

# Sleep Disorders 2019

Florida Osteopathic Medical Association  
Annual Convention  
February 22, 2019

Anthony N. Ottaviani, DO, MPH, MACOI, FCCP  
Clinical Professor of Medicine  
Nova Southeastern University  
Kiran C. Patel College of Osteopathic Medicine  
Chief Academic Officer  
Largo Medical Center

# Findings of National Commission on Sleep Disorders Research

---

- 50 million Americans chronically ill with sleep disorders.
- Additional 25+ million with intermittent sleep problems.
- 60% never questioned about sleep issues - remain undiagnosed/untreated.
- Sleep deprivation – cause serious personal challenges + cost U.S. \$411 billion annually.

# Sleep Related Accidents

- Exxon Valdez (early am)
- Bhopal (early am)
- Challenger
- Chernobyl (1:23 am)  
(50,000 deaths)
- Three Mile Island (4:00 am)
- Peach Bottom Reactor
- Failed Promotions
- Auto –Tuck and Rail Accidents  
(2,474,430 disabling injuries)
- Ballistic missile crew members in  
N. D. - asleep holding classified  
launch code
- Physician EDS/Fatigue (Libby  
Zion case in New York)
- Surgeon in Mississippi

# What is sleep?

## State of:

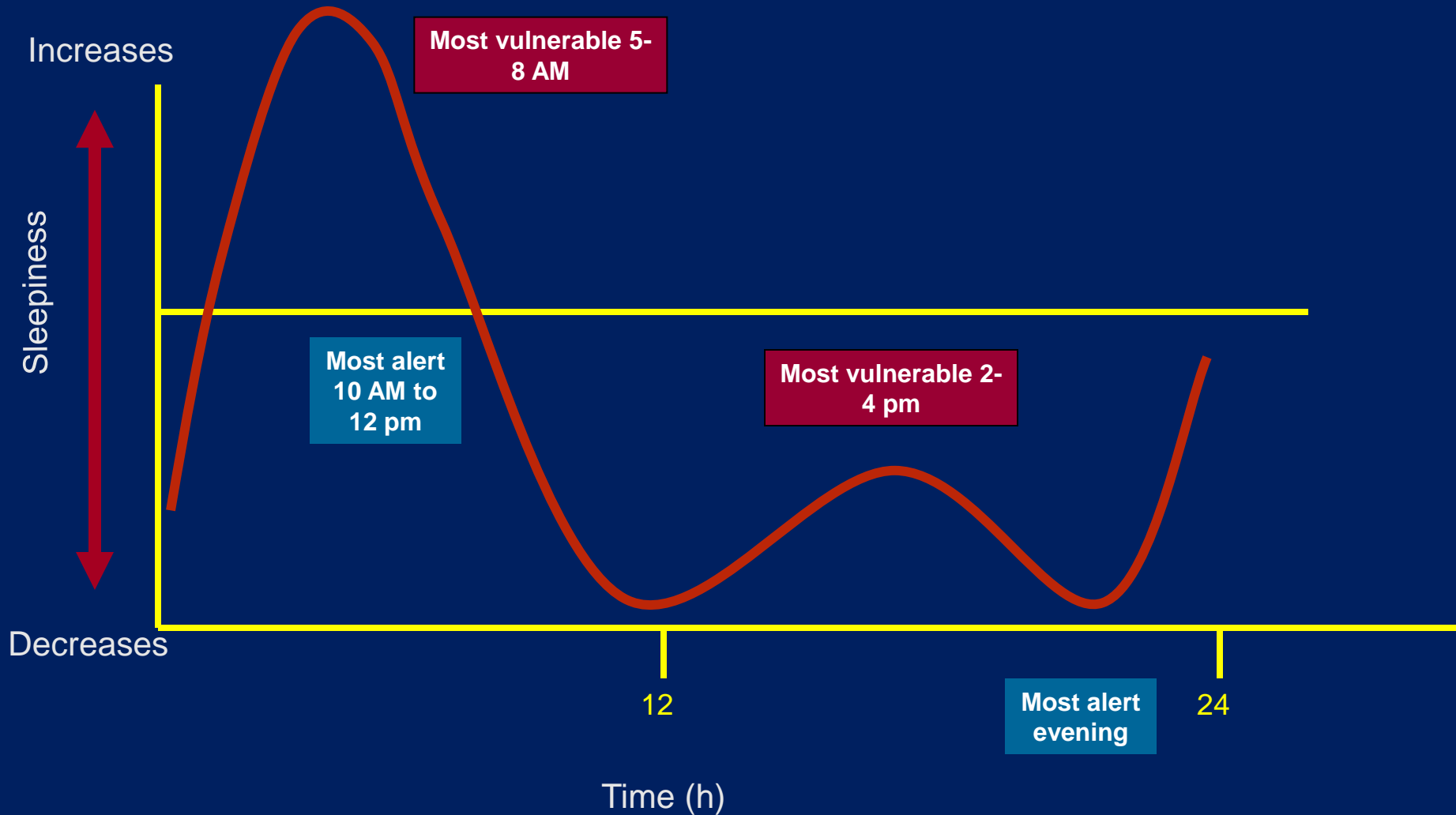
- Recurring relaxation.
- Altered of consciousness.
- Inhibited sensory activity.
- Muscular inhibition.
- Severely reduced interaction with outside entities.

