

# Sleep & Wakefulness Disorders in Parkinson's Disease:



## The Challenge of Getting a Good Night's Sleep

Helene A. Emsellem, MD

March 25, 2017

The Center for Sleep & Wake Disorders

PFNCA Symposium

Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z

# Sleep is mandatory... eventually



**SURVIVAL:**

**water, food, air  
& SLEEP**





# What is sleep & what does it do?

- Restores us physically
- Resets us psychologically
- We learn during sleep
- Mood is dependent on sleep
- Caloric management is sleep dependent

# Sleep? .... What happens when we don't get enough?

- Impaired cognitive function
  - difficulty with FOCUS, ATTENTION & CONCENTRATION
  - irritability
  - impaired memory
  - Impaired inhibitory control
  - subjective sleepiness
    - prolonged auditory reaction time
    - prolonged visual reaction time



Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z

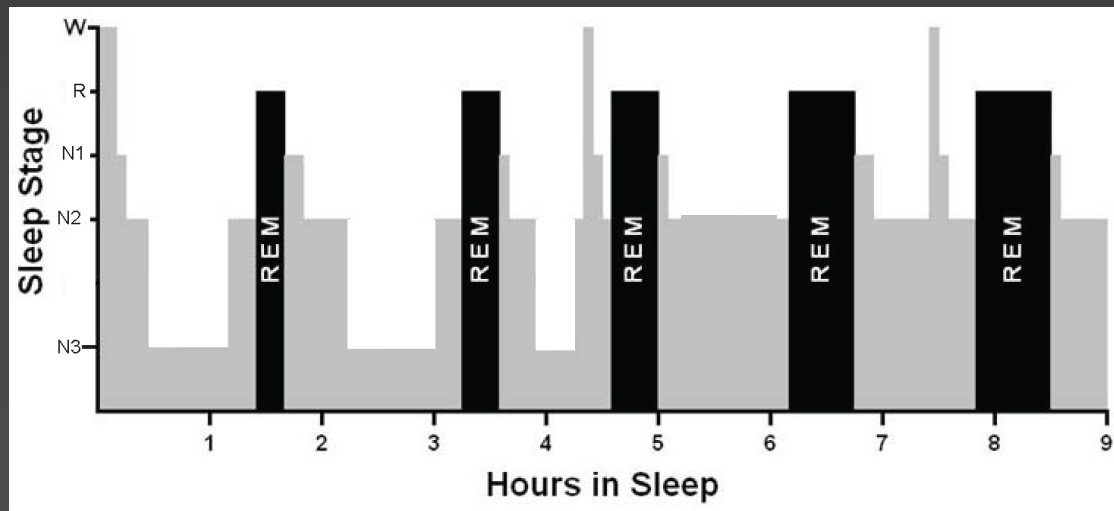
# Impaired motor function

- Prolonged motor reaction time
- Tremor
- Incoordination
- Blurred vision



# Sleep is a dynamic process:

- Each stage has a unique purpose
- Must cycle thru all stages
  - adequate time in each stage
  - orderly sequence



Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z



# Sleep

## Synaptic Homeostasis Hypothesis

During the day we acquire info & build connections .....

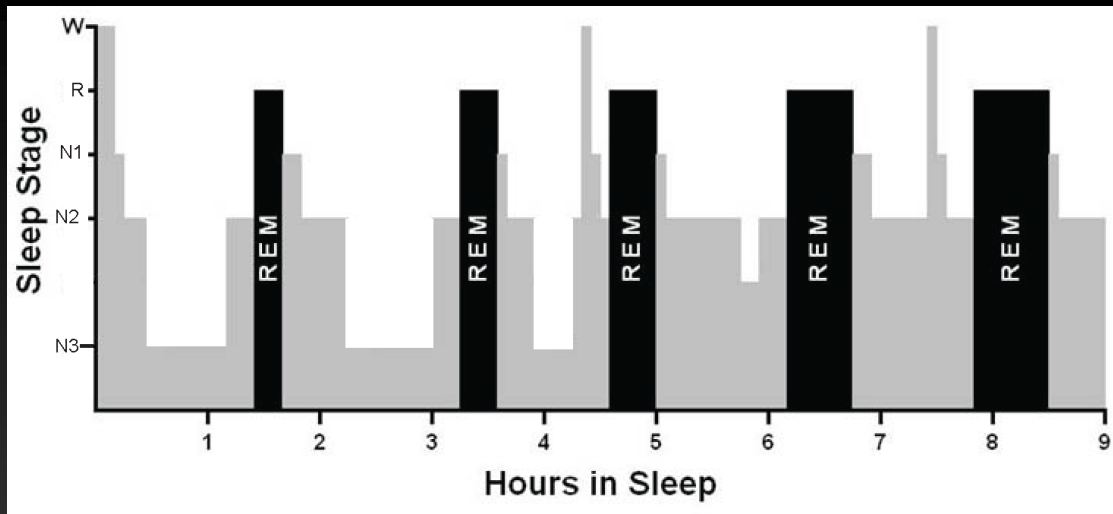
.....At night we downscale and clean up

“Sleep is the price we pay for plasticity”





Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z



- The more we use a brain region during the day → more local slow wave sleep activity is needed to clean up at night

# STATES of BEING

Wakefulness

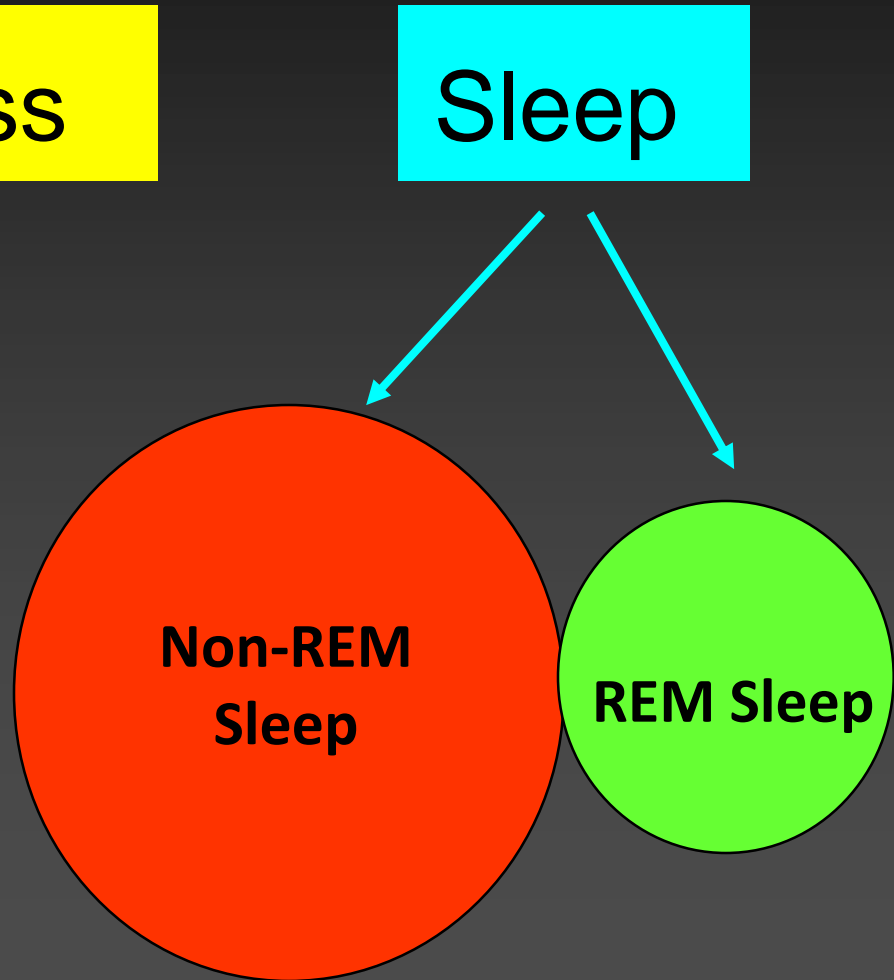
Sleep

..... and many  
ambiguous  
states in  
between.....

... and sleep-  
related  
phenomena

Non-REM  
Sleep

REM Sleep



# REM Sleep

- Dreaming
- No memories of the dream process formed
- Cognitive cortex off line
- Muscle paralysis (atonia)
- Rapid eye movement (REM) bursts
- **LEARNING & CREATIVITY**

