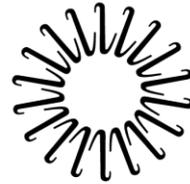




# Sleep Apnea



## **Lifespan Cardiovascular Institute**

**Rhode Island Hospital • The Miriam Hospital  
Newport Hospital**

*Delivering health with care.®*

Center For Cardiac Fitness  
Pulmonary Rehab Program  
The Miriam Hospital

# Outline

- Define sleep apnea
- Causes and risk factors
- Diagnosis
- Cardiovascular consequences
- Treatment
- Summary

# What is sleep apnea?

- Potentially serious sleep disorder in which breathing repeatedly stops and starts during sleep
- Diagnosed by a sleep study
- Two main types of sleep apnea
  - Obstructive sleep apnea (most common)
  - Central sleep apnea

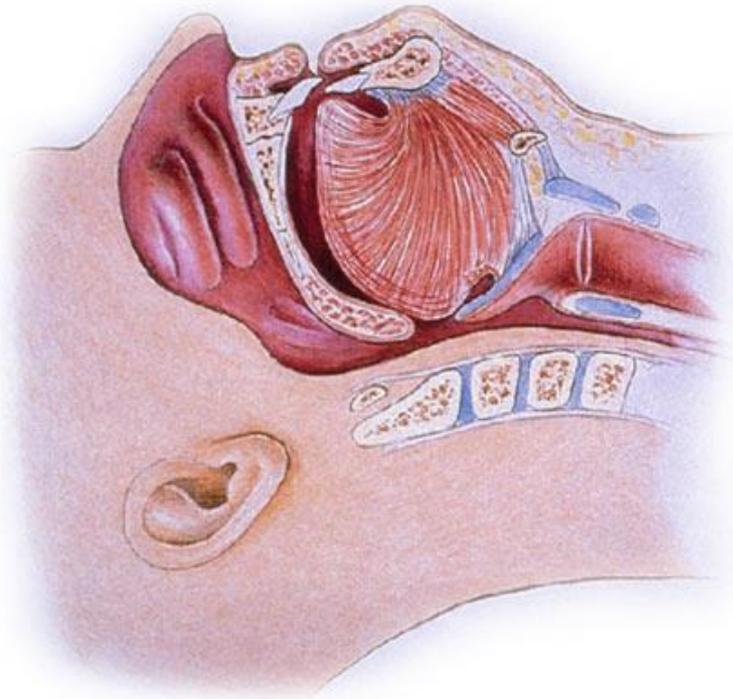
# Central Sleep Apnea

- In central sleep apnea, breathing is disrupted regularly during sleep because of the way the brain functions.
- It is not that you can't breathe, rather, your brain fails to transmit signals to the respiratory muscles to breathe.
- Most common causes are severe heart failure, stroke and medications (particularly narcotics)

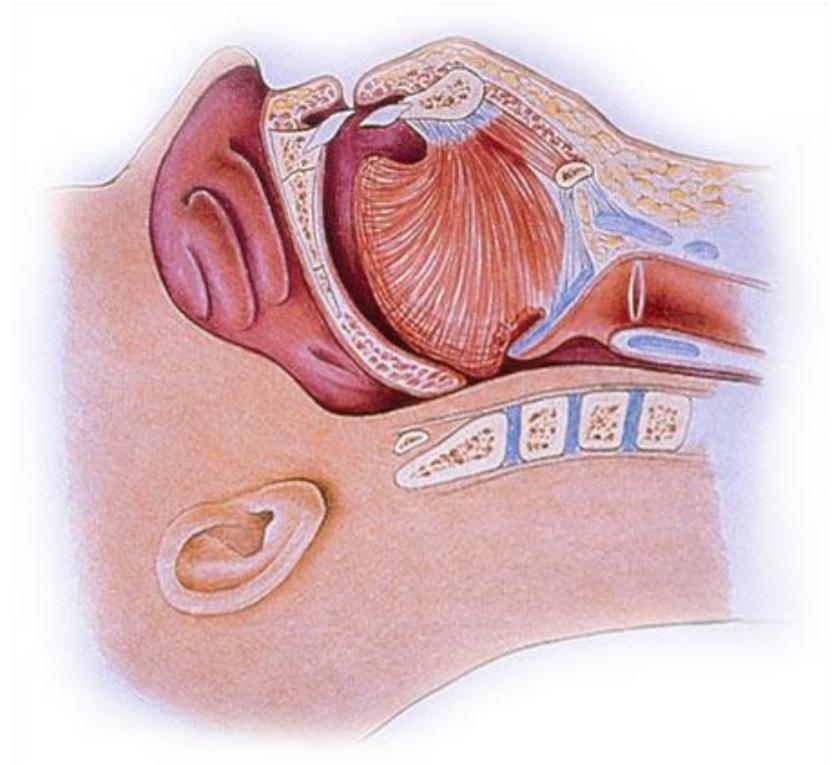
# Obstructive Sleep Apnea (OSA)

- Much more common than central sleep apnea
- Occurs when your throat muscles intermittently relax and block your airway during sleep
- Most commonly caused by obesity

# Pathophysiology of OSA



While awake our reflexes help to maintain the patency of the airway

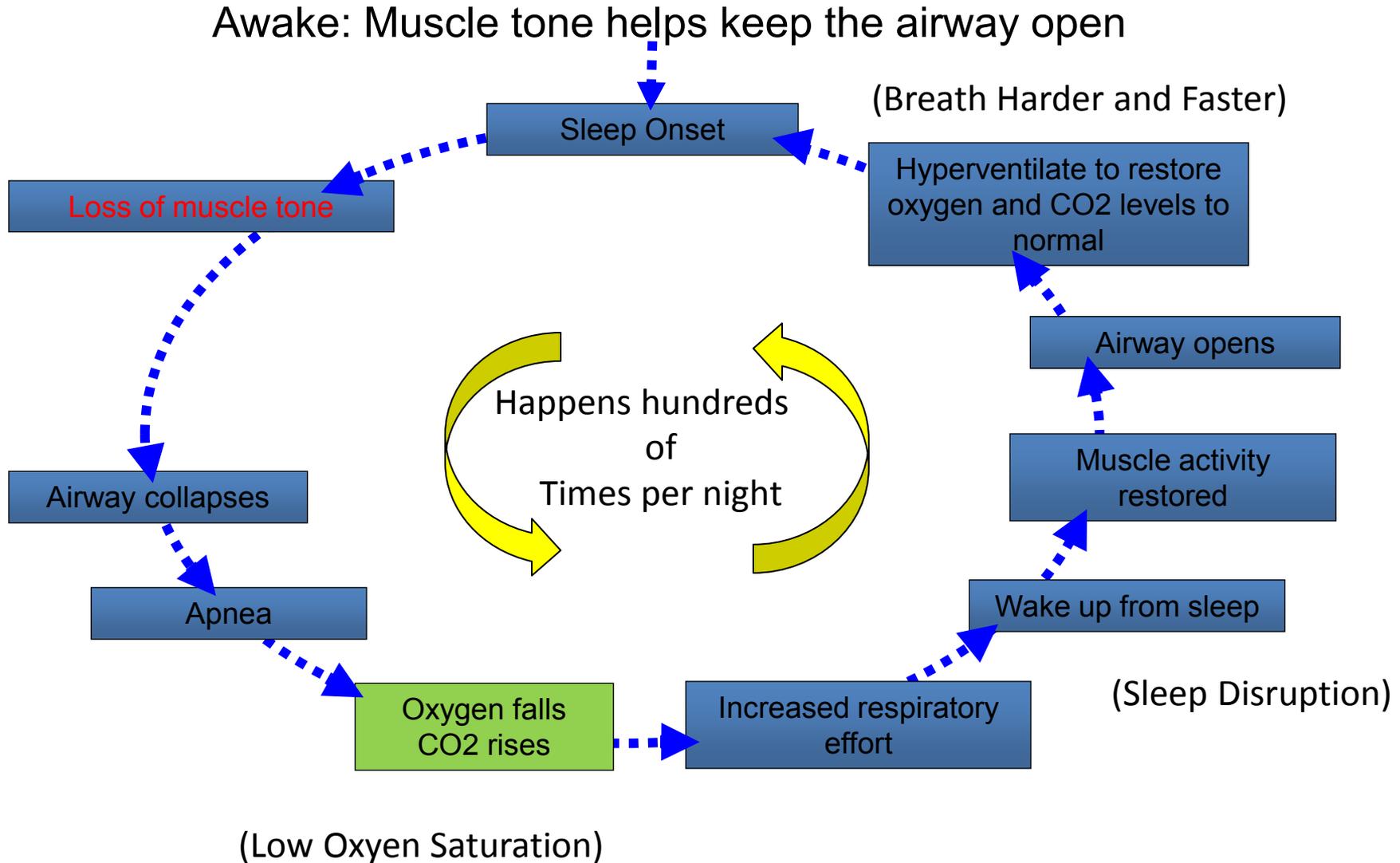


In sleep muscle tone is less and we have collapse of the airway

# Sleep Apnea Symptoms

- Nighttime Symptoms
  - Snoring
  - Apneic events (stop breathing)
  - Nocturnal choking/gasping
  - Insomnia
  - Nocturia (needing to urinate during the night)
- Daytime Symptoms
  - Excessive Daytime Fatigue
  - Memory Impairment
  - Morning Headaches
- Other
  - Increase in Motor Vehicle Accidents
  - Impaired Quality of Life

