STAGES OF SLEEP

- NREM Sleep – Nonrapid eye movement; non-REM
  - Stage 0: Awake; alpha rhythm
  - Stage 1: Transition from wakefulness to sleep; light sleep
  - Stage 2: Transition between delta and REM sleep; medium sleep; sleep spindles and K complexes

- Delta Sleep – non-REM
  - Slow-wave sleep
  - Stage 3: Deeper depth of sleep than stage 2; approximately 20% to 50% of a period consists of delta waves
  - Stage 4: Greater delta-wave activity than stage 3; very deep sleep; greater than 50% of a period consists of delta waves

- REM Sleep – Rapid eye movement
  - Active EEG
  - Dream sleep
  - Depth of sleep between stage 2 and stage 3
  - Loss of muscle tone except ocular and respiratory muscles
  - REM sleep occurs 60 to 90 minutes after onset of sleep

- Polysomnography is used to determine sleep states and includes electroencephalograms (EEGs), electromyograms (EMGs), electrocardiograms (ECGs), and eye movements.

- Normal sleep progresses through the four stages of non-REM sleep in order 1 through 4. Stage 2 then occurs as a transition between delta sleep and REM sleep. REM sleep occurs next, and the entire cycle lasts about 90 minutes. Four to six cycles occur each night in a normal adult.
Stages of Sleep

• α rhythm

REM
• Loss of muscle tone except eye and respiratory muscles

Stage 1
• Only occurs during transition from awake to sleep

Stage 2
• K complexes

Stage 3

Delta Sleep

Stage 4
• 50% of period contains delta waves

Non-REM sleep includes stages 1–4

Awake
Stage 0

Drowsy

Medium Sleep

Deeper Sleep Delta

Very Deep Sleep Delta

Transition between delta sleep and REM

I can’t move, but I can breathe.

REM

Goodnight!

End one cycle ≈ 90 minutes

I can’t move, but I can breathe.
SLEEP DISORDERS: DYSSOMNIAS
Dyssomnias include five primary sleep disorders consisting of difficulty initiating and maintaining sleep and excessive sleep. According to DSM-IV-TR criteria, all of the disorders cause distress or affect social functioning or work and are not caused by a physical or mental condition, medications, or substance abuse.

■ PRIMARY INSOMNIA
- DSM-IV-TR criteria include difficulty falling asleep or maintaining sleep
- Anxiety and depression often coexist
- Treatment includes Zolpidem (Ambien) and Zaleplon (Sonata), which are both benzodiazepine agonists. Short-acting benzodiazepines may be used temporarily. Sedating antidepressants such as trazodone (Desyrel) and amitriptyline (Elavil) may also be used.
- Also advise proper sleep techniques:
  - Discontinue caffeine, nicotine, and alcohol
  - Avoid daytime napping
  - Avoid exercise before sleeping, but encourage regular exercise
  - Avoid meals before sleeping
  - Keep a consistent schedule of waking and sleeping at the same time every day

■ PRIMARY HYPERSOMNIA
- DSM-IV-TR criteria include:
  - Excessive sleepiness occurring for one month
  - Associated with daytime sleepiness
- Treatment includes stimulants for daytime sleepiness

■ NARCOLEPSY
- DSM-IV-TR criteria include:
  - Sleep attacks during the day with abnormal REM sleep (e.g., sleep paralysis, sleep-onset REM, cataplexy, hallucinations)
  - Cataplexy involves the sudden onset of sleep with reversible bilateral loss of skeletal muscle tone and may be triggered by emotions
  - Hypnagogic hallucinations occur at the beginning of sleep
  - May be familial, and greater than 90% have HLA-DR2
  - Daytime naps often relieve sleepiness
- Treatment includes Modafinil, a nonamphetamine stimulant approved for narcolepsy. Methylphenidate (Ritalin), a stimulant, is also used.

