

## Neurochemicals involved in sleep

- **Serotonin (increased)**
  - Involved in sleep initiation
- **Acetylcholine (increased)**
  - Involved in REM sleep
- **Norepinephrine (decreased)**
  - Involved in REM sleep
- **Dopamine (increased)**
  - Involved in arousal and wakefulness, but is *increased* during sleep
    - Dopamine agonists (Parkinson's drugs – bromocriptine, pramipexole) will produce arousal making it harder to sleep
    - Dopamine antagonists (Antipsychotics – haloperidol, risperidone, etc.) will block dopamine and thus reduce arousal making it easier to sleep.

*Some SWS is linked with arousal*

## Neurochemicals involved in sleep

- **Alcohol and barbiturates REDUCE REM sleep!**
- On acute withdrawal, there will be an increase in REM sleep (REM rebound)

*most arousing part of sleep*  
*decrease quality of sleep*

\* Sleep: Narcolepsy > definition & criteria ( sudden attack of sleep in the daytime ) / cataplexy, short REM latency, hypnagogic, hypnopompic

# Sleep disorders

## Sleep- wake Disorders

Notes: primary and secondary causes

Organization of sleep : NREM AND REM



<u>NREM</u> <i>Non-rapid eye movement sleep.</i>	<u>REM</u> <i>rapid eye movement</i>
75% of sleep	25% of sleep
Divided into 4 parts ( NREM 1, 2, 3, 4 )	—
Body active ( there is a muscular tone) and brain is inactive ( no conscious thoughts ) , no eye movement and high muscular tone	Body is inactive while the brain is active . Rapid eye movement. No muscular tone. Dreams are actually remembered in this phase.

*having thoughts this is when you actually are having your dreams that you remember in morning.*

REM latency → *Falling asleep to onset of REM*, average 90min, shorter in depressed + Narcolepsy.

sleep latency → *Time it take to Fall asleep*, average 15min, longer in insomniac + shark → narcolepsy

## ■ Causes of sleep disorders include:

- medical conditions:pain ,endocrine disorder,metabolic condition.
- physical condition: obesity.
- sedative withdrawal.
- Use of stimulants : caffiene ,amphetamine.
- Major depression. *↑ sleep changes, one of the SIG E CAPS symptoms*
- anxiety or mania.
- neurotransmitters abnormality:
  - 1.elevated dopamine and norepinephrene.
  - 2.elevated serotonin (delta wave)
  - 3.elevated acetylcholine (REM)

# classification

- Sleep disorders are classified as either:

-primary:

1 -DYSSOMNIA: disturbance in amount , quality or timing.

2 -primary insomnia. (initiation)

3 -primary hypersomnia

4 -narcolepsy (REM)

5 -breathing –related disorders

→ obstructive sleep apnea  
(all phases)

6 -circadian rhythm sleep disorder

7 -PARASOMNIA: abnormal events in behavior or

physiology during sleep:

- nightmare disorder
- night terror disorder.
- sleep walking disorder

→ things that happen  
while we are sleeping

- sleepwalking (NREM 3-4)
- Night terrors (NREM 3-4) ائيب
- Nightmares (REM)

-secondary.

# Primary insomnia

- Difficulty initiating or maintaining sleep, resulting in daytime drowsiness or difficulty fulfilling tasks. Disturbance occurs three or more times per week for at least 1 month.
- EPIDEMIOLOGY/ETIOLOGY
  - Affects 30% of the general population
  - Often exacerbated by anxiety and preoccupation with getting enough sleep.

# treatment

- **1. Sleep hygiene measures (first line):**
  - Maintain regular sleep schedule.
  - Limit caffeine intake.
  - Avoid daytime naps. (مخلولة)
  - Exercise early in day.
  - Soak in hot tub prior to bedtime.
  - Avoid large meals near bedtime.
  - Remove disturbances such as TV and telephone from bedroom (bedroom for sleep and sex only).
  
- **2. Pharmacotherapy (for short-term use): Benadryl, Ambien (zolpidem), Sonata (zaleplon), Desyrel (trazodone)**

# Primary hypersomnia:

- **DIAGNOSIS**

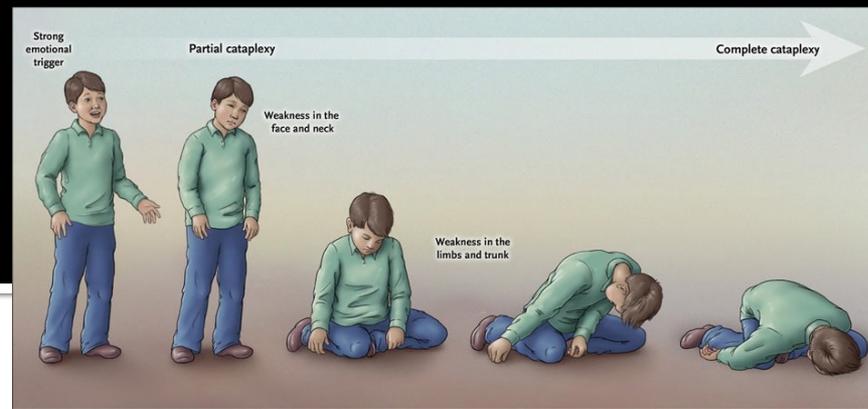
- At least 1 month of excessive daytime sleepiness or excessive sleep not attributable to medical condition, medications, poor sleep hygiene, insufficient sleep, or narcolepsy Usually begins in adolescence.