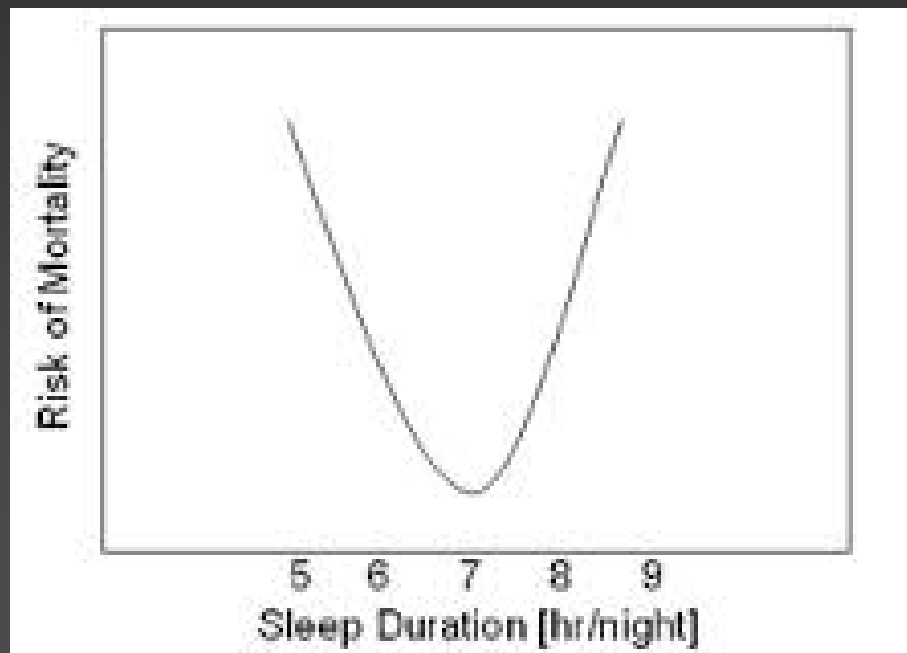



Positive effect of sleep on learning does not occur if sleep restricted!!!!



# Sleep Requirements

Adults .... including seniors:  
7-9 hrs





# Medical & Social Implications of Disrupted & Insufficient Sleep in PD

- Aggravation of underlying PD symptoms
- Impaired responsiveness to medication
- Impaired social function
  - ↑ irritability, mood disorder
  - ↑ hypophonia
- Difficulty with weight control

