics, lithium, and most antidepressants (all except bupropion))
- Nocturnal exercise
- Large meals close to bedtime
- Alcohol
- Caffeine
- Nicotine

## Treatment: Iron replacement

Check Ferritin levels for every pt with RLS

If Ferritin <60, tx with iron sulfate 325mg BID, with 200mg vitamin C BID to aid absorption

Recheck ferritin 3 months to ensure iron repletion

IV iron may be considered for refractory patients.

## Treatments: Pharmacologic

- When to treat? If patient having sx more than twice weekly, daily preventative treatment recommended
- Dopamine agonists (pramipexole, rotigotine, rotigotine transdermal)
- Alpha-2-delta ligands (gabapentin, pregabalin, gabapentin enacarbil)
- L-Dopa PRN
- Opiates (methadone, PRN hydrocodone, tramadol)
- Benzodiazepines- clonazepam, temazepam

# Augmentation

Rate of 9% per year in patients taking DA<sup>1</sup>

Also reported with tramadol

Increases with higher doses and shorter half life

Once augmentation develops, goal is reduce or eliminate DA dose

Cross taper with another agent, such as alpha-2-delta, or rotigotine patch

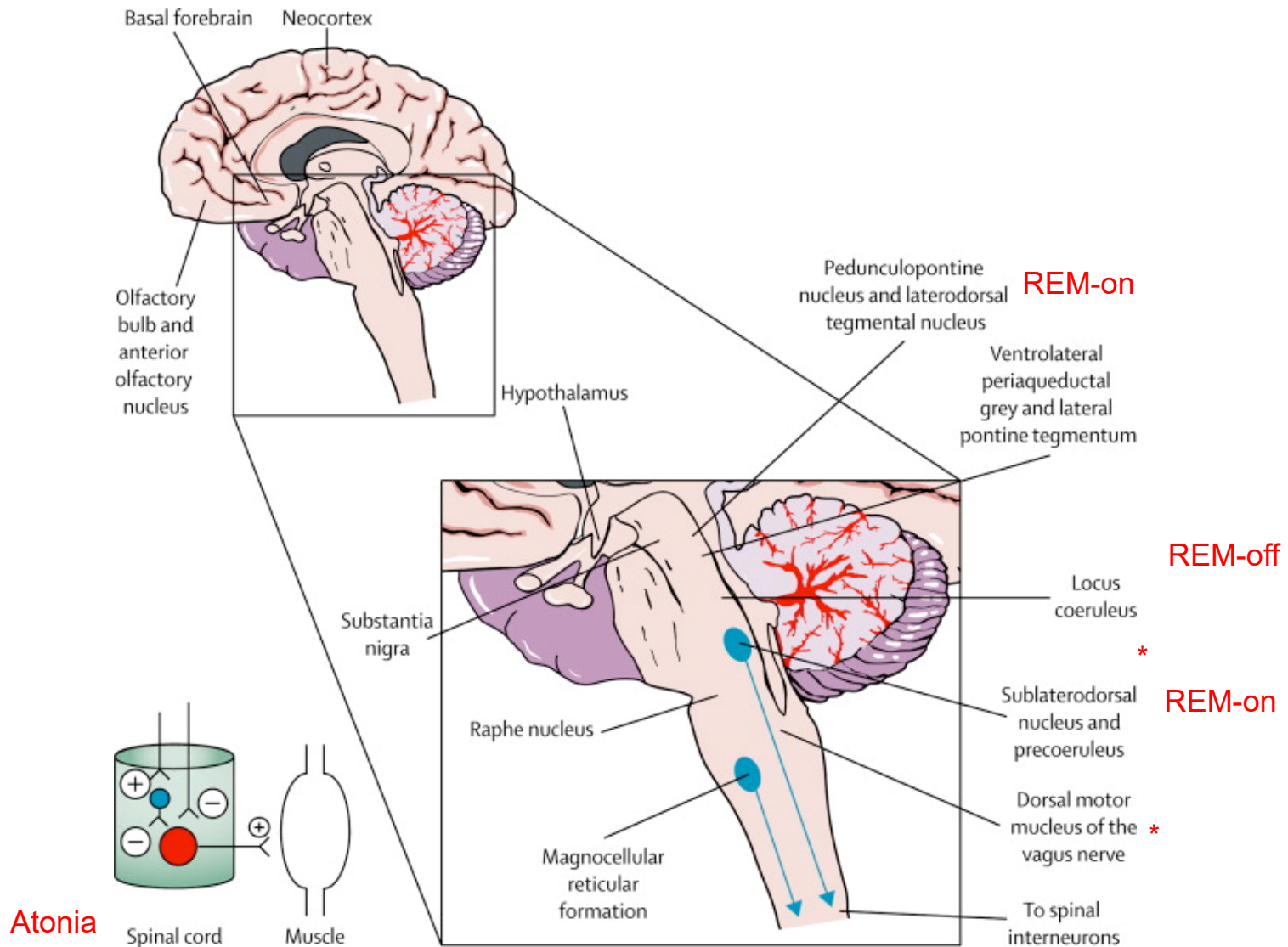
# REM Sleep Behavior Disorder



## RBD and PD

- Occurs in ~50% patients
  - Broad range of manifestations (fight, vocalizations)