## State of:

### Body Rebuilding/Restoring Systems

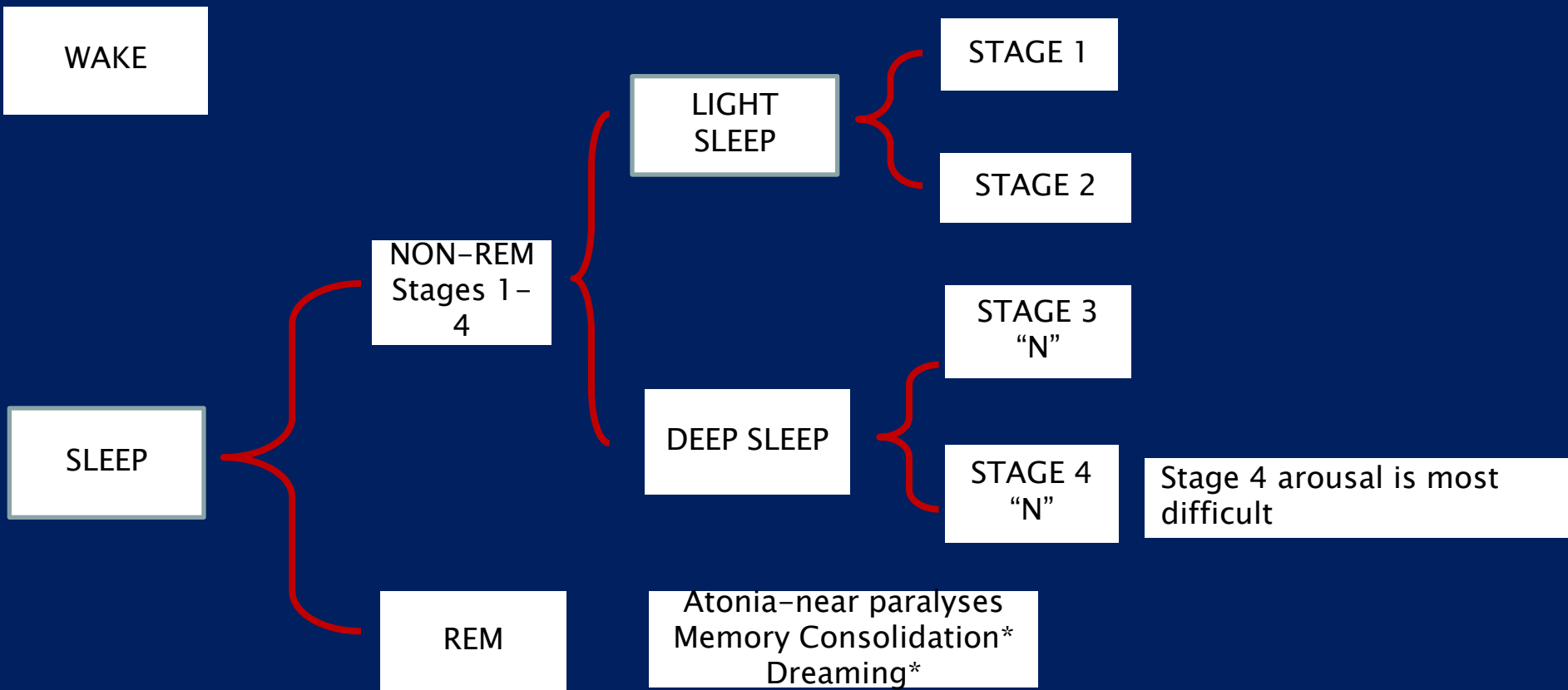
- Immune.
- Nervous.
- Skeletal.
- Muscular.
- Dreaming appears to be time to process mental and emotional input.

# Circadian Rhythm



# Sleep Architecture

## Two States of Existence



# Over View Sleep Loss

- Any Cause -

---

- Performance declines after 16 hrs. of wakefulness, regardless of nightly sleep duration.
- With  $< 5$  hours sleep, homeostatic drive to sleep rises sharply → accelerating the drive to sleep.
- Sleep deprivation - may be acute total sleep deprivation i.e.: one night with little or no sleep.

# Over View Sleep Loss

## ANY CAUSE

---

- Cumulative partial sleep deprivation - problematic - difficult to identify.
- Chronic sleep deprivation < 6 hours sleep/night for 1 week → impairment.

