

SLEEP AND Sleep disorders



Striding for Quality

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OVERVIEW

- ❑ Introduction
- ❑ Neurobiology of Sleep & Wakefulness
- ❑ Stages of Sleep
- ❑ Assessment
- ❑ Classification of sleep disorder
- ❑ Common Sleep disorders and management
- ❑ References

INTRODUCTION: Definition of sleep

Sleep.

- **Definition.**
- Sleep is a state of unconsciousness in which the brain is relatively more responsive to internal than external stimuli.
- **Functions**
- Restorative
- Homeostatic function



INTRODUCTION: Definition of sleep

- Sleep is a regularly recurring, rapidly reversible neurobehavioral state characterized by quiescence, postural recumbence, and reduced awareness of the environment.
- Sleep is considered to be a psychiatric “vital sign,” requiring routine evaluation and treatment whenever sleep disorders are encountered.
- Sleep is required for proper brain function.

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- Sleep disorders are among the most common clinical problems encountered in medicine and psychiatry.
 - Inadequate or nonrestorative sleep can markedly impair a patient's quality of life.
 - Sleep disorders may be primary or may result from a variety of psychiatric and medical conditions.
 - Primary sleep disorders result from an endogenous disturbance in sleep-wake generating or timing mechanisms, often complicated by behavioral conditioning.
 - They may be divided into the following 2 broad categories:

1. **Parasomnias** – These are unusual experiences or behaviors that occur during sleep; they include sleep terror disorder and sleepwalking (which occur during stage 4 sleep) and nightmare disorder (which occurs during rapid eye movement [REM] sleep).
2. **Dyssomnias** – These are characterized by abnormalities in the amount, quality, or timing of sleep; they include primary insomnia and hypersomnia, narcolepsy, breathing-related sleep disorder (ie, sleep apnea), and circadian rhythm sleep disorder

Pathophysiology

- Sleep is divided into the following 2 categories, each of which is associated with distinct patterns of central nervous system (CNS) activity:
- **REM sleep** – This is characterized by muscle atony, episodic REMs, and low-amplitude fast waves on electroencephalography (EEG); dreaming occurs mainly during REM sleep
- **Non-REM (NREM) sleep** – This is further subdivided into 4 progressive categories, termed stages 1–4 sleep; the arousal threshold rises with each stage, and stage 4 (delta), characterized by high-amplitude slow waves, is the sleep state from which arousal is most difficult.

NEUROBIOLOGY OF SLEEP AND WAKEFULNESS SPECTRUM

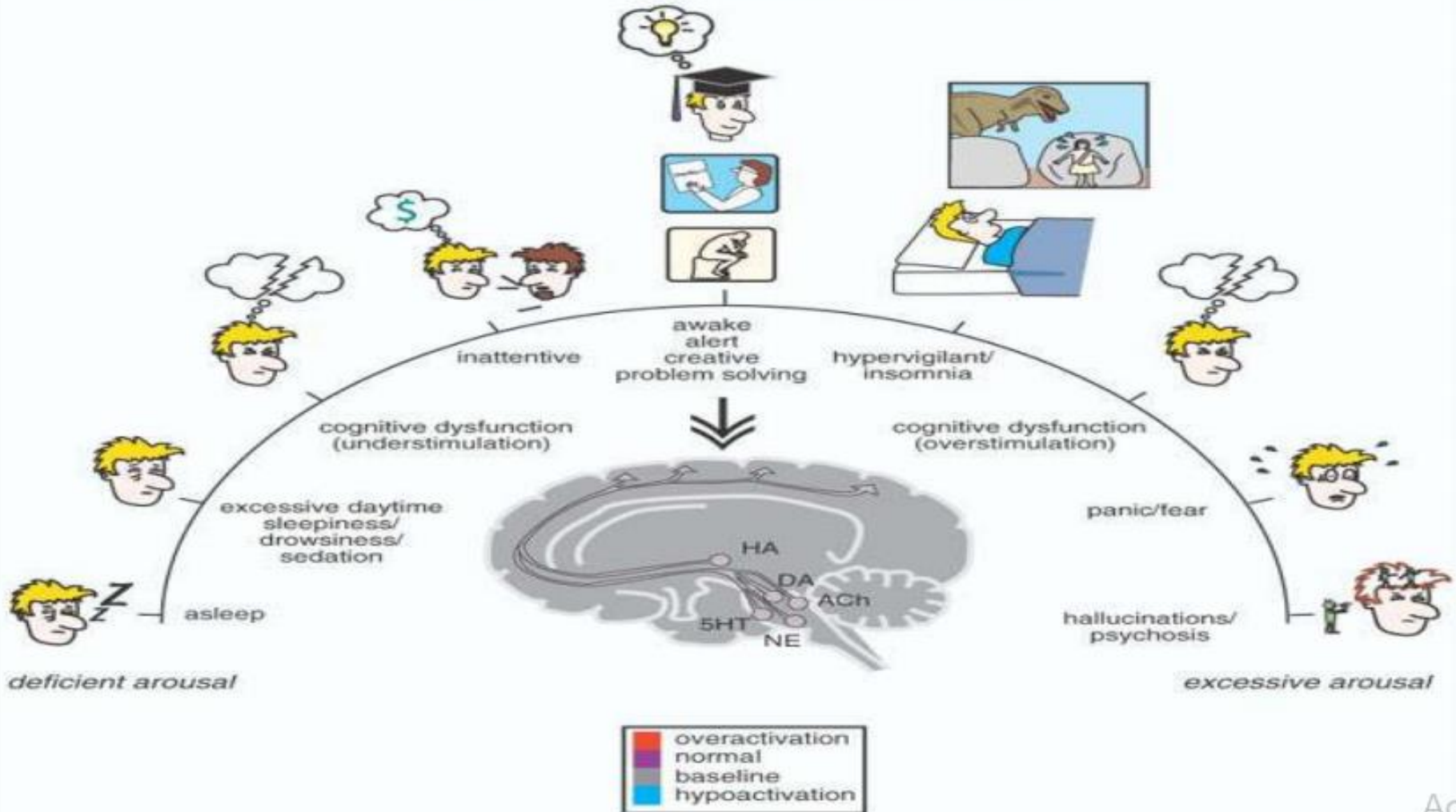
- What keeps us as awake?
- What makes us go to sleep?

AROUSAL SPECTRUM OF SLEEP AND WAKEFULNESS

- Influenced in by five key neurotransmitters:
- Histamine (HA)
- Dopamine (DA)
- Norepinephrine (NE)
- Serotonin (5HT)
- Acetylcholine (Ach).
- When there is good balance between 'too much' and 'too little' arousal, one is awake, alert, and able to function well

Arousal Spectrum

Arousal Spectrum of Sleep and Wakefulness



What Keeps Us Awake?