# Pathophysiology of Sleep Apnea



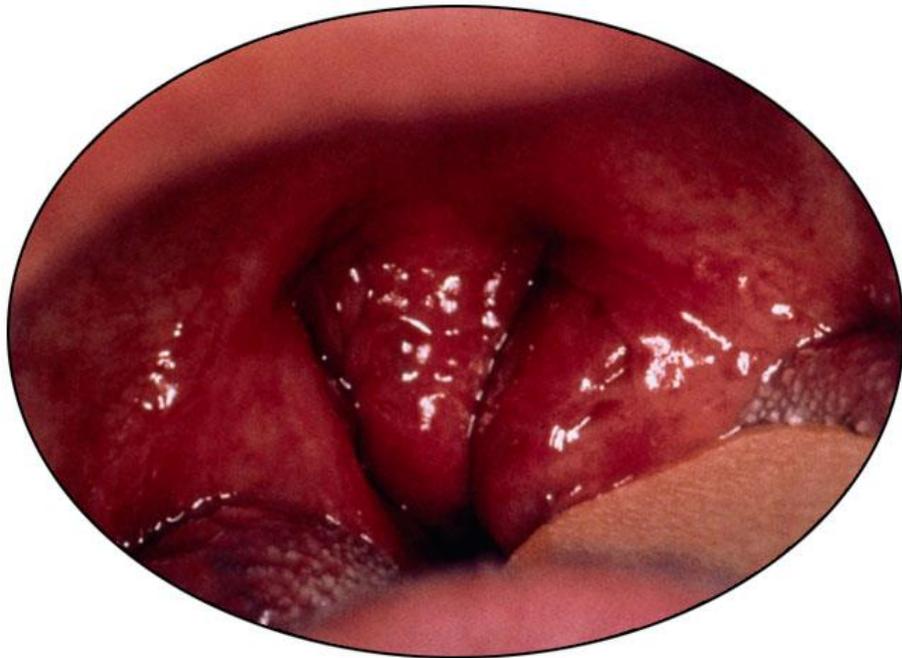
# Physical Examination: Structural Abnormalities



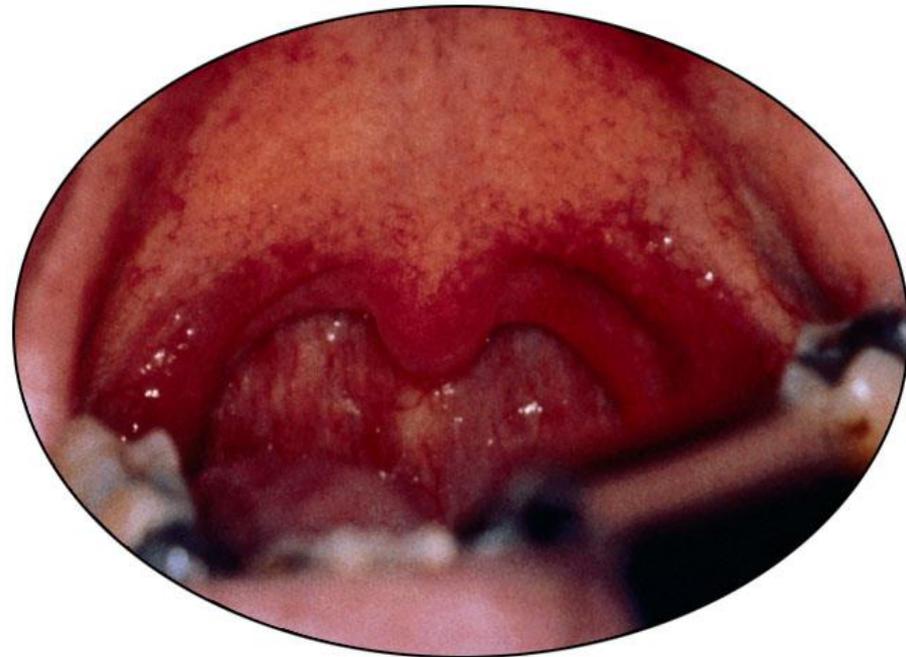
Guilleminault C et al. Sleep Apnea Syndromes. New York: Alan R. Liss, 1978.

# Physical Exam: Tonsillar Hypertrophy

Oropharynx With Tonsillar Hypertrophy



Normal Oropharynx

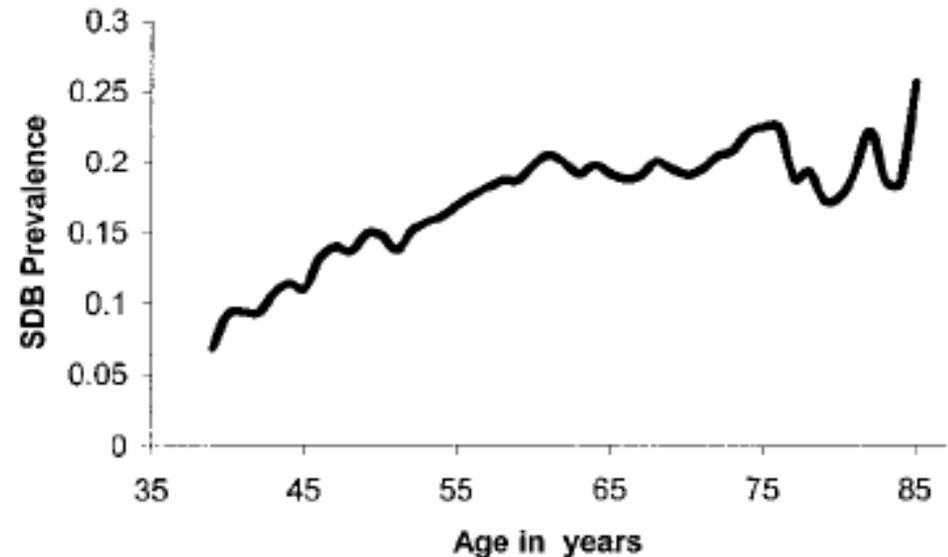


# Risk Factors Associated with OSA

- Age
  - More common as we get older
- Body Weight
- Sex
  - Men 5x more likely to have OSA
- Tobacco and Alcohol use
- Other Medical Comorbidities