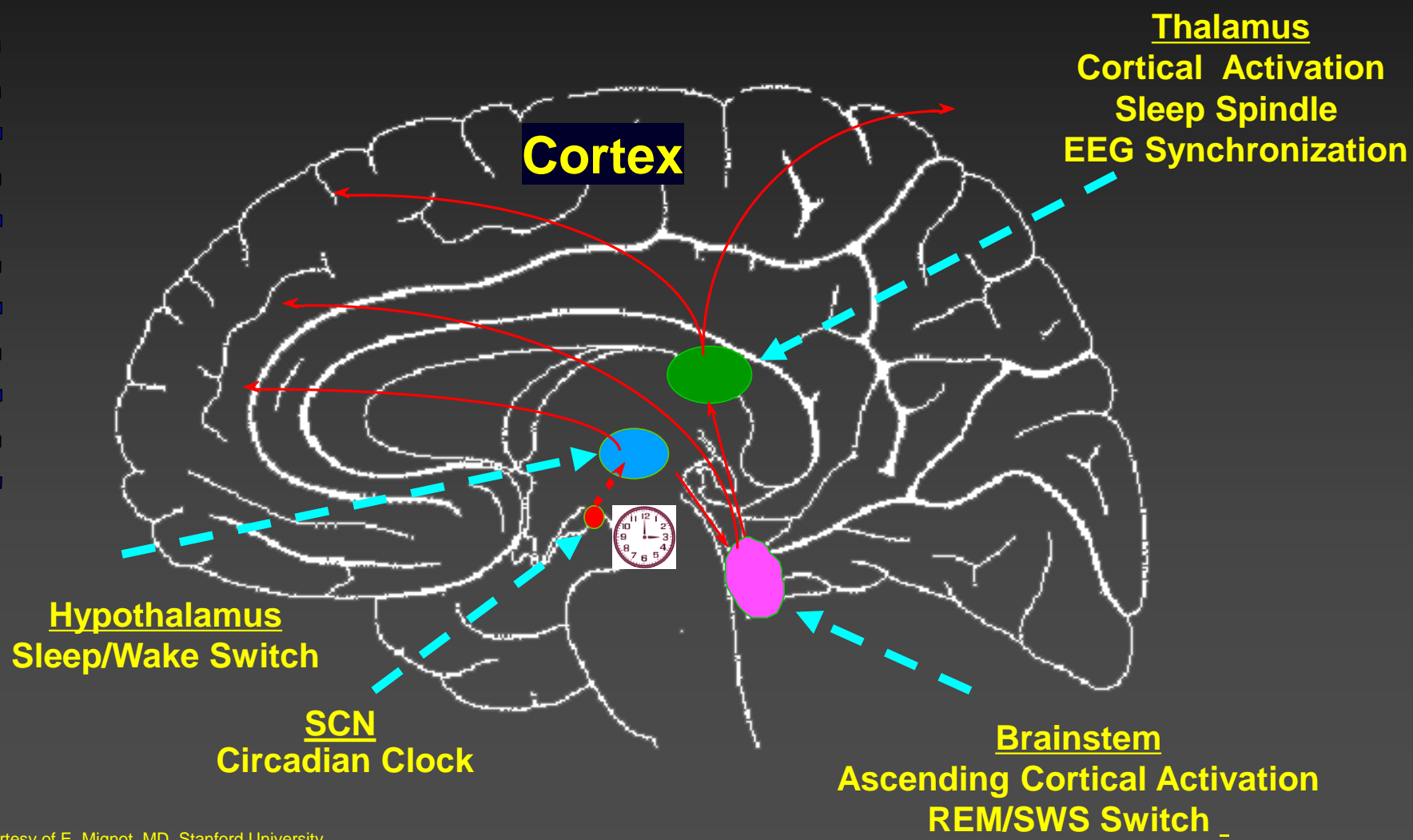


# Parkinson's & Sleep Disorders

- Sleep-wake abnormalities are found in >60% of patients
- More severe PD: ↑ sleep disturbance
  - Nocturnal sleep abnormalities: 60-98%
  - Daytime sleepiness: 15-51%

Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z

# Sleep & Wake Regulation



Courtesy of E. Mignot, MD, Stanford University.



# Disorders of Sleep-Wake in PD

1. Insomnia & Fragmentation of sleep
2. Excessive daytime sleepiness
3. Obstructive Sleep Apnea
4. Periodic Limb Movements of Sleep
5. REM Sleep Behavioral Disorder
6. Disturbed Sleep-Wake Timing (?)



# 1. Insomnia & fragmentation of Sleep

- Sleep onset difficulty
  - Anxiety
  - Medication side effects
- Frequent arousals
  - Tremor during sleep
  - Rigidity (may disturb transition into sleep & repositioning during the night)
- Other sleep disorders:
  - Sleep apnea
  - REM sleep behavioral disorder
  - Periodic limb movements of sleep
- Concurrent depression
- Altered sleep timing (circadian rhythm)

# Is INSOMNIA due to:

- A disorder of the brain's ability to initiate or maintain sleep

OR

- A disorder of the brain's ability to turn alertness OFF

Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z



“Light is a DRUG that promotes WAKEFULNESS”



Charles A. Czeisler, PhD, MD • Director of Sleep Medicine • Harvard Medical School

# Management of Insomnia in PD

- Monitor sleep pattern (keep logs)
- Prioritize sleep
- Regulate the schedule
- Add a pre-bed wind-down time
- Control evening light (orange lenses)
- Disengage: Turn off electronics
- Cognitive – behavioral therapy (CBT)
- Judicious use of sleep medication
- Use of nocturnal PD meds

# Lost Environmental Sleep Cues



- BR no longer for “Ss” sleep & sex only
- Light from screens
- Intellectual engagement
- Noise
  - TV & subliminal messages



## 2. Excessive Daytime Sleepiness in Parkinson's Disease



- Sleep attacks may occur
- Prevalence: 43-56% of PD patients
- Multifactorial:
  - PD disturbs alerting brainstem pathways
  - Side effect of dopaminergic PD therapy
  - Consequence of other sleep disorders





# Measures of Sleepiness

- Subjective: Epworth Sleepiness Scale
  - 8 point rating scale of sleepiness during key activities over the past week
- Objective:
  - Daytime Multiple Sleep Latency Test (MSLT)
  - Daytime Maintenance of Wakefulness Test
    - Used to assess alertness & driving safety

Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z

# Treatment of EDS



- Optimize nocturnal sleep:
  - Quality, quantity & timing
- Identify & Treat co-existent sleep disorders
- Timed naps
- Stimulants & Wake promoting agents
  - Modafinil, r-modafinil
  - In Study: Jazz JZP-110 specifically being studied for sleepiness in Parkinson's disease