- The state of arousal is more complex than “awake” or “asleep”.
- Arousal exists as if on a dimmer switch, with many phases along the spectrum.
- Histamine keeps the brain awake.
- HISTAMINE (TMN) Histamine promotes the CALM wakefulness that helps problem solving, creativity and cognition (unlike the monoamines).

- Tuberomammillary Nucleus (TMN) of Hypothalamus is the Wakefulness Promoter (**the coffee- house of the brain**)
- TMN of hypothalamus contains histamine producing neurons that are activated by glutamate and inhibited by GABA and Benzodiazepines.
- These neurons are the wakefulness promoter.
- Lateral hypothalamus contains **orexin/hypocretin neurons** that promote **weight loss** in addition to **wakefulness**.

Ventro-Lateral Preoptic Nucleus of the Hypothalamus(VLPO) - the Sleep Promoter

- VLPO nucleus contains GABA neurons that inhibit TMN and thus promote sleep.
- Benzodiazepines augment the action of GABA in VLPO nucleus.

The Balance of Sleep and Wakefulness

TMN
VLPO



WAKE PROMOTER:

Tuberomammillary nucleus –
TMN-of the hypothalamus
promotes wakefulness(
produces histamine)

SCN



INTERNAL CLOCK:

Suprachiasmatic nucleus of
the hypothalamus –**THE
SWITCH** (activated by light,
melatonin). It can
promote either sleep or
wakefulness.



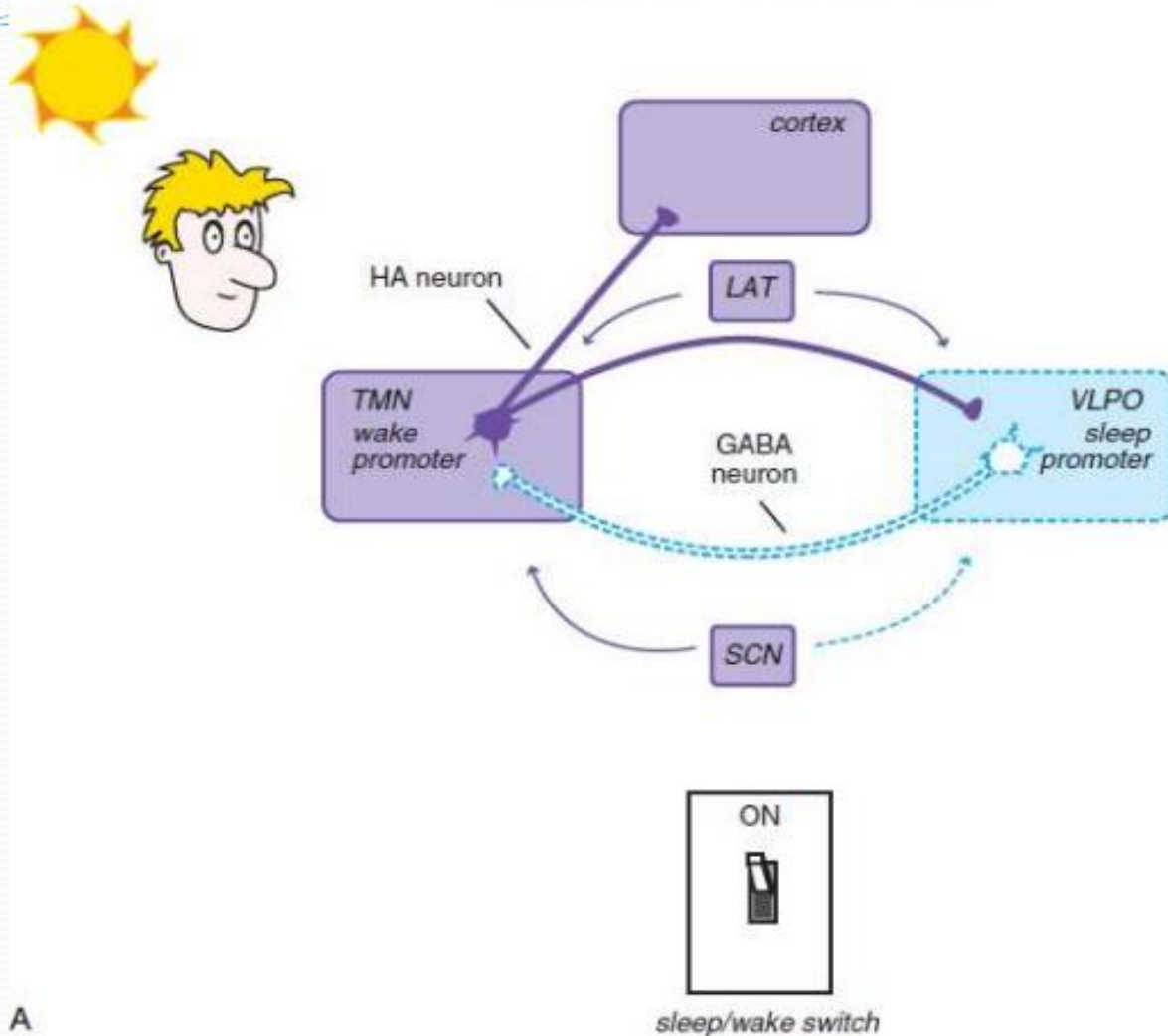
SLEEP PROMOTER:

Ventrolateral
preoptic area –
VLPO-of the
hypothalamus
promotes sleep
(produces GABA)