■ BREATHING-RELATED SLEEP DISORDER (SLEEP APNEA)
- DSM-IV-TR criteria include sleep disruption resulting in daytime sleepiness
- Sleep apnea involves abnormal breathing, snoring, frequent awakenings, and oxygen desaturation
- Sleep apnea can result in depression, anxiety, and memory and concentration disturbances
- Central sleep apnea is caused by brainstem dysfunction
- Obstructive sleep apnea is caused by airway obstruction
- Treatment includes continuous positive airway pressure (CPAP)
- Weight loss or nasal surgery may also be indicated

■ CIRCADIAN RHYTHM SLEEP DISORDER
- DSM-IV-TR criteria include mismatch between intrinsic circadian rhythm and actual sleep periods
- May occur with jet lag, long work shifts, or night shifts
Dyssomnias

Circadian Rhythm Sleep Disorder
⇒ clock
- Mismatch between circadian rhythm and actual sleep periods
- Occurs with jet lag and long shifts
⇒ jet

Abnormal REM sleep

Sleep attacks during day
⇒ sun

Cataplexy

Narcolepsy
- Sleep attacks during the day with abnormal REM sleep
⇒ sun with REM
- Cataplexy ⇒ sleeping cat
  - Sudden onset of sleep
  - Reversible bilateral loss of skeletal muscle tone
- HLA-DR2 in 90%
- Hypnagogic hallucinations
- Treatment includes stimulants such as methylphenidate (Ritalin)
⇒ fin

Primary Insomnia
- Difficulty falling asleep or maintaining sleep
- Treatment includes:
  - Zolpidem (Ambien) ⇒ pie
  - Short-acting benzodiazepines
  - Sedating antidepressants (trazodone or amitriptyline)
- Proper sleep techniques
  - Avoid caffeine, nicotine, and alcohol ⇒ cigarettes, soda, and beer in trash
  - Avoid daytime napping
  - Avoid meals before sleeping
  - Keep a consistent schedule
⇒ alarm clock

Sleep Apnea
- Involves snoring, frequent awakenings, and O₂ desaturation
- Central sleep apnea is caused by a brainstem dysfunction
⇒ flower stem on brain
- Obstructive sleep apnea
⇒ X on neck
- Treatment includes CPAP and weight loss

Central sleep apnea
- Brainstem affected
⇒ flower stem

Primary Insomnia
- Difficulty falling asleep or maintaining sleep
- Treatment includes:
  - Zolpidem (Ambien) ⇒ pie
  - Short-acting benzodiazepines
  - Sedating antidepressants (trazodone or amitriptyline)
- Proper sleep techniques
  - Avoid caffeine, nicotine, and alcohol ⇒ cigarettes, soda, and beer in trash
  - Avoid daytime napping
  - Avoid meals before sleeping
  - Keep a consistent schedule
⇒ alarm clock
SLEEP DISORDERS: PARASOMNIAS

Parasomnias = Pair of Pears

Parasomnias include three primary sleep disorders and involve behavioral events that occur during sleep:

- **SLEEPWALKING DISORDER**
  - Walking during sleep initiated during slow-wave (delta) sleep
    - slow-wave sleep = walking on wave
  - Accompanied by confusion and complex behaviors and motor activity

- **NIGHTMARE DISORDER**
  - Scary dreams that occur during REM sleep and usually wake a person from sleep
    - bad dream
    - awaken from sleep = eyes open

- **SLEEP TERROR DISORDER**
  - Sudden episodes of apparent terror during slow-wave (delta) sleep. May scream or cry out, but do not usually awaken during the episode
    - slow-wave sleep = walking on wave
    - do not awaken = eyes closed
Parasomnias

Sleep Terror Disorder
- Occurs during slow-wave sleep
  ⇒ walking on wave
- May scream out
- Do not awaken
  ⇒ eyes closed

Nightmare Disorder
⇒ bad dream
- Occurs during REM sleep
- Awaken from sleep
  ⇒ eyes open

Sleepwalking Disorder
- Occurs during slow-wave sleep
  ⇒ walking on wave

Pair of Pears = Parasomnias

I had a bad dream!

"AAAH the Terror!"