  - Walking is rare (patients can hit the floor, then usually wake up)
  - High rate of injury to:
    - self (60%)
    - bed partner (>20%)
- Self-awareness is limited (<60%)

Single Item RBD Screen: “Have you ever been told, or suspected yourself, that you seem to act out your dreams while asleep (for example punching, flailing your arms in the air, making running movements?”



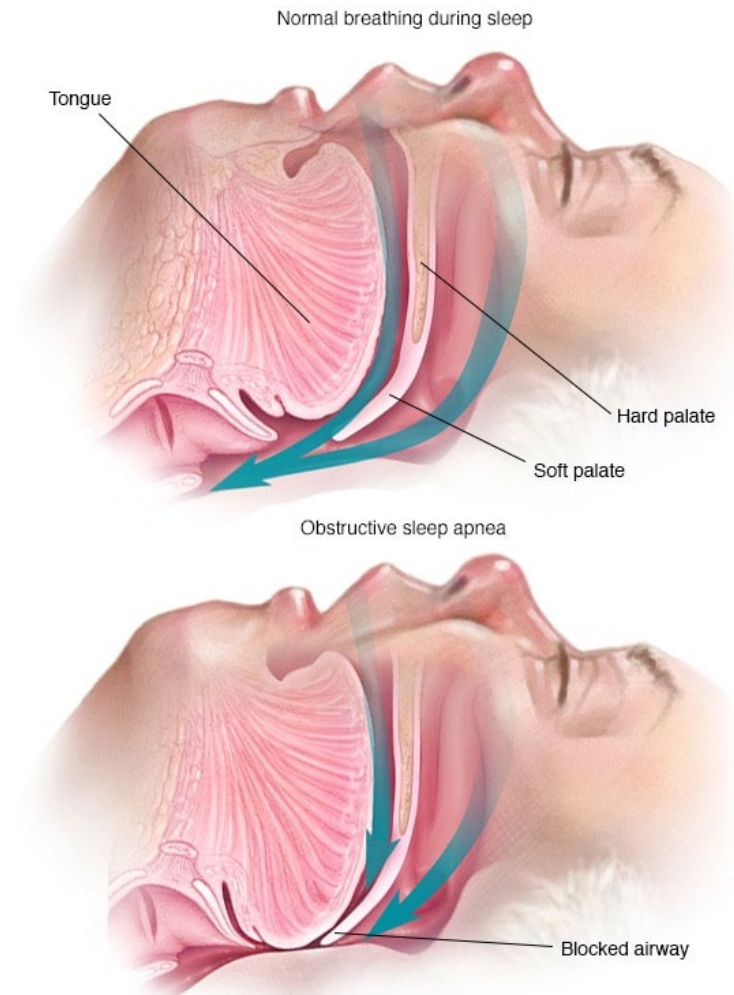
From Boeve et al., NEJM



## RBD: Treatment

- Modify sleep environment to protect patient and bed partner (sleep-related injuries to the affected person or bed partner occur in approximately 1/3 of cases)
- Melatonin (3-12 mg)
- Clonazepam 0.25-1mg

# Obstructive Sleep Apnea



# Symptoms of Sleep Disordered Breathing

Excessive sleepiness

Snoring

Frequent awakenings

Pauses in breathing

Gasping, choking

Morning dry mouth, headaches, nausea

Unrefreshing sleep

# Treatment

Treatment of OSA and stridor: CPAP or Bilevel

Treatment of Central Sleep Apea: Bilevel ST or ASV

If OSA well treated and excessive daytime sleepiness persists:  
consider modafinil (100-200mg 1-2x daily) or sunosi (75-150mg daily)

When do you need a sleep study?

Diagnosis of sleep disordered breathing or RBD

Treatment study to determine optimal  
CPAP/Bilevel/ASV pressure



Thank you!