THE SLEEP/WAKE SWITCH

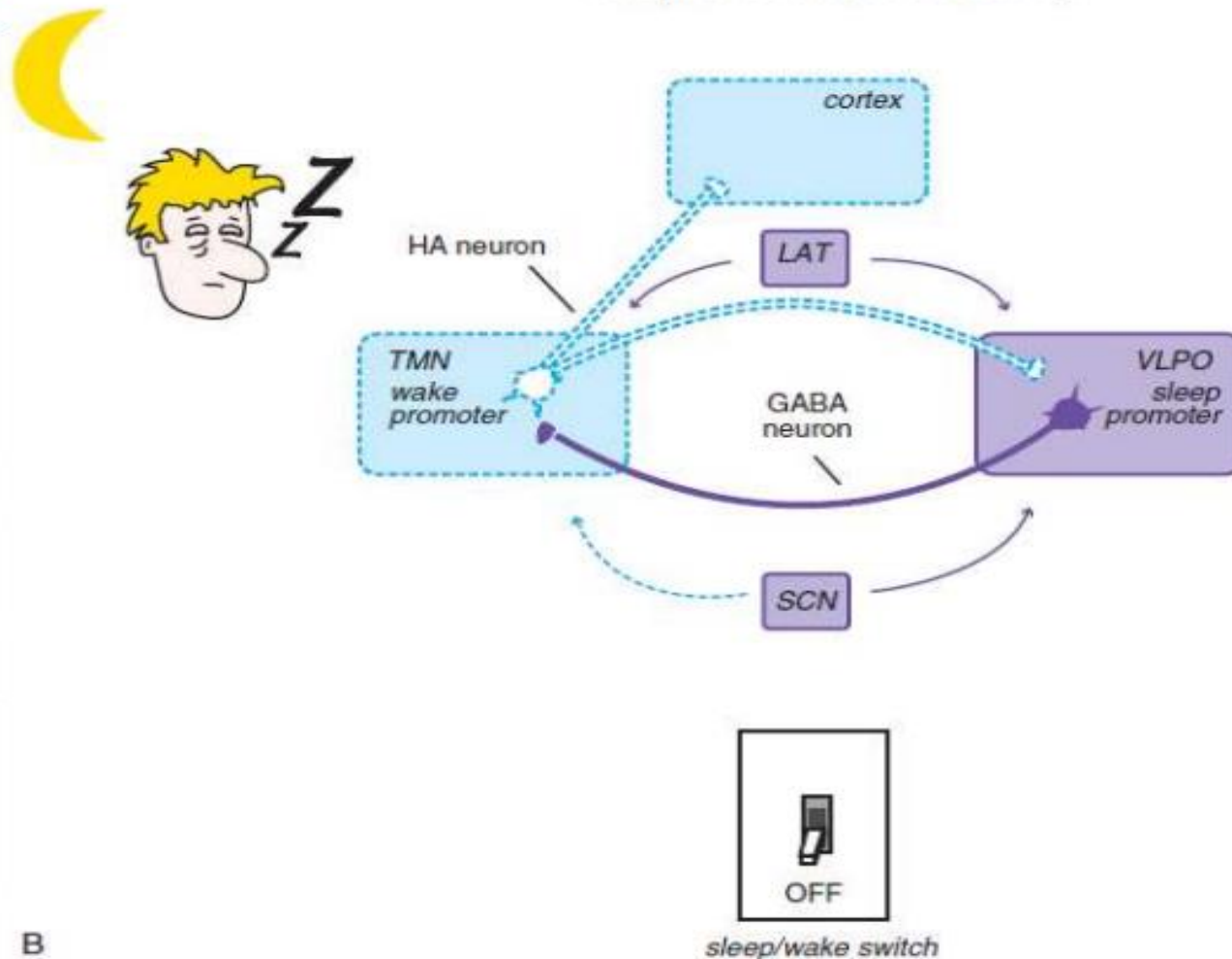
- The hypothalamus is a key control center for sleep and wake
- The “off” setting or sleep promoter, is localized within the Ventrolateral preoptic nucleus (VLPO) of the Hypothalamus
- The “on” setting – the wake promoter – is localized within the Tuberomammillary nucleus (TMN) of the hypothalamus
- Two key neurotransmitters regulate the sleep/wake switch: Histamine from the TMN and GABA from the VLPO

Sleep/Wake Switch On and Awake



- When the TMN is active and histamine is released to the cortex and the VLPO, the wake promoter is on and the sleep promoter inhibited.

Sleep/Wake Switch Off and Asleep

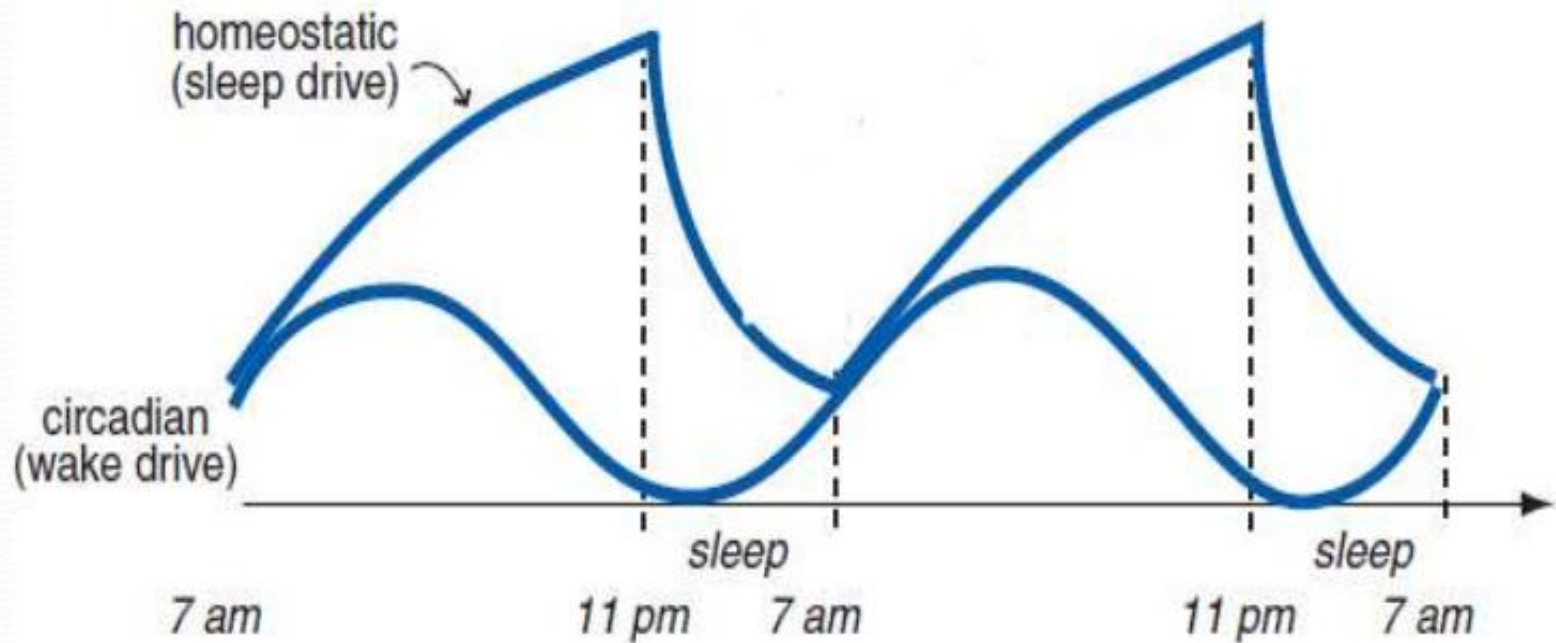


- When the VLPO is active and GABA is released to the TMN, the sleep promoter is on and the wake promoter inhibited