### *New studies*

*Impairment now recognized in even modest degrees sleep deprivation.*



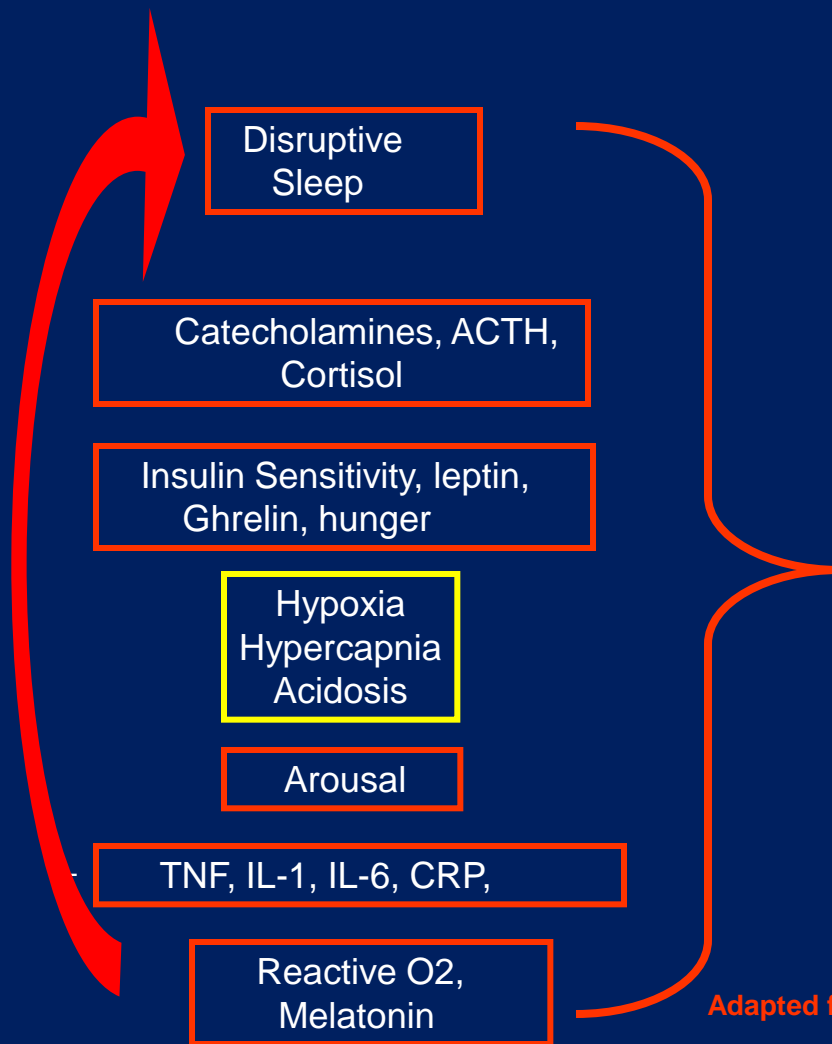
# What we know as of 2019: Short Duration Sleep - increasing concern

- 35% of Americans sleep less than recommended 7 hrs./night.
- Current average duration of sleep is 6.8 hrs./night.
- 1910 average sleep duration 9 hrs.
- Since 1985 sleep of less than 6 six hrs./night has increased by 31%.
- 97% of teenagers get less than the recommended amount of sleep.
- 7 out of 10 college students get inadequate sleep

# HOW MUCH SLEEP DO WE NEED?

- AASM and the Sleep Research Society recommend that adults sleep – 7–8 (OR MORE HOURS PER NIGHT) ON A REGULAR BASIS TO PROMOTE OPTIMAL HEALTH.
- Difficult to determine a normal quantity of sleep for a given individual. Need varies in individuals/ across the lifespan.
- Alertness – normal if patient wakes feeling refreshed and is capable of moving through the day feeling alert without effort, even when placed in boring or monotonous situations.
- Some require less than six hours of sleep/night – others require ten or more hours/night.
- All-cause mortality – length of sleep is U “shaped”? Inconclusive.

# Cascade of Event in Sleep Deficit



- Sleep deficit induces a chain of event in susceptible patients.
- Results in subsequent sleep related complaints and medical/psychological complications.

Adapted from: Rapoport DM. *Mt Sinai J Med.* 1994.

## CONSEQUENCES OF ACUTE SLEEP DEPRIVATION:

- Cognitive effects–mistakes
- Mood and judgment – poor performance.
- Sleepiness and microsleeps – auto accidents.
- Respiratory physiology – blunted .
- Circadian factors – sleep –wakefulness, disconnected body temperature .

## CONSEQUENCES OF CHRONIC SLEEP INSUFFICIENCIES:

- Accidents and workplace errors.
- Occupational errors.
- Quality of life.
- Cardiovascular morbidity.
- Immunosuppression.
- Obesity and metabolism.

# Insomnia: 50% Patients Have Experienced It; 10% Chronic

## MULTIPLE ETIOLOGIES

### 100 Classified Sleep Disorders

---

- Stress – Personal Demands
- Medical Conditions
- Psychiatric
- Medication Substance Abuse
- Habits Life Styles
- Psychophysiological Insomnia
- Periodic Limb Movement
- Restless Leg Syndrome
- Narcolepsy
- Inadequate Sleep Hygiene
- Circadian Rhythm Sleep Disorder

