

Sleep Disorders in Adolescents and Young Adults

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edematous pharynx. Neck: 16-inch circumference. Chest: clear. Cardiac: S₄ gallop. Laboratory tests: normal.
Sleep Study: AHI 40/hr. Minimum arterial oxygen saturation: 85% during NREM, 75% during REM.

Figure: A sample tracing from the sleep study is shown.

Question: Are the premature ventricular contractions (PVCs) being caused by obstructive sleep apnea?



Sleep Definitions

- Sleep Latency
- Rem Latency
- Sleep Efficiency
- Sleep Stages
- Sleep Fragmentation

Sleep Physiology – the EEG

- Stage I; alpha activity
- Stage II: low voltage random with K complexes and spindles
- Stage III – IV nonrandom high voltage discharges – “synchronicity” probably regulated or mediated by acetylcholine in nucleus basalis of forebrain and pedunculo pontine/peribrachial nuclei of brainstem
- REM – low voltage random with *extreme* diminishment of muscle tone and disconnection of brainstem function – leaving a freewheeling autonomic nervous system
 - 2-5 episodes nightly, usually the stage of sleep at morning awakening
 - Increases in duration as sleep progresses through the night
 - Vascular engorgement (nasal passages, penis, clitoris), variable heart rate, respiratory rate and BP

Sleep Onset and Awakening

- Drowsiness; respond promptly to a whisper; readjustment of respiratory demands to slower deeper breathing; prone to hypnic jerks
- Stage I – easily arousable to name, sounds, cutaneous stimulation
- Stage II onward: far less arousable
- Stage III onward: prone to sleep drunkenness and poor memory formation (takes about 10 seconds of full wakefulness to restart memory generation)

Sleep Stages and Body Physiology

- REM sleep: notable for thematic dreams with physical action; a deep suppression of spinal cord reflexes typically prevents physical response
 - Increased in depression, stress
 - Depression subsides when REM is interrupted
- Stage III – IV (Slow Wave Sleep): growth hormone released
 - These stages of sleep predominant in childhood to early adulthood

The Role of the full night sleep study

- For the purposes of college health, probably none. Useful only in suspected sleep apnea or excluding narcolepsy, in which case it is paired with a Mean Sleep Latency test
- Everything else is clinical

Sleep Deprivation

- Voluntary sleep deprivation – common in adolescence
- Involuntary sleep deprivation – noise, intrusions
- Poor sleep hygiene
 - TV/computers before bedtime
 - TV on all night
- 10-12 hours sleep nightly recommended for children or young adults
 - Sara Hughes as example

Alcohol

- Initially depressants; metabolized after 4-6 hours
- Suppression of REM sleep for the first 2/3 of sleep then REM rebound as it wears off
- Suppresses SWS and REM, increases Stage II; chronic use leads to permanent Staging changes, favoring stage II and increasing K complexes and spindles
- DT's may be a form of REM sleep encroaching on Wake

Depression

- Leads to early morning awakening
- Increased REM sleep
- Restricting REM improves depression – but not practical at present

Obsessive Compulsive

- Underappreciated cause of “insomnia” or increased sleep latency
- Perseveration of random thoughts at bedtime; mind unable to “clear the desk”
- Inhibited by SSRIs, independent of their antidepressive effects
 - I often start with 3 weeks of a selected benzodiazepine inhibitor (ambien, etc) while the SSRI becomes active
 - Escitalopram (Lexapro) probably the fastest onset, lesser side effects
- Behavioral Programs: guided imagery

Sleep Phase Inversion

- Common in Adolescence
- Bedtime becomes later and later
- Corrected by “chasing the clock”; assuring darkness 1 hour before bedtime, inhibiting optic nerve stimulation (neural pathway to pineal gland); bright light at time of awakening.
- Consistent awakening time no matter what

Sleep Phase Delay

- Desired sleep onset is 3 to 6 hours later than conventional
- Multiple causes
- Forced awakening time may lead to chronic sleep deprivation
- Diagnosis made clinically
- Origin uncertain: ?decreased entrainment of the normal sleep wake oscillation to photic input
- Melatonin and synthetic analogues may be useful (Rozarem) plus bright light. Note Rozarem side effects including excessive sleepiness, increased prolactin levels.

Insomnia

- “Never the diagnosis, always the symptoms”
- Exclude medical issues: gi renal, respiratory; chronic pain
- Exclude medications/depressants/alcohol
- Exclude shift work, especially if switching back and forth
- Psychiatric disorders