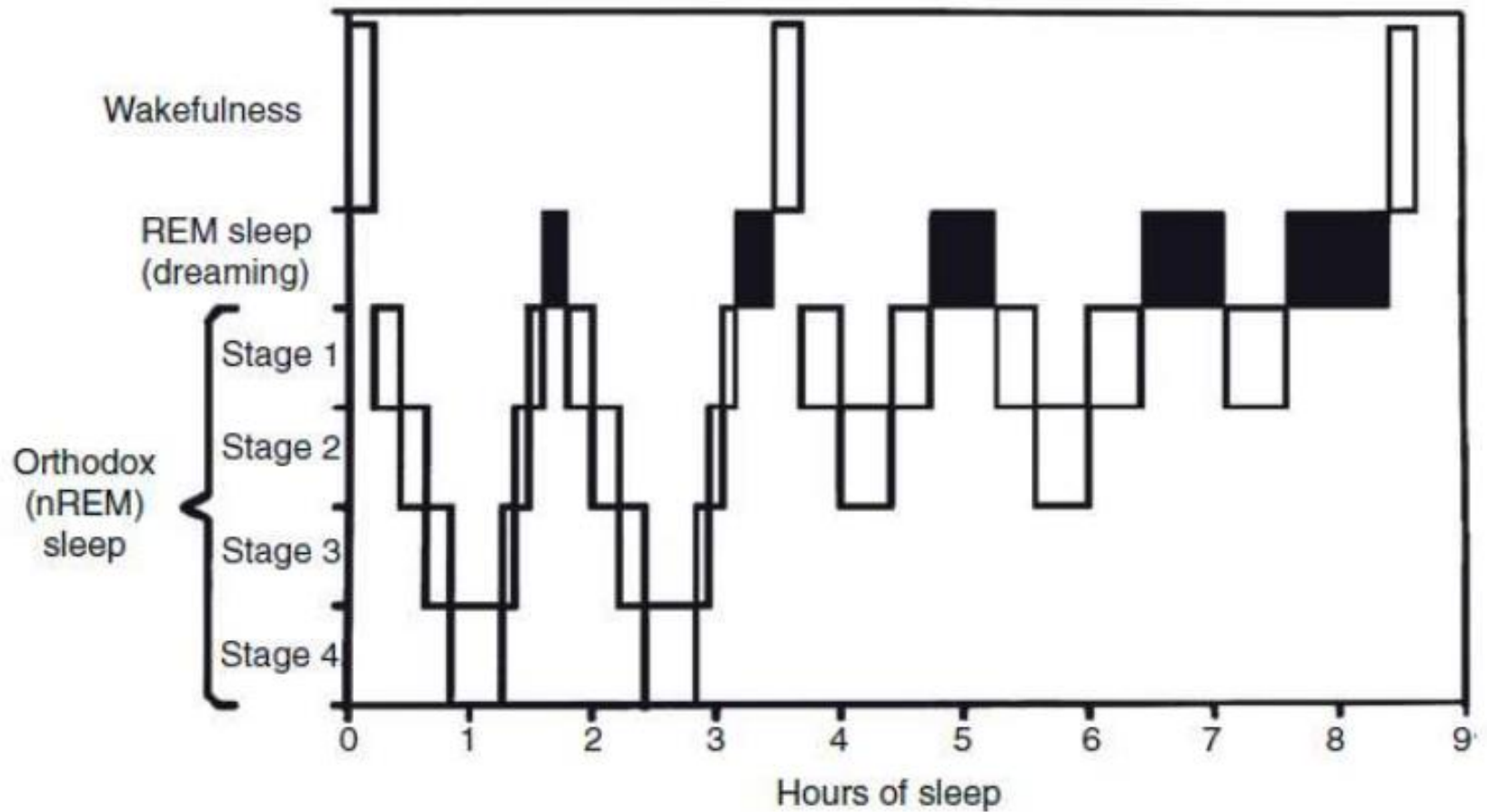
PROCESSES REGULATING SLEEP

- The circadian wake drive is a result of input (light, melatonin, activity) to the **Suprachiasmatic** nucleus (SCN).
- The longer one is awake – Homeostatic sleep drive increases and it decreases with sleep.
- As the day progresses, circadian wake drive diminishes and homeostatic sleep drive increases until a tipping point is reached and the Ventrolateral preoptic sleep promoter (VLPO) is triggered to release GABA in the Tuberomammillary nucleus (TMN) and inhibit wakefulness

Processes Regulating Sleep

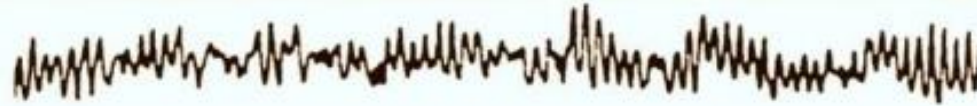


STAGES OF SLEEP





Awake
Low-voltage, high-frequency beta waves



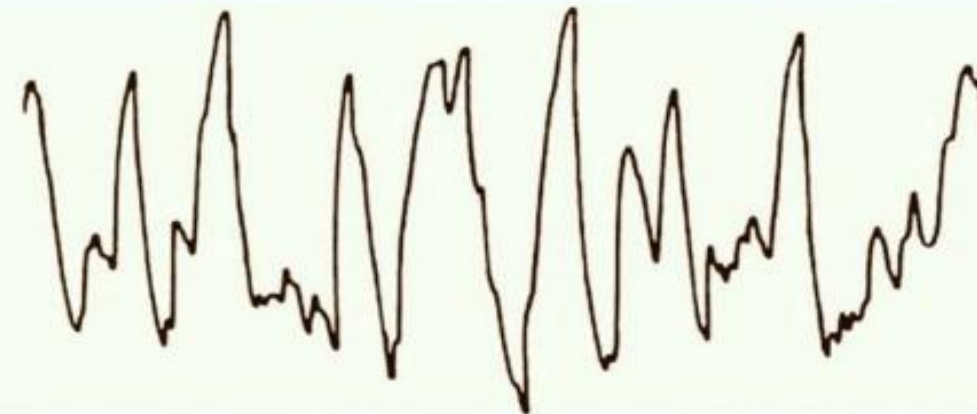
Drowsy
Alpha waves prominent



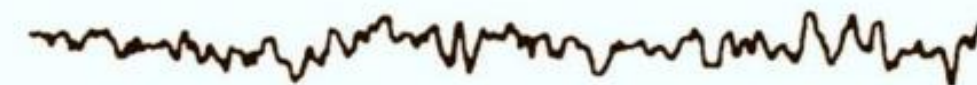
Stage 1 sleep
Theta waves prominent



Stage 2 sleep
Sleep spindles and mixed EEG activity



Slow-wave sleep
(stage 3 and stage 4 sleep)
Progressively more delta waves (stage 4 shown)



REM sleep
Low-voltage, high-frequency waves

EEG activity

4 types :

- beta(>12 Hz)
- alpha(8–12 Hz)
- theta(4–8 Hz)
- delta(1–3 Hz)

In stage 1 we experience a light transitional sleep. This is where drowsiness and sleep begin.

Stage 1

In stage 2 more stable sleep occurs. Chemicals produced in the brain block the senses making it difficult to be woken.