# Obstructive Sleep Apnea 2019

---

Advances in technology and surgery  
has improved therapeutic options

# Obstructive Sleep Apnea

---

*Estimated 5% of population in Western Countries have OSA*

*Prevalence of Sleep Apnea 3-28% - In North America*

*3-7% Adult Males*

*2-5% Adult Females*

*1 of 5 on PSG have at least mild OSA*

*Approximately 60-80% of patients undiagnosed*



# Obstructive Sleep Apnea

## Prevalence Similar to Chronic Disease

---

Asthma

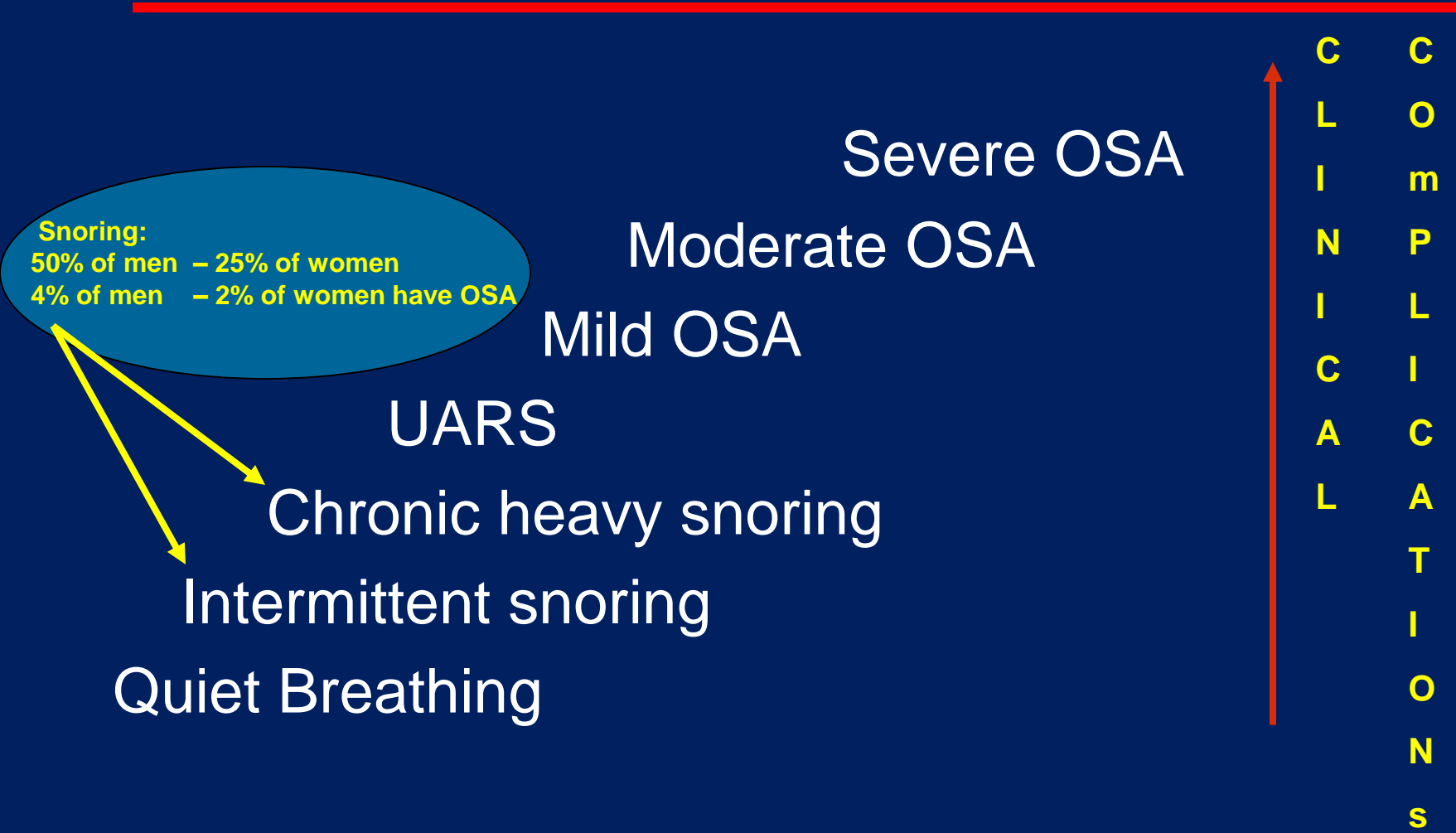