- **Treatment**

- stimulant drugs:amphetamines are first line.

- SSRI may be useful in some patients

# Narcolepsy:



## ■ DIAGNOSIS

-Repeated, sudden attacks of sleep in the daytime for at least 3 months, associated with:

1. **Cataplexy**—collapse due to sudden loss of muscle tone (occurs in 70% of patients); associated with emotion, particularly laughter
2. Short REM latency
3. Sleep paralysis—brief paralysis upon awakening (in 50% of patients)
4. Hypnagogic (as patient falls asleep or is falling asleep); hypnopompic (as patient wakes up; dream persists); hallucinations (in approximately 30% of patients)

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# Epidemiology/etiology

- Occurs in 0.02 to 0.16% of adult population
  - Equal incidence in males and females
  - Onset most commonly during childhood or adolescence
  - May have genetic component
  - Patients usually have poor nighttime sleep.
- 
- **Treatment:**
  - Timed daily naps plus stimulant drugs (amphetamines and methylphenidate) *give also i - hypersomnia*
  - SSRIs or sodium oxalate for cataplexy.

# Breathing-related Disorders:

- Sleep disruption and excessive daytime sleepiness (EDS) caused by abnormal sleep ventilation from either obstructive or central sleep apnea.
- EPIDEMIOLOGY
  - Up to 10% of adults
  - More common in men and obese persons
  - Associated with headaches, depression, pulmonary hypertension, and sudden death in elderly and infants
  - Obstructive sleep apnea (OSA): Strong correlation with snoring
  - Central sleep apnea (CSA) correlated with heart failure

الانقطاع  
الشديد أثناء  
النهار

- **OSA RISK FACTORS:**

1. Male gender
2. Obesity
3. Male shirt collar size  $\geq 17$
4. Prior upper airway surgeries
5. Deviated nasal septum
6. "Kissing" tonsils
7. Large uvula, tongue
8. Retrognathia

- **TREATMENT**

1. *OSA: Nasal continuous positive airway pressure (nCPAP), weight loss, nasal surgery, or uvulopalatoplasty*
2. *CSA: Mechanical ventilation (such as b-PAP) with a backup rate*

# Circadian rhythm sleep disorder:

\_Disturbance of sleep due to mismatch between circadian sleep–wake cycle and environmental sleep demands. Subtypes include jet lag type, shift work type , and delayed sleep or advanced sleep phase type.

## TREATMENT:

1. Jet lag type usually remits untreated after 2 to 7 days(no need to treat possible diet or light)
2. Light therapy may be useful for shift work type(non changing scheduals,clock wise dirction)
3. For shift life, delayed/advanced phase is better
4. Melatonin can be given 5 1/2 hrs before desired bedtime

# Nightmare disorder:

## ■ DIAGNOSIS

- Repeated awakenings with recall of extremely frightening dreams  
Occurs during REM sleep and causes significant distress

## ■ EPIDEMIOLOGY

- Onset most often in childhood
- May occur more frequently during times of stress or illness

## ■ TREATMENT

- Usually none, but tricyclics or other agents that suppress total REM sleep may be used.

# Night terror disorder:

## ■ DIAGNOSIS

- Repeated episodes of apparent fearfulness during sleep, usually beginning with a scream and associated with intense anxiety. Episodes usually occur during the first third of the night during stage 3 or 4 sleep (non-REM). Patients are not awake and do not remember the episodes.

## ■ EPIDEMIOLOGY/ETIOLOGY

- Usually occurs in children
- More common in boys than girls
- Prevalence: 1 to 6% of children
- Tends to run in families
- High association with comorbid sleepwalking disorder

EEG →  
to rule out  
epilepsy

## ■ TREATMENT

Usually none, but small doses of diazepam at bedtime may be effective (if nec

# Sleep walking disorder (somnambulism):

- Repeated episodes of getting out of bed and walking, associated with blank stare and difficulty being awakened. Other motor activity may occur, such as getting dressed, talking, or screaming. Behavior usually terminates with patient returning to bed, but patient may awaken with confusion for several minutes. Episodes occur during the first third of the night during stages 3 and 4 sleep and are never remembered.
- EPIDEMIOLOGY/ETIOLOGY
  - Onset usually between ages 4 and 8; peak prevalence at age 12
  - More common in boys than girls and tends to run in families
- TREATMENT
  - Measures to prevent injury in surrounding environment