# Cardinal Symptoms of OSA

Loud snoring.... but not always

Excessive daytime sleepiness

Obesity ... but not always

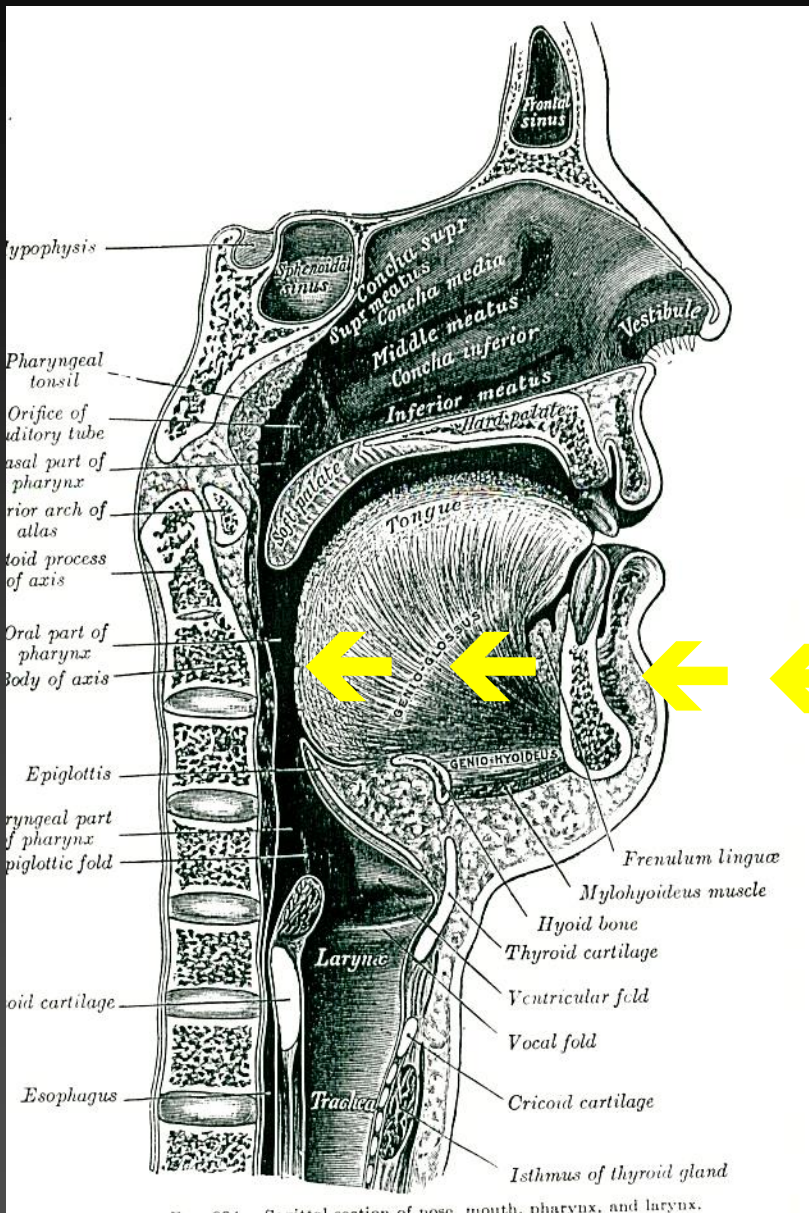
Less frequent associated symptoms

- sleep onset insomnia

- multiple nighttime awakenings

- fatigue

- cognitive impairment



# AIRWAY

Nose: cartilage

Mouth: boney palate

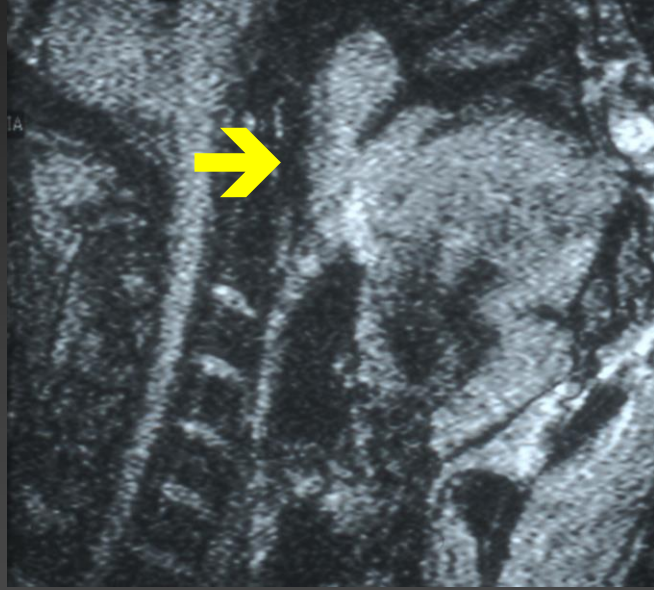
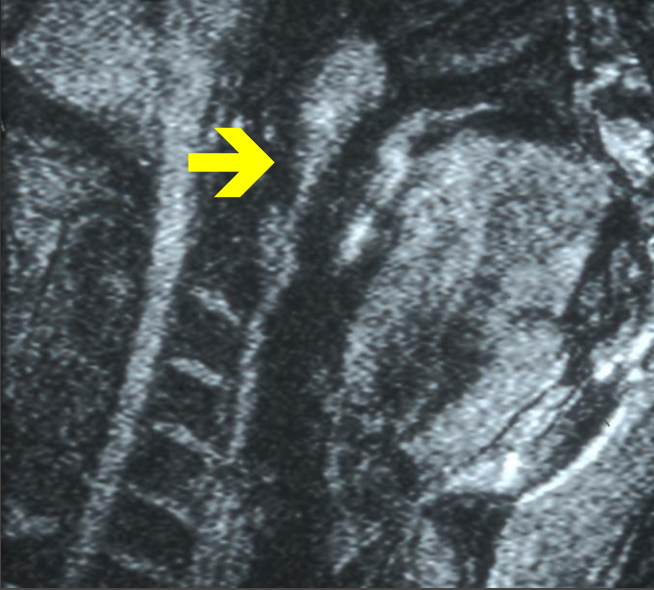
Pharynx: jeopardy  
zone: muscular

Trachea:  
cartilaginuous rings

Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z  
Z

# Open Airway

# Closed Airway





## 4. Nocturnal movements in PD

- 28% of PD patients have Restless Leg Syndrome
- >15% have Periodic Limb Movements of Sleep
- 15-50% have REM Sleep Behavioral Disorder

# RLS & PLMS Dx & RX

- Clinical history +/- sleep study
- Check serum iron / ferritin levels
- Treatments overlap with PD meds
- Gabapentin
- Opioids



- Failure of normal paralysis of REM sleep
- Dream enactment behaviors
- Rx
  - Treat underlying sleep apnea
  - Remove offending medications: SSRIs
  - Rx: Clonazepam, melatonin, gabapentin

z  
z  
z  
z  
z  
z  
z  
z  
z  
z  
z  
z  
z

# Resources


# Epworth Sleepiness Scale (ESS)

How likely are you to doze off in the following circumstances over the past week?

Score 0-3: 0 = no chance of dozing, 1=slight chance, 2=moderate chance, & 3=high probability

1. Sitting & reading
2. Watching TV
3. Sitting inactive in a public place
4. As a passenger in a car for 1 hour



- 
5. Lying down to rest in the afternoon
  6. Sitting & talking to someone
  7. Sitting quietly after a lunch without alcohol