Diabetes Mellitus

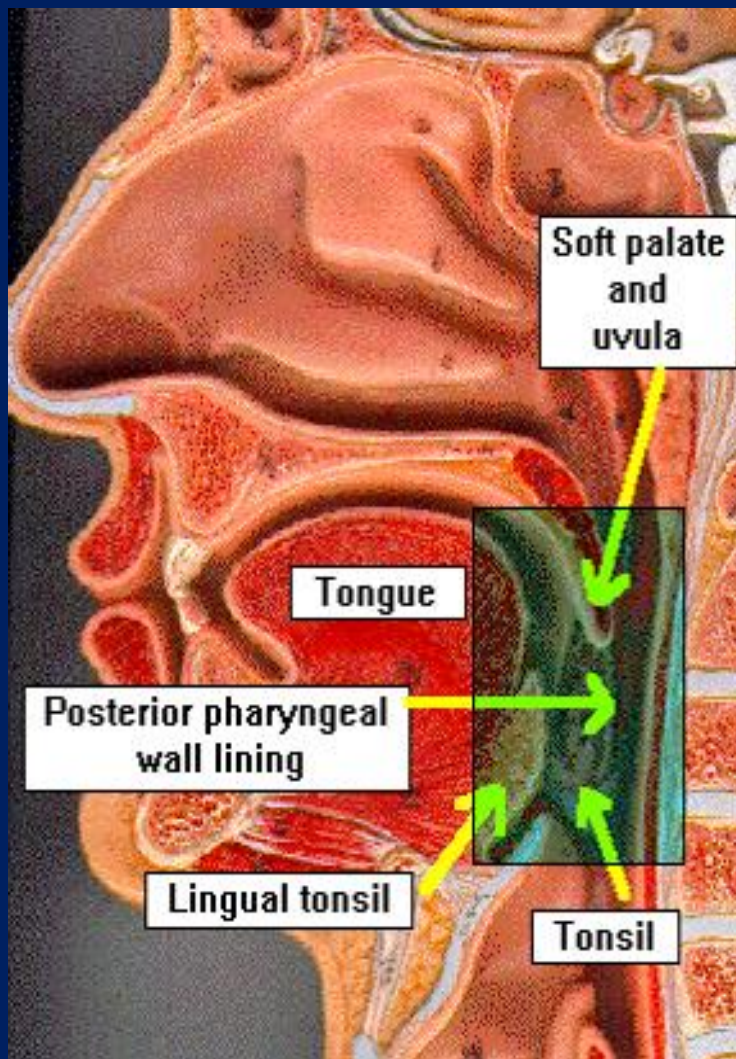
*BUT*

Lacks recognition by public/physicians

Increased evidence of Medical complications

# Spectrum of Sleep Disordered Breathing





## *Oropharynx Principle Sites of Obstruction*

---

Soft palate may be enlarged thickened elongated

Uvula may become swollen bulbous

Base of tongue can protrude back and obstruct airway

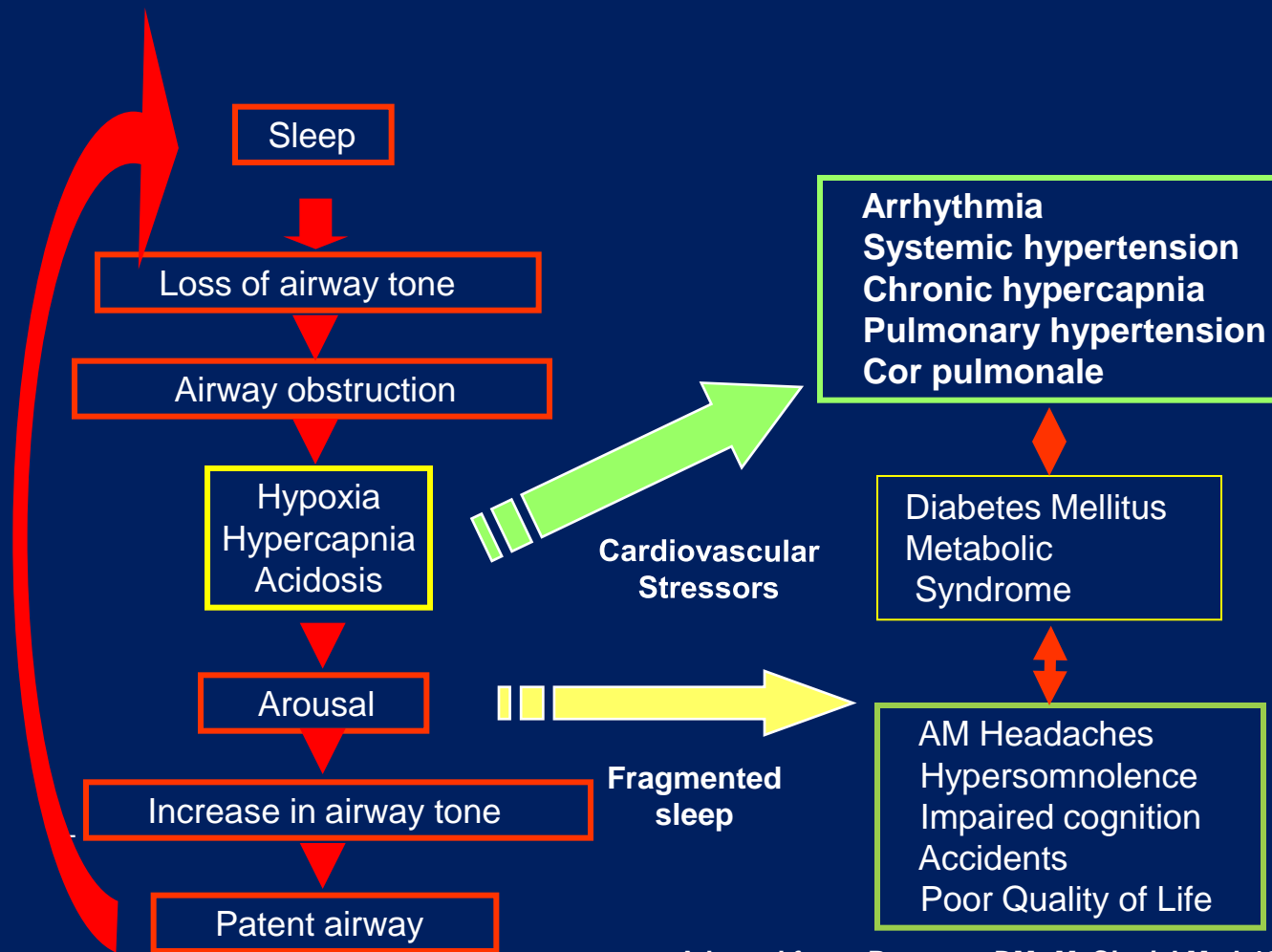
Posterior pharyngeal lining can form folds of redundant tissue