Stage 2

Stage 3 is deep sleep. Growth hormone is released during this stage. Most stage 3 sleep occurs in the first third of the night.

Stage 3

REM sleep revitalizes the memory. In this stage brain activity is very high and intense dreaming is likely to occur.

REM

90-120
Minutes

PHYSIOLOGICAL CHARACTERISTICS OF SLEEP–WAKE STATES

	Wake	NREM	REM
EEG	Fast, low voltage	Slow, high voltage	Fast, low voltage
Eye movement	Vision-related	Slow-irregular	Rapid
Muscle tone	++	+	-
Neuronal activity in Hypocretin / orexin neurons	++	-	-
Heart rate, blood pressure, respiratory rate	Variable	Slow/ low, regular	Variable, higher than NREM
Responses to hypoxia and hypercarbia	Active	Reduced responsiveness	Lowest responsiveness
Thermoregulation	Behavioral and physiological regulation	Physiological regulation only	Reduced physiological regulation
Mental activity	Full	None or limited	Story-like dreams

ASSESSMENT

- Sleep history and accurate history of concurrent medical and psychiatric disorders
 - Evaluation of current medications
 - Retrospective self-report:
 - Pittsburgh Sleep Quality Index (Buysse et al., 1989)
 - Epworth Sleepiness Scale (Johns, 1991)
 - Insomnia Severity Index (Bastien et al., 2001)
 - Berlin Sleep Apnea Questionnaire (Netzer et al., 1999)
 - Prospective self-report: sleep–wake diaries or sleep logs

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- **Polysonnography** (PSG) : EEG, electro-oculograms (EOG), electromyogram (EMG), ECG, oral–nasal airflow, nasal pressure, ribcage and abdominal movement and oximetry.
 - PSG is Gold standard for sleep assessment
 - Functional imaging methods: PET, SPECT and fMRI

SLEEP DISORDER CLASSIFICATIONS

- Diagnostic & Statistical Manual of Mental Disorders (DSM 5)
- International Classification of Diseases (ICD 10)
- International Classification of Sleep Disorders (ICSD-3)

DSM-5 CLASSIFICATION

- Insomnia Disorder
- Hyper somnolence Disorder
- Narcolepsy
- Breathing-Related Sleep Disorders
- Circadian Rhythm Sleep–Wake Disorders
- Parasomnias
- Non-REM Sleep Arousal Disorders
- Nightmare Disorder and REM Sleep Behavior Disorder
- Restless Legs Syndrome
- Substance/Medication-Induced Sleep Disorder

ICD 10 CLASSIFICATION

- G47 Sleep disorders
 - G47.0 Disorders of initiating and maintaining sleep [insomnias]
 - G47.1 Disorders of excessive somnolence [hypersomnias]
 - G47.2 Disorders of the sleep-wake schedule
 - G47.3 Sleep apnoea
 - G47.4 Narcolepsy and cataplexy
 - G47.8 Other sleep disorders
 - G47.9 Sleep disorder, unspecified

International Classification of Sleep Disorders (ICSD 3)

Major diagnostic section:

- Insomnia
- Sleep-related breathing disorders
- Central disorders of hypersomnolence
- Circadian rhythm sleep-wake disorders
- Parasomnias
- Sleep-related movement disorders
- Other sleep disorders

INSOMNIA DISORDER

- Sleep disorders involve problems with the quality, timing and amount of sleep, which cause problems with functioning and distress during the daytime.
- There are a number of different types of sleep disorders, of which insomnia is the most common.

Insomnia Disorder

Diagnostic Criteria

780.52 (G47.00)

- A. A predominant complaint of dissatisfaction with sleep quantity or quality, associated with one (or more) of the following symptoms:
 - 1. Difficulty initiating sleep. (In children, this may manifest as difficulty initiating sleep without caregiver intervention.)
 - 2. Difficulty maintaining sleep, characterized by frequent awakenings or problems returning to sleep after awakenings. (In children, this may manifest as difficulty returning to sleep without caregiver intervention.)
 - 3. Early-morning awakening with inability to return to sleep.
- B. The sleep disturbance causes clinically significant distress or impairment in social, occupational, educational, academic, behavioral, or other important areas of functioning.
- C. The sleep difficulty occurs at least 3 nights per week.
- D. The sleep difficulty is present for at least 3 months.
- E. The sleep difficulty occurs despite adequate opportunity for sleep.
- F. The insomnia is not better explained by and does not occur exclusively during the course of another sleep-wake disorder (e.g., narcolepsy, a breathing-related sleep disorder, a circadian rhythm sleep-wake disorder, a parasomnia).
- G. The insomnia is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication).
- H. Coexisting mental disorders and medical conditions do not adequately explain the predominant complaint of insomnia.

Specify if:

With non-sleep disorder mental comorbidity, including substance use disorders

With other medical comorbidity

With other sleep disorder

Coding note: The code 780.52 (G47.00) applies to all three specifiers. Code also the relevant associated mental disorder, medical condition, or other sleep disorder immediately after the code for insomnia disorder in order to indicate the association.

Epidemiology:

Most common sleep disorder.

- ~ 30–50% of the adult population may experience insomnia symptoms during the course of a year
- M:F = 1.5:1
- Age effect is not universally observed

Medical disorders and conditions associated with insomnia:

- Congestive heart failure
- COPD, asthma
- Chronic renal failure, prostatic hypertrophy
- Gastro-esophageal reflux disease
- Fibromyalgia, osteoarthritis, rheumatoid arthritis
- Hyperthyroidism, diabetes
- Parkinson's disease, cerebrovascular disease
- Menopause

Psychiatric disorders and conditions associated with insomnia:

- Major depression, dysthymic disorder, Bipolar disorder
- Generalized anxiety disorder, panic disorder, PTSD
- Schizophrenia
- Substance use disorders

Medications and Substances Associated With

- Insomnia: Alcohol (acute use, withdrawal), Caffeine, Nicotine, Cannabis, Antidepressants, Corticosteroids, β agonists, theophylline derivatives, β antagonists, Statins, Stimulants, Dopamine agonists

Etiology and Pathophysiology

- **Genetic Factors:** Increased prevalence of insomnia has been observed among monozygotic twins and first-degree family members.
- **Neurobiological Factors:** associated with physiological hyperarousal.
- Patients with insomnia have increased whole body metabolic rate, increased cortisol and ACTH (particularly in the evening and early sleep hours), altered heart rate variability, and altered secretion of norepinephrine and cytokines

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- **Psychological Factors:** Individuals with insomnia often have minor elevations in depressive and anxiety symptoms
 - **Social/Environmental Factors:** Insomnia is often precipitated by social or environmental stressors

Treatment

- **Treatment Goals:** to improve qualitative and quantitative aspects of sleep, to reduce sleep-related distress, and to improve daytime function.
- **Somatic Treatments:** Currently approved drugs include benzodiazepine receptor agonists, tricyclic drug, melatonin receptor agonist, antihistamines, and barbiturates
- **Psychosocial Treatments:** Stimulus control, Sleep restriction therapy, Relaxation training, Cognitive restructuring of irrational sleep-related beliefs and sleep hygiene.