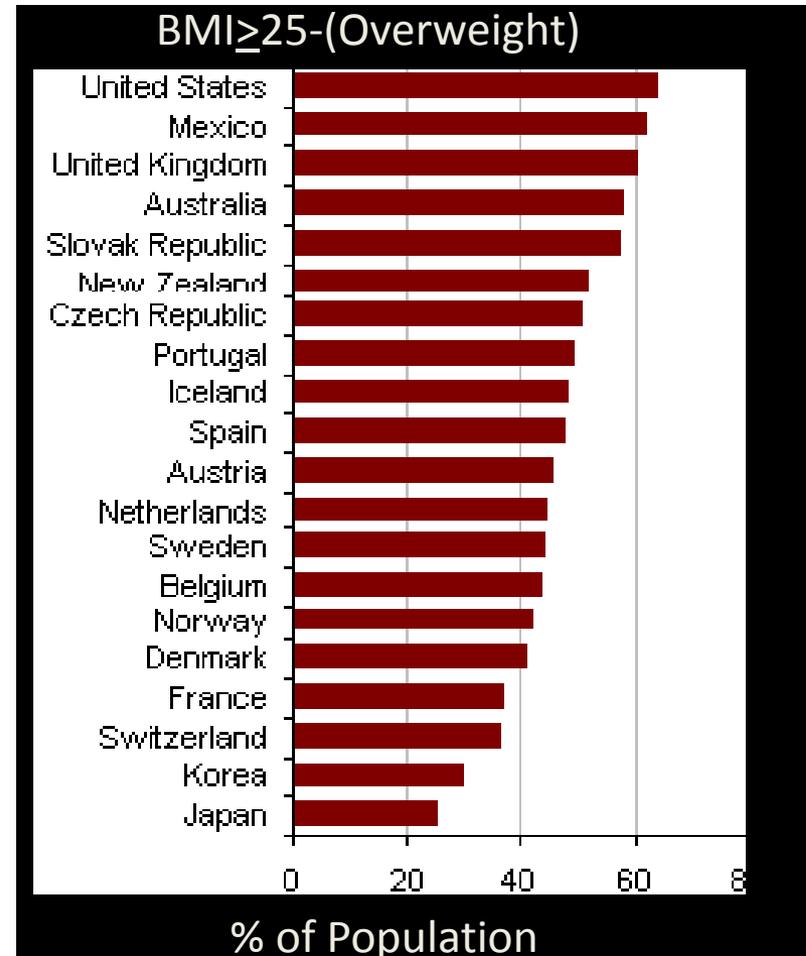
# Sleep disorders become more common as we get older

- >50% people over age 65 have some sleep difficulties
  - Falling asleep
  - Staying asleep
- In women, risk of OSA is 4x greater after menopause than before
  - Changes in weight and throat muscles

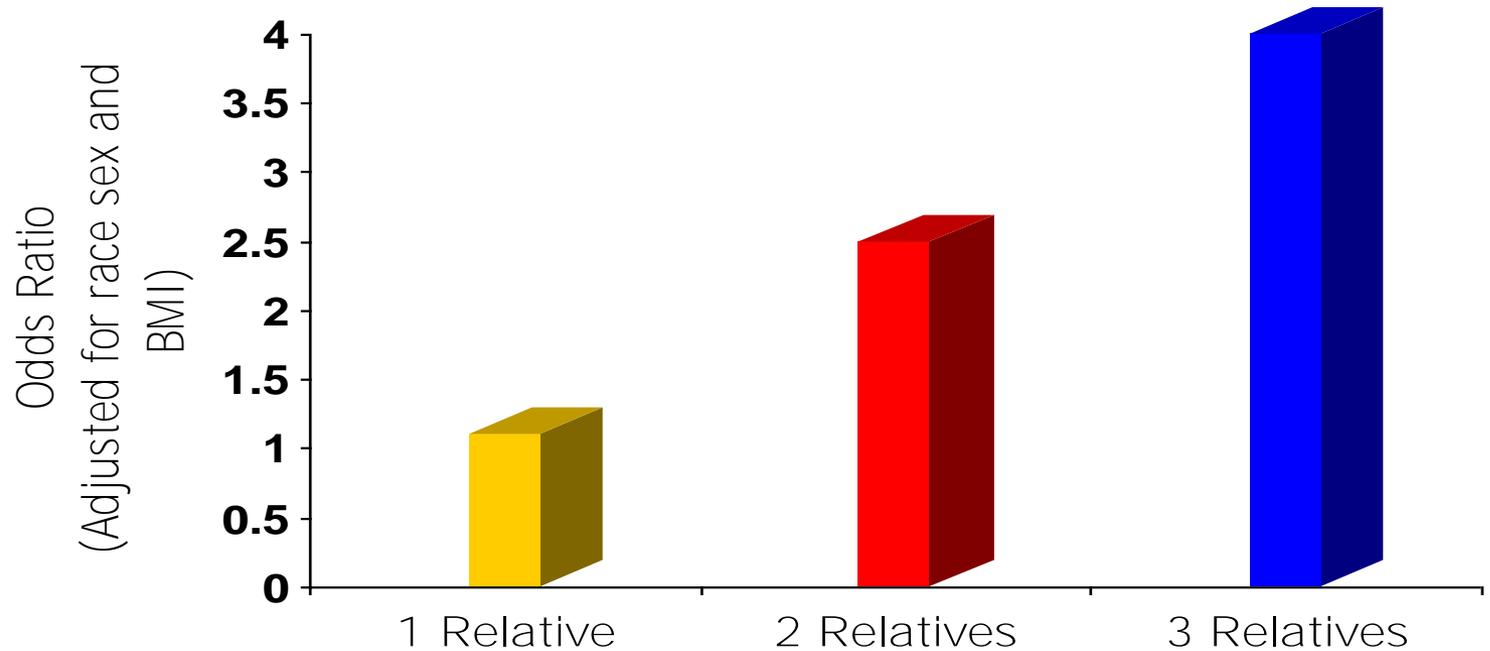


# Obesity and OSA

- 4x increase in OSA in people who are overweight compared to those who are not
- Gastric bypass surgery cohort (morbidly obese)
  - 95.7% of men
  - 65.9% women



# OSA Runs in Families



No recommendation to screen family members

# Risk Factors Associated with OSA

- Other Factors
  - Tobacco:
    - Smokers have higher prevalence of snoring and OSA
    - Increased inflammation alters upper airway properties
  - Alcohol Use:
    - Increases upper airway collapsibility
    - Prolongs apnea duration
  - Polycystic ovarian syndrome (PCOS)
  - Hypothyroidism