Pillars of fauces may be prominent – close to midline

Tonsils can be enlarged and in some the lingual tonsils may enlarge and obstruct

Cranial Facial Abnormalities

# Consequences of OSA



Adapted from: Rapoport DM. *Mt Sinai J Med.* 1994.

# 4 Year Incidence of Hypertension Wisconsin Sleep Cohort

---

AHI	Incidence of Hypertension
0	9.7%
1-5	17.1%
5-15	31.5%
15	32.1%

# Drug Resistant Hypertension Sleep Apnea

---

Comprises - 15-20% of hypertensive patients

83% of patients with drug Resistant Hypertension  
had OSA

Males = 96%

Females = 65%

# Sleep Apnea and Hypertension

---

Sleep apnea listed as first  
among treatable  
cause of hypertension

# Clinical Features of Sleep Apnea

Some Elements Shared with other Sleep disorders – EDS

---

## Symptoms

- Restless sleep/snoring
- EDS
- Intellectual decline/scholastics
- Forgetful
- Personality changes
- AM headaches
- Dyspnea daytime
- Insomnia
- Social embarrassment
- Marital problems
- Depression
- Impotence

## Signs

- *Reduced sleep  
latency/EEG*
- *Obesity*
- *HTN*
- *Cardiac arrhythmia*
- *Pulmonary  
hypertension*
- *Polycythemia*
- *Edema*



# Consequences, Morbidities, Comorbidities and Public Health Burden Associated with Insomnia – Any Etiology

---

- Job performance:
  - Increased absenteeism
  - Errors
  - Inefficiencies
  - Promotion failure
- Increased medical complaints:
  - Substance use/abuse
  - Medical comorbidities
  - Increase health care costs/use

# Quality of Life

Short Form -36

Impairment –correlates with EDS

---

Physical

Emotional

Social functions

Pain

General health

Vitality

Mental Health

# Approach For Patients With Insomnia Or EDS of Any Cause

---

- Sleepiness assessment, such as the Epworth Sleepiness Scale.
- General medical and psychiatric inquiry (questionnaire) to detect comorbid disorders.
- 2-week sleep log to very helpful to define sleep-wake patterns and their variability.
- Timing of insomnia.
- Patient's sleep habits (commonly referred to as sleep hygiene).
- Presence or absence of symptoms of sleep disorders associated with insomnia.
- A thorough medical history with review of systems.
- Psychological history screening for psychiatric disorders, particularly on anxiety and depression if suspected.

# Medication History: Rx/OTC/Substances Commonly Associated With Insomnia

---

- Beta blockers
- Clonidine
- Theophylline (acutely)
- Certain antidepressants (eg, protriptyline, fluoxetine)
- Decongestants
- Stimulants
- Over-the-counter and herbal remedies
- EOTH
- Tobacco
- Caffeine

# Physical Examination: Clues To Underlying Medical Disorders Predisposing To Insomnia

---

- History suggestive of Sleep Apnea: Careful head and neck examination.
- Symptoms of Restless Leg Syndrome or periodic limb movement disorder or any other neurologic disorder: Careful neurologic examination.
- Daytime symptoms consistent with a medical cause of insomnia: Careful examination of the affected organ system (eg, lungs in Chronic Obstructive Lung disease).