Sleep hygiene: Promote behaviors that improve sleep; limit behaviors that harm sleep:

- Avoid naps
- Get regular exercise
- Maintain a regular sleep schedule
- Avoid stimulants (caffeine, nicotine)
- Limit alcohol intake
- Do not look at the clock when awake in bed

NARCOLEPSY

- The hallmark of Narcolepsy is extreme daytime sleepiness, marked by recurrent episodes of an irresistible need to sleep, unintentional sleep episodes, or napping. (at least 3 times per week for at least 3 months)
- In addition, Narcolepsy requires one of three additional findings:
- **Episodes of cataplexy** : Sudden and bilateral loss of muscle tone with preserved consciousness, and often precipitated by strong emotions such as laughter

- **Hypocretin (orexin) deficiency** in cerebrospinal fluid
- **Specific PSG findings:** reduced latency to REM sleep during nocturnal PSG (15 minutes or less)
- ❑ Narcolepsy is associated with sleep-related hallucinations at sleep onset (hypnagogic) or sleep offset (hypnopompic) in 20–60% of patients.
- ❑ Sleep paralysis at sleep onset or offset is also typical of narcolepsy, and consists of episodes of alertness with an inability to move skeletal muscles
- ❑ Nightmares and vivid dreams also occur frequently

- Prevalence: 0.02–0.04% of the general population
- Narcolepsy follows chronic persistent courses.
- ❖ **Etiology and Pathophysiology:**
- ❖ **Genetic Factors:** Strong association with HLA marker DQB 1*0602
- ❖ **Neurobiological Factors:** Narcolepsy is associated with deficiency of Hypocretin (orexin) in central nervous system
- ❖ Postmortem studies of humans with narcolepsy show loss of orexinergic cells and reduced orexin immunoreactivity in the lateral hypothalamus

Treatment:

- **Treatment Goals:** to reduce daytime sleepiness and to manage the symptoms of cataplexy, sleep paralysis, and sleep-related hallucinations when present
- **Somatic Treatments:** Monoaminergic stimulants (Methylphenidate, Dextroamphetamine, and mixed Amphetamine salts), Modafinil and Armodafinil, Atomoxetine, Bupropion, Anti-cataplectic drugs (Venlafaxine, Desmethylvenlafaxine, Duloxetine, or Fluoxetine, TCAs)
- **Psychosocial Treatments:** Scheduling regular brief nap

HYPERSOMNOLENCE DISORDER

- Main feature of Hypersomnolence Disorder is excessive sleepiness despite a normal sleep duration at night.
- Repeated episodes of sleep during daytime hours; prolonged night time sleep, typically 9 hours or longer; and/or difficulty transitioning from sleep to wakefulness, often called sleep inertia.
- Must be present at least 3 days per week for at least 3 months.
- Significant distress or impairment in important daytime functions

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- Prevalence: 0.005–0.06% of Western populations
 - Comorbidity: Autonomic dysfunction such as orthostatic hypotension. Depression is also common
 - Equal distribution among men and women
 - Insidious onset in the second or third decade with a chronic persistent courses.

Types of Hypersomnia

- Kleine-Levin Syndrome
- Menstrual-Related Hypersomnia
- Idiopathic Hypersomnia
- Behaviorally Induced Insufficient Sleep Syndrome
- Hypersomnia Due to a Medical Condition
- Hypersomnia Due to Drug or Substance Use

Etiology and Pathophysiology

Genetic Factors:

- Familial aggregation in approximately 50% of cases, with a suggestion of autosomal dominant inheritance
- 20-fold risk in first-degree family members

Neurobiological Factors:

- Dysfunction of monoaminergic arousal systems have been suggested by studies showing reduced CSF dopamine and/or norepinephrine metabolites

Treatment:

- Treatment Goals: to reduce the impact of long night time sleep and excessive daytime sleepiness
- **Somatic Treatments:** Monoaminergic stimulants (methylphenidate, dextroamphetamine, and mixed amphetamine salts), Modafinil and armodafinil, Atomoxetine, Bupropion.
- **Psychosocial Treatments:** setting regular sleep–wake schedules and using multiple alarms (including social interactions or bright light) may help to ease the sleep–wake transition

BREATHING-RELATED SLEEP DISORDERS

1. Obstructive Sleep Apnea Hypopnea (OSAH)
 2. Central Sleep Apnea (CSA)
 3. Sleep-Related Hypoventilation (SRH).
- All are associated with impaired ventilation during sleep, often associated with intermittent or sustained hypoxemia, as well as with sleep disruption that may result in awakenings as well as daytime sleepiness or fatigue

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- Reductions in airflow lasting at least 10 seconds are classified as either apnea (absent airflow) or hypopnea (reduced airflow), and the frequency of these events per hour of sleep, termed the apnea hypopnea index (AHI)
 - AHI is an important measure of the severity of OSAH and CSA

OBSTRUCTIVE SLEEP APNEA HYPOPNEA (OSAH)

- Most common
- Characterized by repetitive pharyngeal airway obstruction during sleep
- **Diagnosis:** In the absence of symptoms, PSG documenting at least an AHI of 15

Or

- $AHI > 5$ with predominantly obstructive respiratory events, accompanied by symptoms of

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- 1) Nocturnal breathing disturbances: snoring, snorting/gasping, or breathing pauses, or
 - 2) Daytime sleepiness, fatigue, or unrefreshing sleep despite sufficient sleep opportunity
- Habitual snoring is a sensitive indicator
 - Increasing loudness of snoring is associated with higher risk
 - Snoring may be interrupted by silent periods (apneas), which are often terminated by resuscitative breathing.

- Memory disturbances, poor concentration, irritability, and personality changes
- OSAH affects multiple organs and may cause hypertension, heartburn, nocturia, morning headaches, and sexual dysfunction
- Age (>55), gender (male), BMI (>30) and neck circumference (>16 inches women, >17 inches men) identify higher risk groups.
- Male: Female = 2:1 to 4:1

Treatment:

- Treatment Goals: to improve symptoms and quality of life and minimize risks of comorbidity
- **Somatic Treatments:** Continuous positive airway pressure (CPAP) and Mandibular advancement devices (MAD) and surgical procedures like uvulopalatopharyngoplasty.
- **Psychosocial Treatments:** Weight loss, avoiding the supine sleep position, reducing evening alcohol consumption, and getting adequate sleep duration.