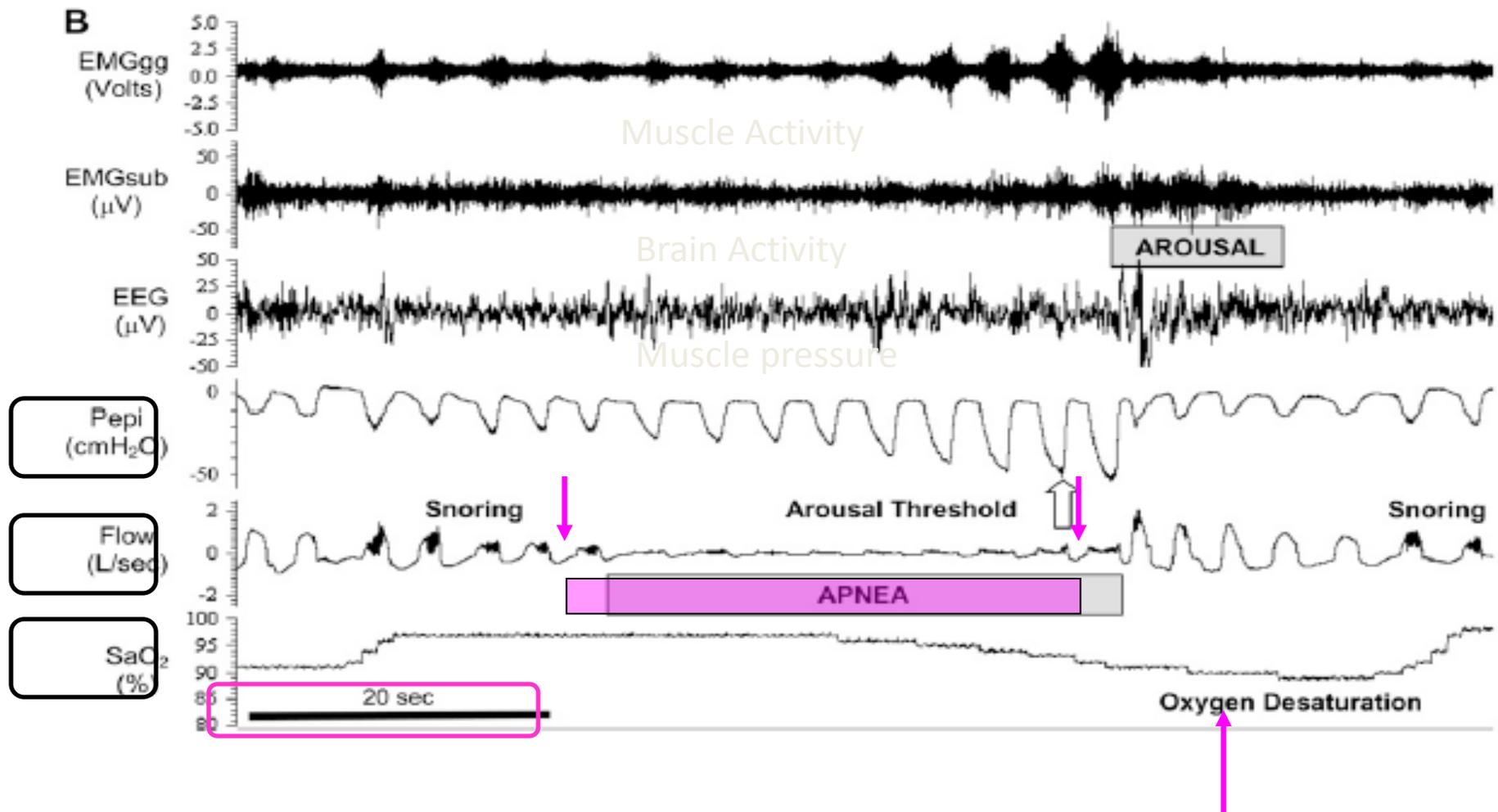
# Diagnosing Sleep Apnea

# Polysomnography

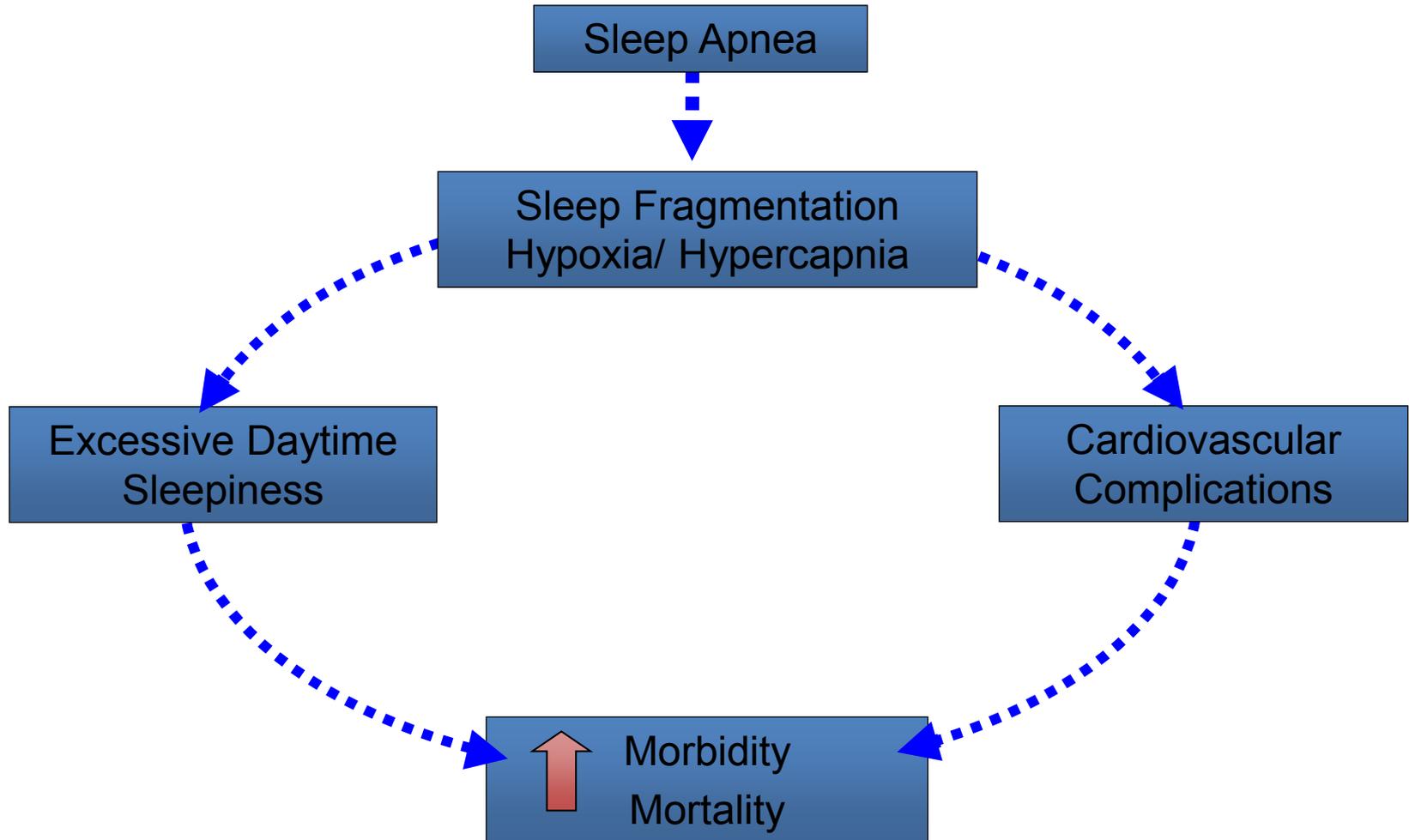


Diagnostic Evaluation

# Sleep Data



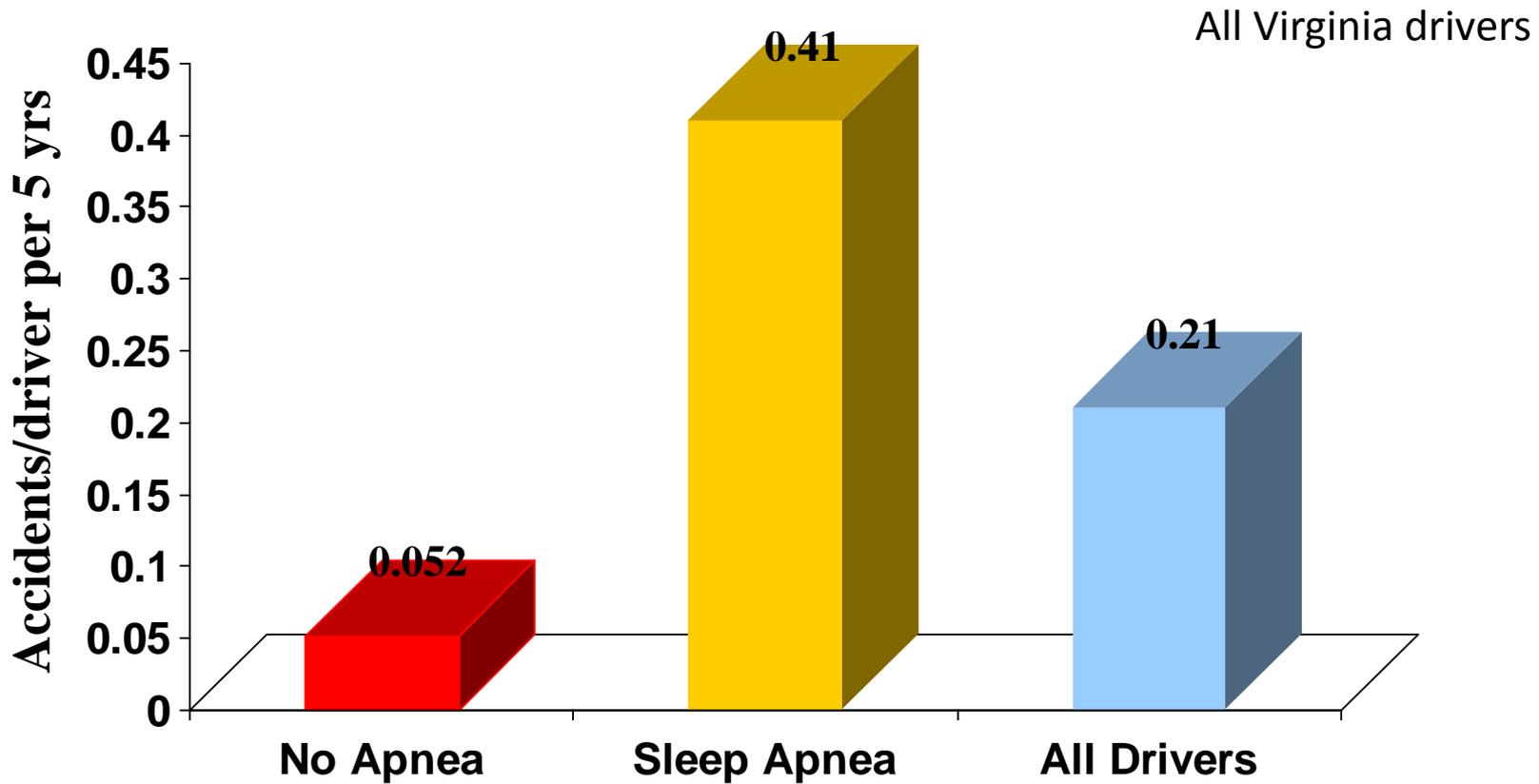
# Clinical Consequences of OSA