# OSA – EXAMINATION

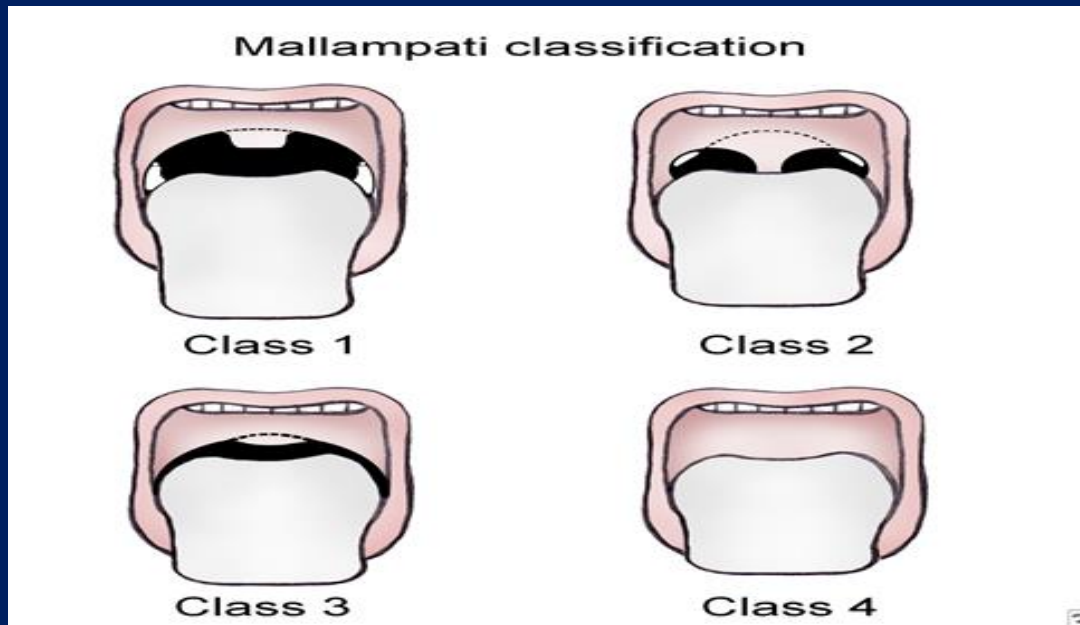
---

- High Body Mass Index > 30 (obese/non-obese).
- Neck circumference:
  - Men > 17"
  - Women > 16".
- Elevated BP – 50% (noted in AM)
- Resistant HPB – VERY HIGH REVELANCE of OSA!
- ? Pulmonary Hypertension.
- Nocturnal Cardiac Dysrhythmias – all.
- Cranial Facial Abnormalities or Narrow Airway:
  - Retrognathia
  - Micrognathia
  - Macroglossia
  - Tonsillar Hypertrophy
  - Elongated or enlarged uvula
  - High arched or narrow palate
  - Nasal septal deviation
  - Nasal polyps

# OSA – EXAMINATION

---

Mallampati classification – quantify airway classes 3 and 4 considered positive for airway narrowing.



# Epworth Sleepiness Scale (ESS)

Situation	Chance of dozing (0-3)			
Sitting and reading	0	1	2	3
Watching television	0	1	2	3
Sitting inactive in a public place—for example, a theater or meeting	0	1	2	3
As a passenger in a car for an hour without a break	0	1	2	3
Lying down to rest in the afternoon	0	1	2	3
Sitting and talking to someone	0	1	2	3
Sitting quietly after lunch (when you've had no alcohol)	0	1	2	3
In a car, while stopped in traffic	0	1	2	3
<b>Total Score</b>				

0 = would never doze                      2 = moderate chance of dozing  
 1 = slight chance of dozing              3 = high chance of dozing

**ESS total score  $\geq 10$  indicates possible excessive sleepiness or sleep disorder.**

Johns MW. *Sleep*. 1991;14:540-545.  
 Reprinted with permission from the  
 American Academy of Sleep Medicine.



# OSA – Diagnostic Studies: Insurers And CMS Requirements

---

- PSG – gold Standard
- Full night – Ideal!
- Split night
- Home studies
- Five or more predominantly obstructive respiratory events (obstructive and mixed apneas, hypopneas, or RERAs) per hour of sleep (for polysomnography) or recording time (for HSAT) in a patient with symptoms.
- 15 or more predominantly obstructive respiratory events (apneas, hypopneas, or RERAs) per hour of sleep (for polysomnography) or recording time (for HSAT), regardless of the presence of associated symptoms or comorbidities

# Diagnosis Of OSA

RDI	<5 Normal ?
RDI	5–14 Mild Associate Symptoms (EDS), HTN,CVD
RDI	15–30 Moderate
RDI	> 30 Severe

# Which One is Right for You?

Nasal



Nasal Pillow



Full Face



## Types of Oral Appliances for Obstructive Sleep Apnea



Klearway



Somnomed



Herbst



Tap



Suad

# Advancement in Technology and Surgery in Treatment of OSA

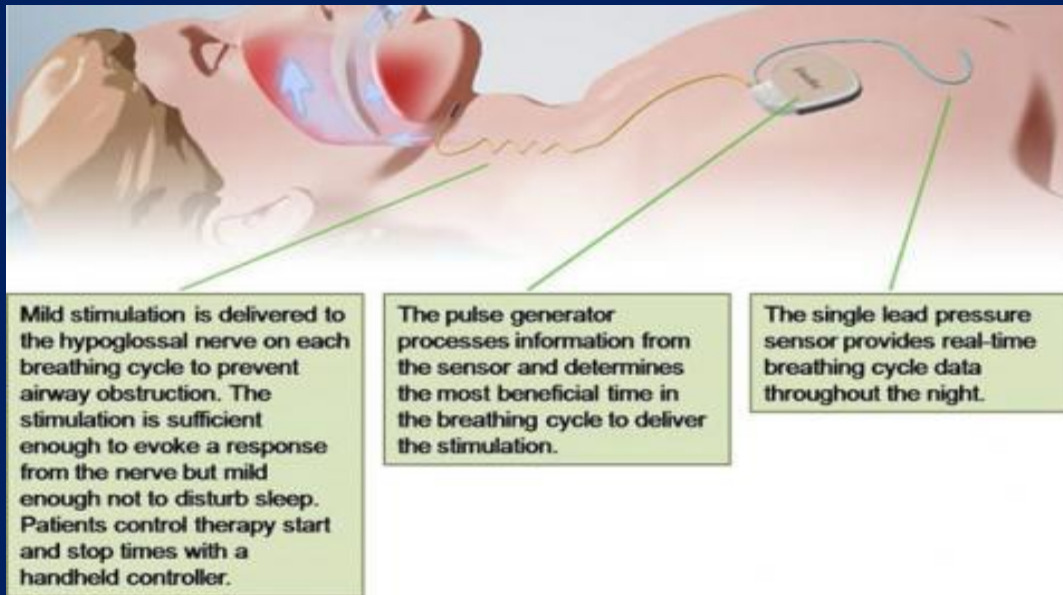
Newer Technology Continuous Positive Airway Pressure Very Effective	Dental Appliance	Most Recent Addition to Care Hypoglossal Nerve Stimulation
<p>CPAP</p> <p>BIPAP</p> <p>APAP</p> <p>Documented efficacy</p> <p>But very high non compliance</p> <p>46 to 83%</p>	<p>Viable treatment alternative to continuous positive airway pressure (CPAP) in patients with mild to moderate obstructive sleep apnea syndrome (OSAS)</p> <p>In patients with severe OSAS, CPAP remains the treatment of first choice.</p>	<p>Offers reasonable improvement in patients with OSA as defined by the FDA approval criteria.</p>