CENTRAL SLEEP APNEA

- Characterized by variability in respiratory effort that leads to episodes of apnea and hypopnea during sleep
- **Diagnostic criteria** require at least **five** central apneas per hour
- Subtypes:
 1. Cheyne–Stokes Breathing (CSB) - heart failure, stroke, or renal failure
 2. Central Sleep Apnea Comorbid with Opioid Use - Chronic use of long-acting opioid medications, such as methadone
 3. Idiopathic Central Sleep Apnea

Treatment:

- The goals of treatment are to improve symptoms and quality of life and minimize cardiopulmonary risks
- CPAP therapy is effective
- Adaptive servo-ventilation (ASV)
- Low-flow oxygen therapy
- CSA comorbid with opioid use may improve with reduction in opioid dosage

SLEEP RELATED HYPOVENTILATION

- Characterized by inadequate ventilation during sleep
- **Diagnosis** is made by PSG, which demonstrates abnormal elevation of CO₂ levels, unassociated with apneas or hypopneas
- Patients may report fatigue, sleepiness, awakenings during sleep, morning headaches, or insomnia
- Most commonly SRH is seen with medical or neurological disorders or medications that depress ventilation

- Rarely, SRH can occur independently (**Idiopathic Sleep-Related Hypoventilation** or Congenital Central Alveolar Hypoventilation)
- **Obesity Hypoventilation Syndrome** requires the presence of obesity ($\text{BMI} > 30 \text{ kg/m}^2$), awake hypercapnia ($\text{pCO}_2 > 45 \text{ mmHg}$) and the exclusion of other causes of hypoventilation.

- Severity is determined by the amount of blood gas abnormalities measured during sleep (elevation of CO₂ and decrease in SpO₂) and evidence of end organ dysfunction, which may include pulmonary hypertension, cor pulmonale, polycythemia, and neurocognitive abnormalities.
- Congenital Central Alveolar Hypoventilation is caused by mutations of PHOX2B

Treatment:

- The goal of therapy is to provide adequate ventilation in order to normalize blood gases during sleep and wakefulness.
- Bi-level positive airway pressure: provides higher inspiratory pressures relative to expiratory pressures to augment tidal volume of spontaneous breaths.

Circadian Rhythm Abnormalities

- Circadian rhythm sleep disorders are a distinct class of sleep disorders.
- They may be caused by an alteration in the functioning of the circadian timing system or may be related to changes in the external environment.
- Physiologic, behavioral, and environmental factors all affect the severity of these disorders, which may present as complaints of insomnia and hypersomnia.

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- Nearly all bio-behavioral functions in humans occur on a rhythmic basis, which leads to dramatic diurnal fluctuations in human performance capabilities.
 - Disruptions in human rhythmicity have been associated with a variety of mental and physical disorders and may interfere with safety, performance, and productivity,
 - Regardless of whether they result from voluntary (ie, rapid travel across time zones, or shift work) or involuntary (ie, illness or advanced age) factors.

CIRCADIAN RHYTHM SLEEP-WAKE DISORDERS

- The essential feature is a persistent or recurrent pattern of sleep-wake disturbance characterized by abnormal timing of sleep or sleep propensity relative to the physical environment.
- Manifest as insomnia, excessive sleepiness, or some combination of both.

Delayed Sleep Phase Type:

- Individuals exhibit a sleep–wake cycle that is delayed by around 3 hours when compared to the general population
- If allowed to sleep at times that are consistent with their endogenous biological night, sleep duration and quality are typically normal

Advanced Sleep Phase Type:

- Individuals exhibit a stable sleep–wake cycle that is advanced in relation to conventional times.
- Patients present with symptoms of difficulty staying awake in the evening and early morning awakening, typically with a history of falling asleep between 6 and 9 p.m., and waking up between 2 and 5 a.m.

Irregular Sleep-Wake Type:

- Characterized by an irregular pattern of sleep, with at least three distinct sleep periods occurring during a 24-hour period.
- Patients or their caregivers report symptoms of insomnia, excessive sleepiness, or both.

Non-24-Hour Sleep–Wake Disorder:

- This results when an individual's sleep–wake pattern is no longer entrained to the 24-hour physical environment, instead following the endogenous circadian rhythm that is usually slightly more than 24 hours
- Daytime napping is common, and is associated with impairment of function, particularly in blind individuals.

ShiftWork Disorder:

- Characterized by sleep and wake disturbances for at least 3 months in the context of chronic shift work
- Complaints include excessive sleepiness while at work, or of difficulty falling asleep during the time allowed for rest

- **Jet Lag Type:**

- With the advent of highspeed air travel, an induced desynchrony between circadian and environmental clocks became possible. Thus, the term **jet lag** came into use
- When an individual rapidly travels across many time zones, either a circadian phase advance or a phase delay is induced, depending on the direction of travel.
- Normally, healthy individuals can easily adapt to one to two time zone changes per day; therefore, natural adjustment to an 8-hour translocation may take 4 or more days

Assessment:

- Sleep logs and/or actigraphy measurements for 7–14 days
- Biological markers of circadian phase: Dim-light melatonin onset (DLMO) or core body temperature

Treatment :

- Both light and melatonin, when given at specific times, can act to reset the circadian clock.
- Modafinil is FDA-approved for use in shift workers with excessive daytime sleepiness
- Behavioural interventions (regular sleep scheduling)

PARASOMNIAS

- Parasomnias are unpleasant or undesirable behavioral or experiential phenomena which occur predominately or exclusively during the sleep period.
- Contrary to popular belief, most parasomnias are not the manifestation of underlying psychiatric disease
- Two broad categories: those occurring in association with Non-REM sleep, and those occurring in association with REM sleep.

NON-REM SLEEP AROUSAL DISORDERS

Diagnosis:

- They are a set of parasomnias with varying clinical manifestations, linked by a common mechanism of arousal from Non-REM sleep.
- The essential feature of these disorders is recurrent episodes of partial arousals from sleep, usually during the first third of the night.
- Regardless of the specific behavioral manifestation, the individual recalls little, if any dream imagery, and has little or no recall for the event.

Sleepwalking:

- Characterized by repeated episodes of rising from bed during sleep and walking about.
- The individual's eyes are open with a blank, staring face.
- The sleepwalker is relatively unresponsive to the efforts of others to communicate with him or her, and can be awakened only with great difficulty.

Sleep Terrors:

- Initiated by a loud scream associated with extreme panic and signs of intense fear.
- The individual may have signs of autonomic arousal, such as mydriasis, tachycardia, tachypnea, and diaphoresis.
- This is followed by prominent motor activity such as hitting the wall, or running around or out of the bedroom, occasionally resulting in personal injury or property damage
- Complete amnesia for the activity is typical

Confessional Arousals:

- Often seen in children
- Characterized by movements in bed, occasionally thrashing about, or inconsolable crying.

Sleep-Related Eating Disorder:

- DSM-5 – subtype of sleepwalking.
- It is characterized by frequent episodes of nocturnal eating, generally without full conscious awareness.