# Clinical Consequences of OSA: Excessive Daytime Sleepiness

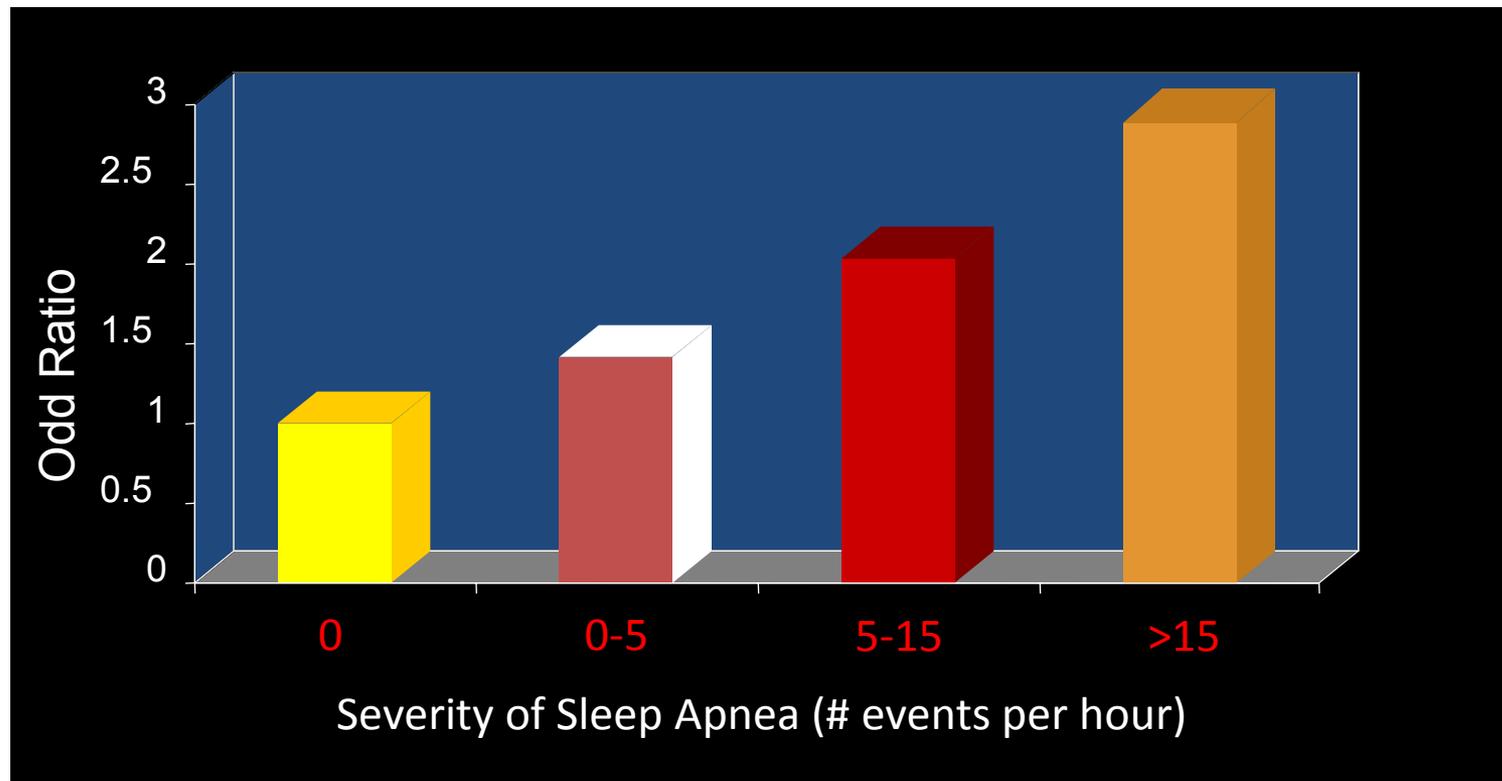
- Increased motor vehicle crashes
- Increased work-related accidents
- Poor job performance
- Depression
- Family discord
- Decreased quality of life