# Recent Advances in Treatment OSA

## Neuromodulation of the upper airway

### “Hypoglossal nerve stimulation (HNS)”

- Inclusion criteria: failure of CPAP adherence.
- BMI less than 32 kg/m<sup>2</sup>.
- AHI between 20 to 50 events per hour.
- Absence of CCC seen on DISE at the velum.
- Absence of significant positional or central apneas.



- FDA approved.
- Costs- \$30,000 to \$40,000 to place, including the expenses associated with surgery.
- Replacement of the battery - \$17,000.
- Costs may be covered by insurance.

# OSA Surgical Success:

CPAP is the preferred treatment, poor compliance is common

---

- Correct ENT problems: rhinitis etc., anatomical pathology.
- Surgery: UPP – correct anatomical abnormalities, etc.
- Maxillomandibular advancement has the highest surgical efficacy (86%) and cure rate (43%).
- Soft palate surgical techniques are less successful, with uvulopalatopharyngoplasty having an OSA surgical success rate of 50% and cure rate of 16%.

# Summary Management Of Sleep Disorders

## Sleep Hygiene Rules: “Retrain The Brain”

---

- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>• “Ritual” prior to sleep.</li><li>• Reduce time in bed.</li><li>• Avoid trying to sleep.</li><li>• Avoid clock watching.</li><li>• Avoid problem solving at bedtime.</li><li>• Avoid intense discussions/argument.</li><li>• Avoid late night exercise.</li><li>• Avoid daytime naps.</li></ul> | <ul style="list-style-type: none"><li>• Avoid alcohol.</li><li>• Avoid Caffeine.</li><li>• Avoid problem solving at bedtime.</li><li>• Avoid intense discussions/arguments.</li><li>• Avoid TV?</li><li>• Avoid tobacco.</li><li>• Bed room comfortable.</li><li>• Bed room is for intimacy and sleep.</li></ul> |
|--|--|

# Cognitive Behavioral Therapy Is Effective:

---

- Cognitive Behavior Therapy – Preferred to MEDICATION - consistently reduces Primary and Secondary Insomnia
- Relaxation therapy
- Stimulus-control therapy
- Sleep-restriction therapy
- Dietary.
- Acupressure.
- Exercise 6 hours before bed time.



# Other Considerations: Basic Medical Care is Irreplaceable

- Nasal Congestion
- Pain
- Psychological
- Residual EDS

# Over 100 Classified Sleep Disorders

## Screen for Patients for Sleep Disorders

---

### Obstructive Sleep Apnea

Psychophysiological Insomnia

Periodic Limb Movement

Restless Leg Syndrome

Narcolepsy

Inadequate Sleep Hygiene

Circadian Rhythm Sleep Disorder

# References

- Watson NF, Badr MS, Belenky G, et al.; Consensus Conference Panel. Joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society on the recommended amount of sleep for a healthy adult: methodology and discussion. *Sleep*. 2015;38:1161–1183.
- Wheaton AG, Olsen EO, Miller GF, Croft JB. Sleep duration and injury-related risk behaviors among high school students — United States, 2007–2013. *MMWR Morb Mortal Wkly Rep*. 2016;65:337–341. <https://www.cdc.gov/mmwr/volumes/65/wr/mm6513a1.htm>
- **Sleep Education** (from the American Academy of Sleep Medicine): <http://www.sleepeducation.org/>
- **National Healthy Sleep Awareness Project** (from the American Academy of Sleep Medicine): <http://www.sleepeducation.org/healthysleep>
- **National Sleep Foundation**: <https://sleepfoundation.org/>
- **American Sleep Association**: <https://www.sleepassociation.org/>
- **National Heart, Lung, and Blood Institute-National Institutes of Health**: <https://www.nhlbi.nih.gov/health-pro/resources/sleep>