Sleep-Related Sexual Behavior (Sexsomnia):

- A subtype of Sleepwalking.
- Consists of inappropriate sexual behaviors occurring during the sleep state without conscious awareness
- Such behaviors may result in feelings of guilt, shame, or depression and may have medico-legal implications

Treatment:

- **Treatment Goals:** environmental safety: heavy curtains over windows, alarms at bedroom doors, and sleeping on the ground floor.
- **Somatic Treatments:**
- Tricyclic antidepressants such as imipramine, and benzodiazepines such as clonazepam, may be effective.
- Dopaminergic agents, opiates, or topiramate has been reportedly effective in sleep-related eating disorder
- Sleep-related sexual behaviors may respond to clonazepam

REM-SLEEP RELATED PARASOMNIAS

- Nightmare Disorder and REM Sleep Behavior Disorder (RBD)
- Normal REM sleep is characterized by increased physiological activation, active mentation (dreams), and muscle atonia
- Nightmare Disorder and RBD are characterized by heightened mental activity and, in the case of RBD, absence of usual muscle atonia

NIGHTMARE DISORDER

- Bad dreams and nightmares are normal
- What differentiates Nightmare Disorder from normal bad dreams or nightmares is the frequency of events, degree of dysphoria, and the extent of distress or impairment in social, occupational, or other important areas of functioning.
- Usually remembered in great detail, and immediately upon awakening, the individual is completely alert and oriented

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- More commonly seen in the setting of physical/sexual abuse and posttraumatic stress disorder (PTSD)
 - May be comorbid with a number of medical or psychiatric conditions, and may be induced by medication, notably beta-adrenergic antagonists or withdrawal from alcohol or other sedating medications.

Treatment:

- **Somatic Treatments:**

- Prazosin 10–16mg reduces nightmare frequency in PTSD
- Cyproheptadine, Guanfacine, and Clonidine have been reportedly helpful

- **Psychosocial Treatments:**

- Dream rehearsal therapy - scripting and rehearsal of a new dream scenario to replace a common dream.

REM SLEEP BEHAVIOR DISORDER

- Defined by repeated episodes of awakening from sleep accompanied by agitated or violent behaviors, such as shouting, screaming, kicking, and punching.
- Commonly occur in the second half of the sleep period and usually accompany vivid, action-packed dreams.
- Following an event, arousal from sleep to alertness and orientation is usually rapid and accompanied by complete dream recall

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- Patient may have repeated injury, including ecchymosis, lacerations, and fractures.
 - The resulting injuries to the patient or bed partner may result in legal issues, such as charges for assault
 - Many patients adopt self-protection measures such as tethering themselves to the bed, using sleeping bags or pillow barricades, or sleeping on a mattress in an empty room

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- RBD is a frequent harbinger of neurodegenerative disorders
 - Upto 70% of affected individuals will eventually develop a neurodegenerative disorders (most commonly Parkinson's disease)

Treatment:

- **Somatic Treatments:**

- About 90% of patients respond well to clonazepam 0.5– 2.0mg
- Melatonin at doses up to 12 mg at bedtime or Pramipexole may also be effective.

- **Psychosocial Treatments:**

- Environmental safety - Potentially dangerous objects should be removed from the bedroom, cushions put around the bed or the mattress placed on the floor, and windows protected

RESTLESS LEGS SYNDROME (RLS)

- Neurological sensorimotor disorder characterized by uncomfortable leg sensations described as aching, grabbing, burning, tingling, creeping, crawling, or electric sensations that occur deep in the leg.
- Symptoms occur in one or both of the legs, most often between the ankle and the knee, but may also extend to the arms or even trunk
- Typically worse in the evening, may occur prior to sleep onset, and are exclusively present at rest

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- Generally relieved by motor activity, such as walking, pacing, shaking, stretching, or simply standing and bearing weight.
 - Associated features include sleep disturbance, daytime fatigue/sleepiness, and involuntary, repetitive, and jerking limb movements
 - Several medications can either evoke or aggravate RLS, including Antihistamines, Lithium, Tricyclic antidepressants, Serotonin reuptake inhibitors, and Monoamine oxidase inhibitors

- Sleep deprivation/fatigue, alcohol, tobacco and caffeine use, lack of or excessive exercise, and exposure to extremes of temperature (either hot or cold) may also worsen symptoms

Assessment:

- Neurological examination, including peripheral nerve function and peripheral vascular examination.
- Laboratory studies - a complete blood count with RBC indices, iron binding capacity, ferritin, B₁₂, folate, thyroid function tests, electrolytes and renal and liver function tests

- **Prevalence** - between 5% and 15% in the general population
- Slightly more common in women

Differential diagnosis

- Hypnic myoclonus (sleep starts)
- Phasic twitches (normal muscle twitches that occur during REM sleep)
- Nocturnal leg cramps
- Akathisia (neuroleptic-induced)

Treatment:

- Dopamine precursors, such as regular or sustained-release carbidopa/levodopa.
- Dopamine agonists Pergolide, Pramipexole, and Ropinirole.
- Benzodiazepines decrease nocturnal arousals and improve the quality of sleep.
- When nutritional deficiencies are present, replacement with iron, folate, B12, or magnesium may be indicated.

SUBSTANCE/MEDICATION-INDUCED SLEEP DISORDER

- This is a prominent sleep disturbance associated with use, intoxication, or withdrawal from a medication or substance.
- May be associated with Mood symptoms ranging from depression and anxiety to irritability and excitement.
- Physical symptoms may also be present

- **Medications and Substances Associated With**
- **Insomnia:** Alcohol (acute use, withdrawal), Caffeine, Nicotine, Cannabis, Antidepressants, Corticosteroids, β agonists, theophylline derivatives, β antagonists, Statins, Stimulants, Dopamine agonists

REFERENCES

- Sadock BJ, Sadock VA, Ruiz P. Kaplan and Sadock's Comprehensive textbook of Psychiatry. 9th edition. Philadelphia: Lippincott Williams and Wilkins; 2009.
- David AS, Fleminger S, et al. Lishman's Organic Psychiatry. 4th edition. John Wiley & Sons Ltd. Publication; 2009.
- Stahl SM. Stahl's Essential Psychopharmacology. 4th edition. Cambridge University Press; 2014.
- Tasman A, Kay J, Lieberman JA, First MB, Riba MB. Psychiatry. 4th ed. West Sussex: John Wiley & Sons Ltd; 2015

Reference

- American Psychiatric Association, Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Washington DC: New School Library; 2013
- World Health Organisation. The International Classification of Diseases, 10th edition. Geneva. WHO; 1996.
- Satela MJ. International Classification of Sleep Disorders. 3rd Edition. American Academy of Sleep Medicine; 2014.



THANK YOU
HAVE A NICE SLEEP