# Clinical Consequences of OSA Automobile Accidents

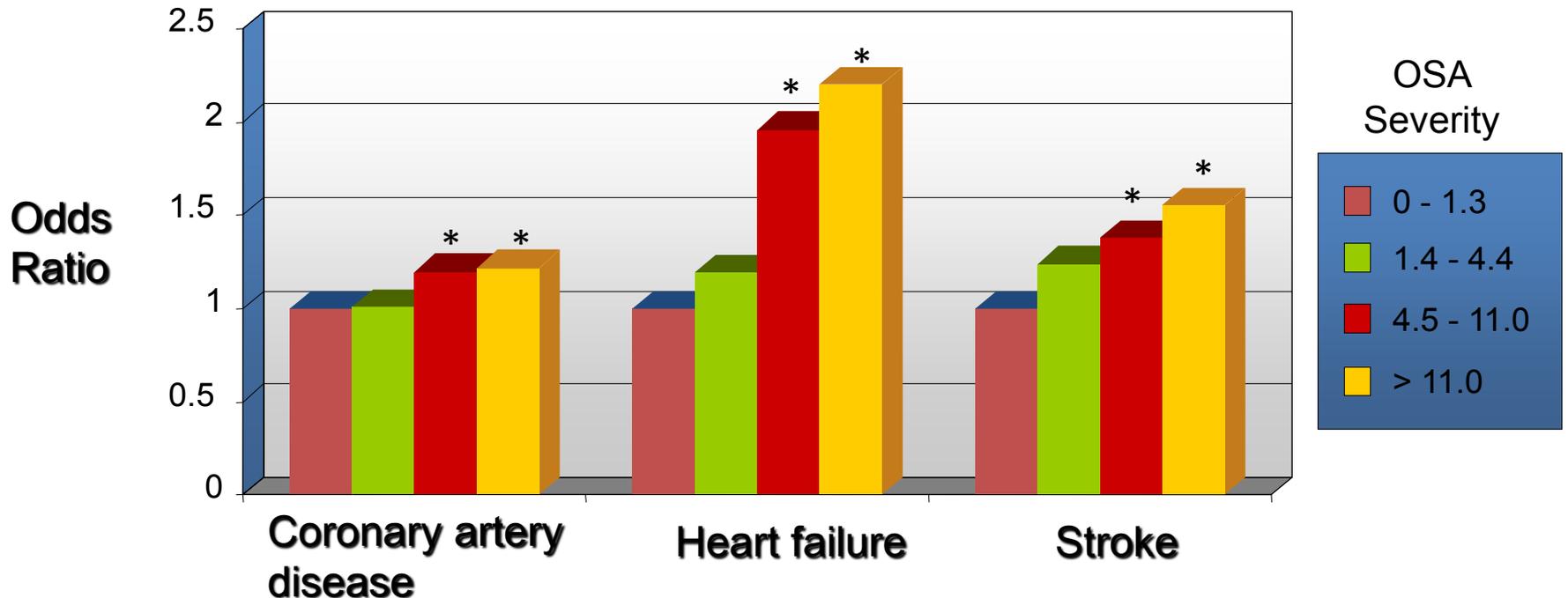


7-8 fold Risk in Patients with OSA

# Clinical Consequences of OSA Hypertension

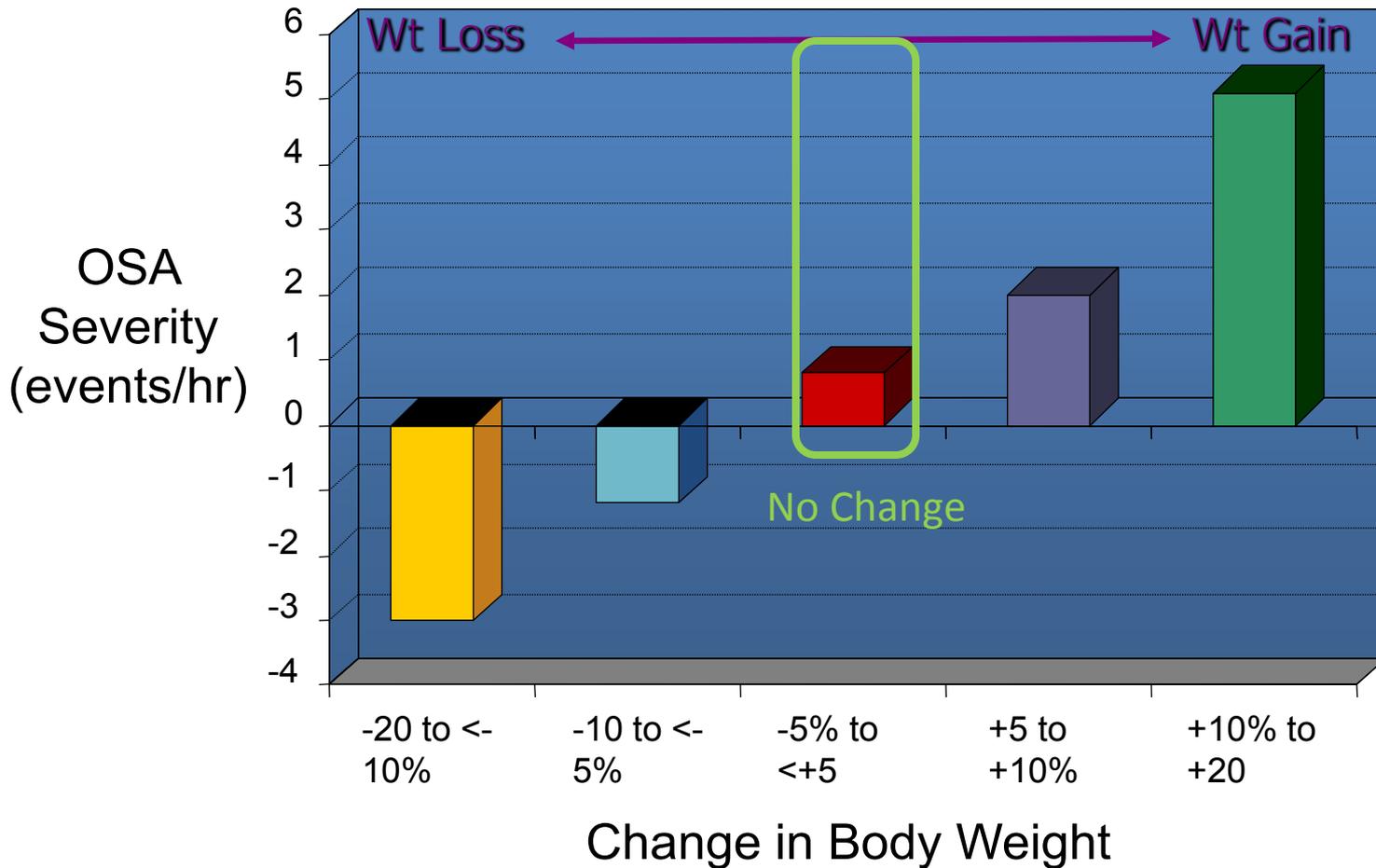


# Clinical Consequences of OSA Cardiovascular Disease



Treatment

# Weight Loss and Sleep Apnea

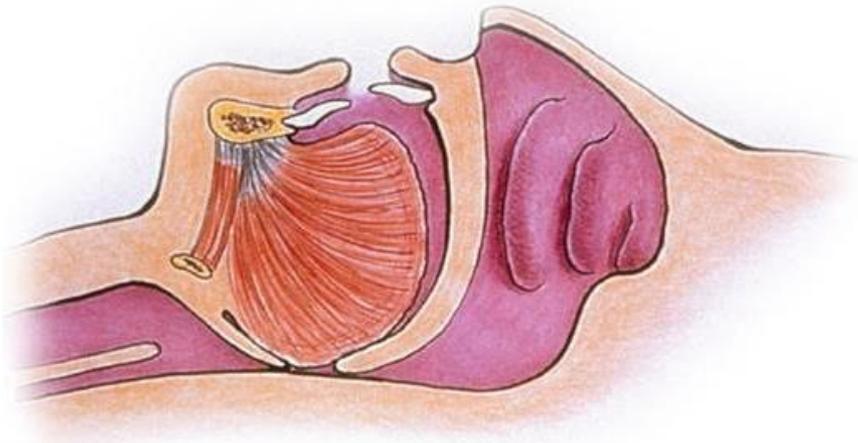