  8. In a car while stopped in traffic

### Scoring of ESS:

$< 8/24$  = normal alertness

8-9/24 = borderline alertness

$\geq 10/24$  = excessive daytime sleepiness



# Multiple Sleep Latency Test

- Measures patient's tendency to fall asleep
- Obtained in setting of regular sleep schedule with preceding in-lab sleep study
- Patient is given 5, 20-minute opportunities to nap at 2 hour intervals during the day lying down in a darkened room
- Sleep onset is scored objectively by EEG, eye movements and muscle tone

Average sleep latency < 10 minutes is considered abnormal

# Resources for Insomnia

- Sleep logs to track sleep schedule:
  - [http://www.sleepdoc.com/pdf/sleep\\_log.pdf](http://www.sleepdoc.com/pdf/sleep_log.pdf)
- On-line cognitive behavioral therapy
  - <http://www.myshuti.com/>
  - \$135 for 6 session course
  - On line access for 16 weeks

# Light Control

- Uvex orange lens glasses:
  - to block the alerting blue light portion of the light spectrum in the evening
  - Wear in PM beginning 1.5 - 2 hours prior to desired bedtime to help initiate sleep
  - [www.amazon.com](http://www.amazon.com): search UVEX orange lens glasses
  - The standard UVEX S1933x are fine unless you wear glasses in which case you may want the larger S0360x model. \$9-12.



# Habits to Help You Sleep Better

- Keep a regular schedule
- Wind down “me time” before bedtime
- Daily exercise
- Dim screens/reduce ambient light
- Clear the decks – safe sleep environment
- Avoid late, heavy meals
- Avoid evening naps
- Avoid late alcohol
- No heavy discussions at bedtime
- Sleep work-up & treat the problems