# CPAP Therapy

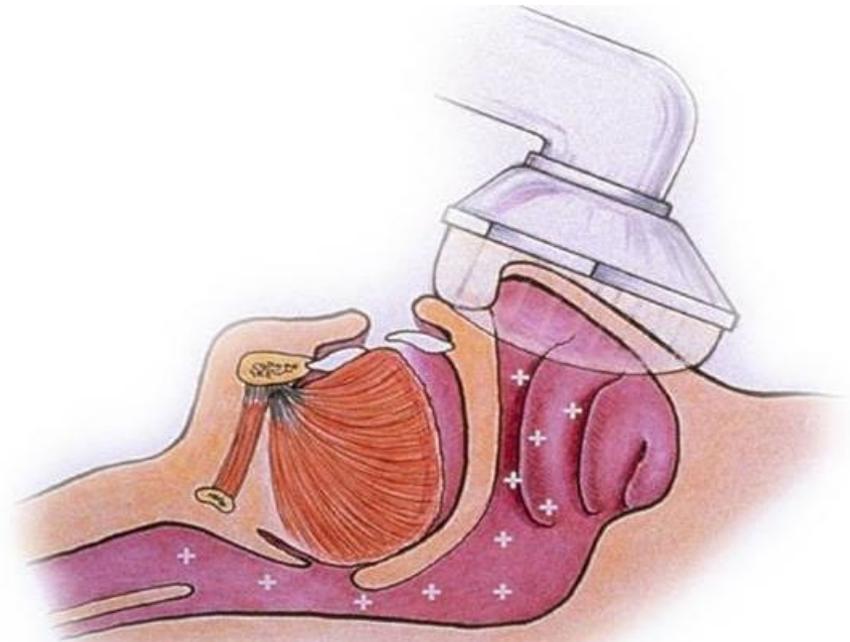


# Treatment of OSAS

## Positive Airway Pressure



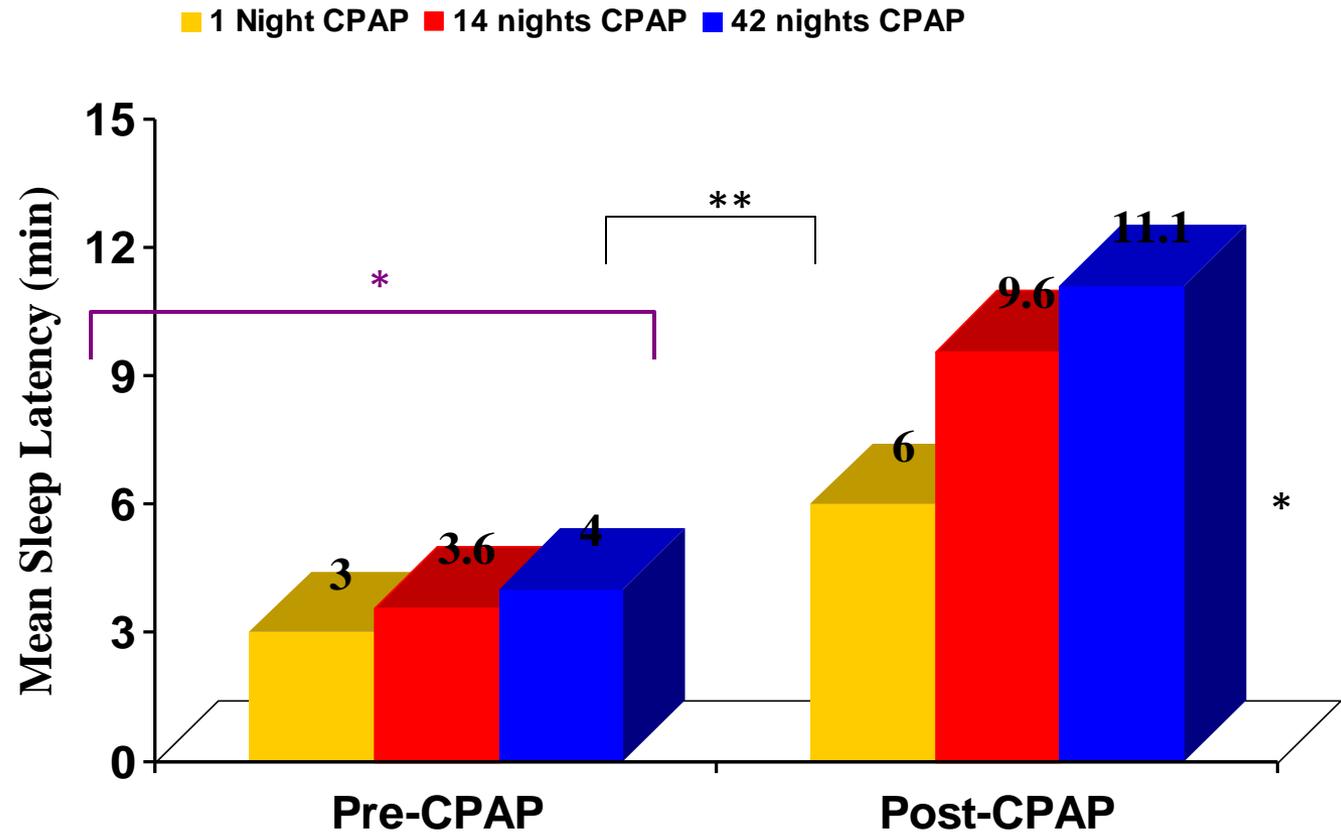
Airway Closure without CPAP



Airway Splinted Open with CPAP

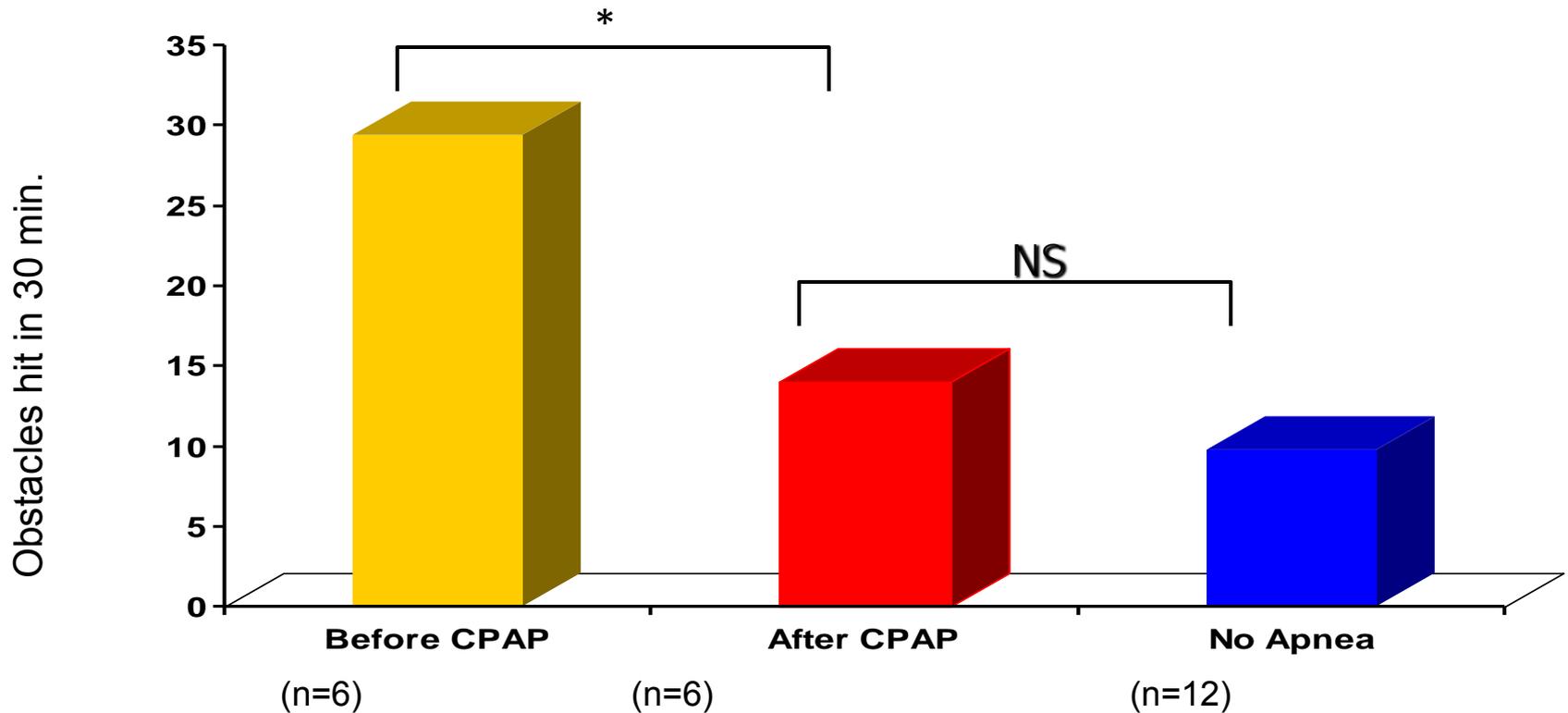
# Benefits of CPAP: Sleepiness

## *CPAP Treatment*



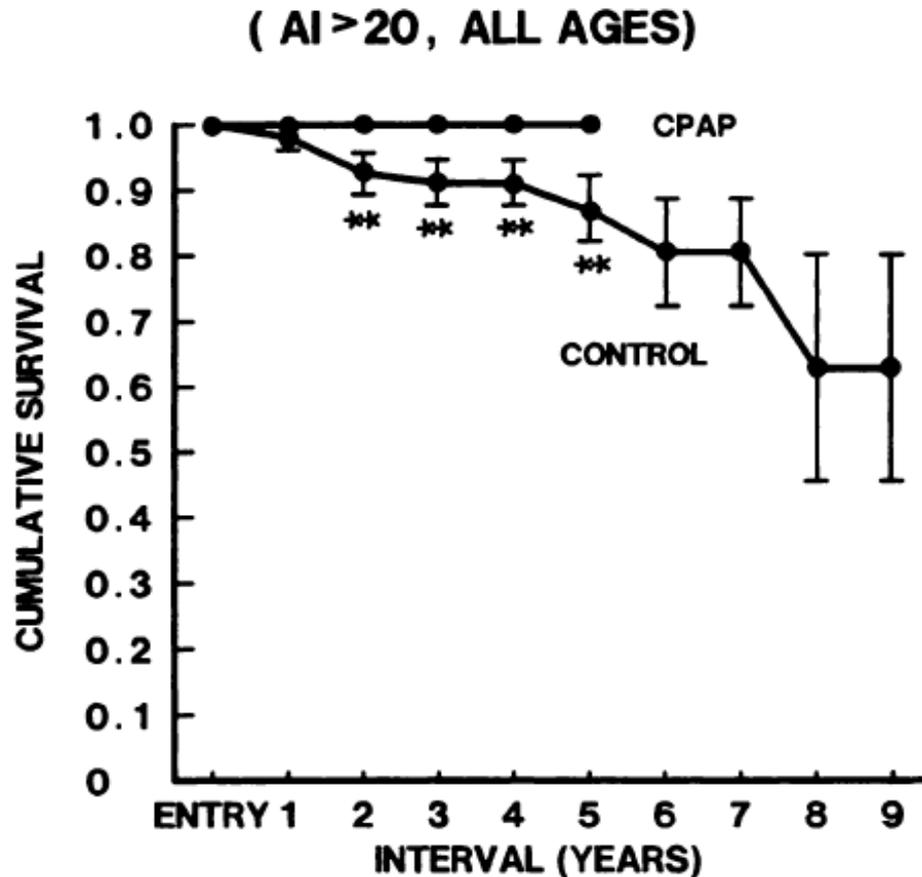
Mean sleep latency is a measure of sleepiness

# Benefits of CPAP: Performance



Test of driving performance after 3-5 months of OSA treatment

# Benefits of CPAP: Mortality



Treatment with continuous positive airway pressure (CPAP) reduces mortality

# CPAP Compliance

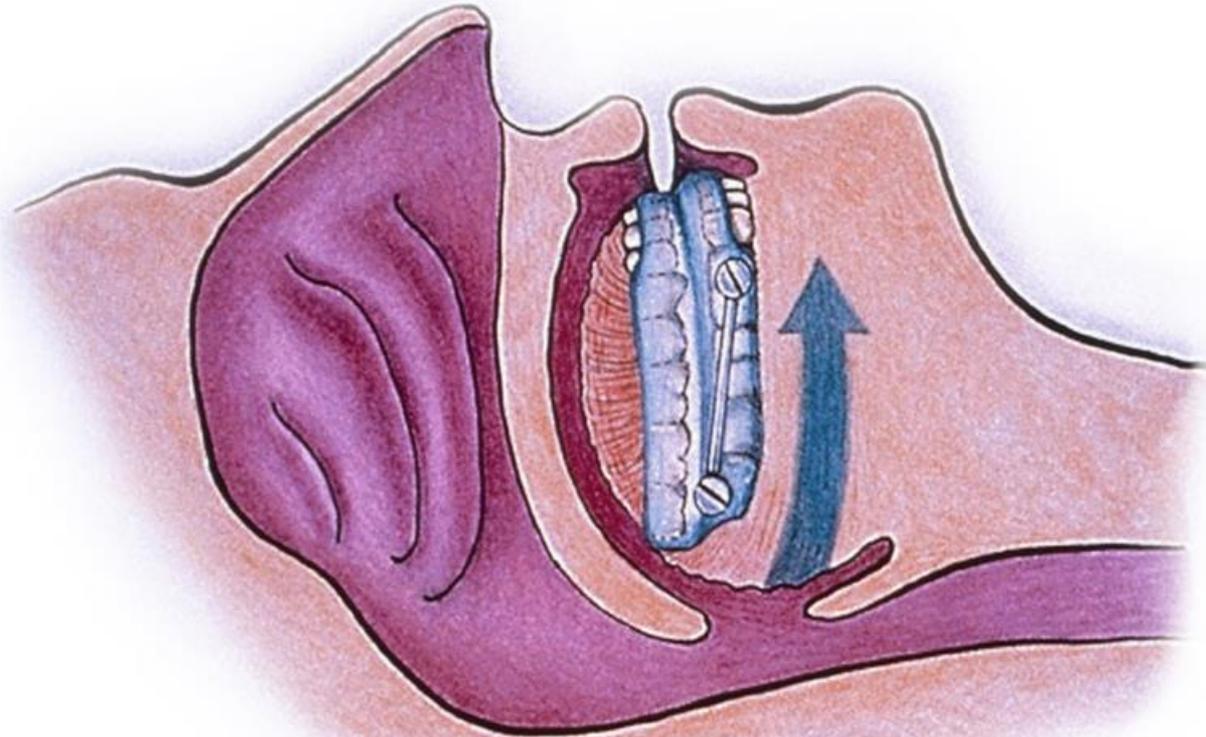
- 75% of patients report that they use their CPAP regularly
- Objectively 46% of patients use their CPAP for  $\geq 4$  hrs for  $\geq 5$  nights per week
- Asthma medicine compliance is even worse (30%)



Treadmill Clothes Hanger

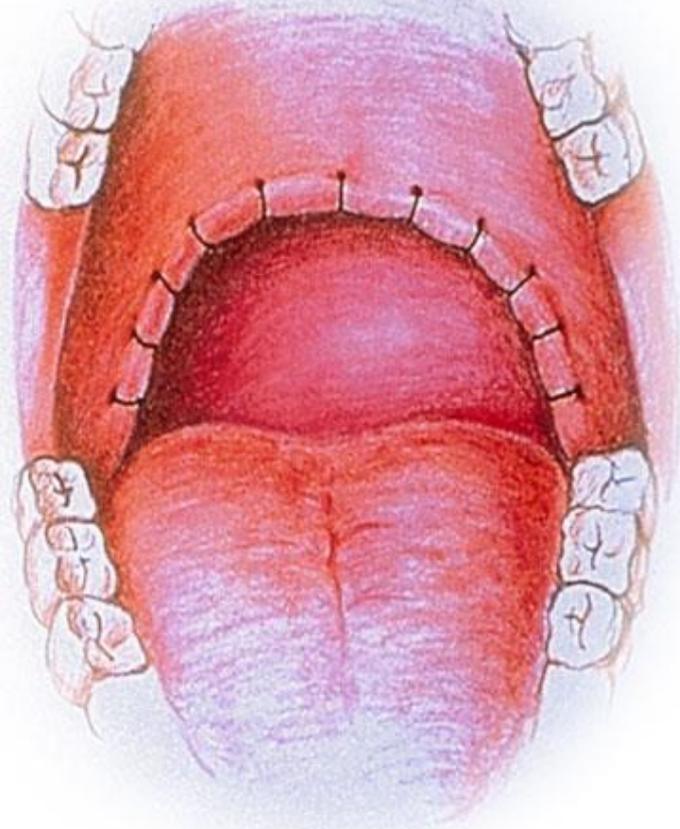
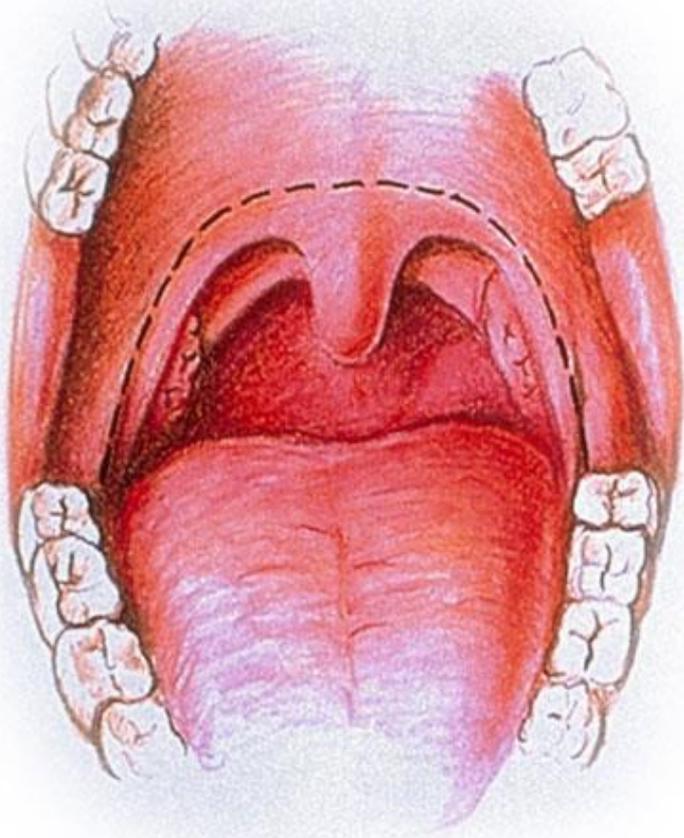
# Treatment of OSA

## Oral Appliance



Enlarges the airway, reduces airway collapsibility  
and decreases airway resistance

# Uvulopalatopharyngoplasty (UPPP)



40-50% success rate to cure OSA

# Tracheostomy

- Last resort
- Extremely effective for the treatment of OSA
- Used for patients with severe life-threatening disease who can't tolerate CPAP



# Summary

- Sleep is common and under diagnosed
- There are two types (central and obstructive) and obstructive is by far the most common
- Diagnosis is made by overnight sleep study
- There are several risk factors for OSA
  - some modifiable: alcohol intake and weight
- There are a number of consequences of untreated OSA that improve with treatment
- Treatment options include dental device, CPAP, surgery