Insomnia – treatment

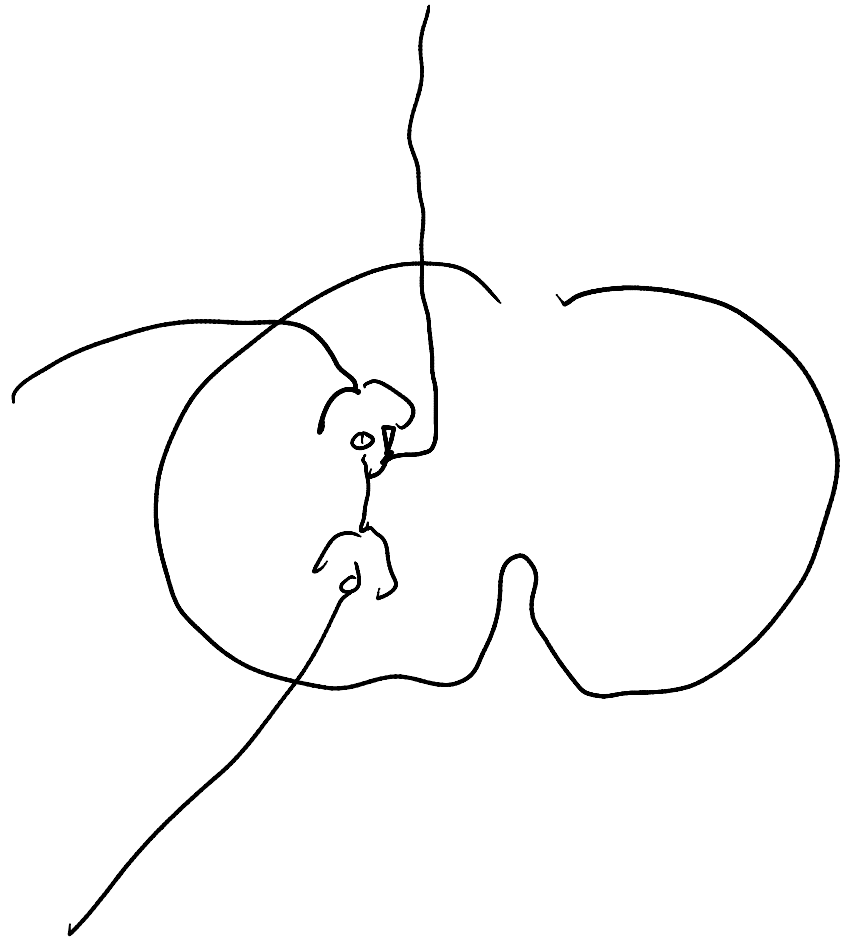
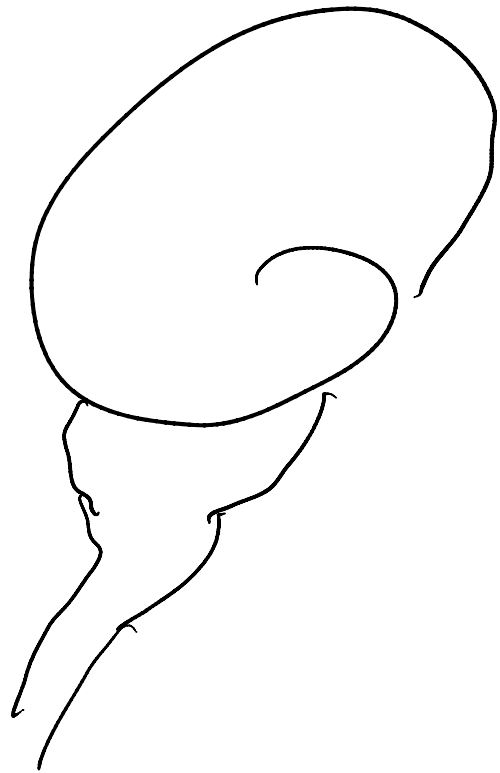
- Leave the bed
- Bedroom only for sleeping
- Find alternative activity, usually reading under dim light or similar “engaging, relaxing” event
- No optic nerve stimulation
- No daytime naps

Narcolepsy

- Onset usually early teens onward
- Different penetrations, severities – EDS vs sudden sleep attacks
- With or without cataplexy; sleep paralysis; hallucinations
- Diagnose by MSLT (can be confounded by sleep deprivation, severe sleep apnea); MSLT is series of 4 to 5 naps performed the day after a full night sleep study. It is validated. Its inverse, the MWT (often used by DOT or FAA for drivers/pilots), is not validated
- Incidence of sleep apnea higher in narcolepsy

Narcolepsy: treatment

- Modafanil, amphetamines; tricyclies for cataplexy
- GHB – liquid taken at night to increase SWS. Tightly controlled by federal government, only one US pharmacy may dispense and drug is sent via courier to the patient. Was abused decades ago to promote SWS in body builders so as to increase growth hormone



Sleep Paralysis

- Consequence of REM sleep
 - Conscious while unable to move
 - Occurs at rare intervals in normal, associated with sleep deprivation for example
 - More common in narcolepsy

Confusional Arousals

- Occurs in normal from SWS
- Consequence of Sleep Fragmentation: stress, stimuli, pain, pregnancy, Tourettes
- Depressant Medications
- Fevers
- Periodic Hypersomnia (Klein-Levine syndrome)

Sleep Walking

- Familial; 80% have a family history; prevalence may be 1 to 10% of population in adults
- Sleep talking is frequently associated
- High amplitude slow wave at the beginning of the episode, persisting from childhood into adulthood
- Adult onset cases sometimes associated with impulsivity, antisocial behavior, hypomania – difficult to say if these precede the symptoms

Sleep Terrors

- Arise abruptly from deep sleep in the first 3rd of the night
- Almost always outgrown by adulthood
- Distinguish from REM nightmares (specific thematic dream), nocturnal panic attacks, or confusion arousals (no element of terror)

Sleep Terror treatment

- Allow the attack to subside spontaneously
- Benzodiazpines (Diazepam); shifts sleep from SWS to Stage II but efficacy greater than the percentage
 - Can use shorter acting medications such as midazolam
 - Can add clomipramine, imipramine (mechanism uncertain)
 - Stress reduction techniques
 - ?role of beta blockade

Epilepsy

- Epileptiform events (Interictal discharges, not recognizable clinically)
- Seizures tend not to occur in REM
- Do not confuse with specific parasomnias

Rem Behavior Disorder

- Males predominant
- Age 45 onset or greater
- Failure of preservation of muscle atonia during REM sleep; seen on polysomnography
- Responds to benzodiazepines

Rhythmic Movement Disorder

- Rhythmic, stereotyped movements (head banging, body rocking), usually in childhood, rarely in adults
- May be familial
- No underlying psychiatric disorders
- Rarely the sole manifestation of a seizure

Periodic Limb Movements Disorder

- More prevalent in elderly; Determined by polysomnogram
- Salvos of dorsiflexion of toe, foot, or flexion of leg, as detected on EMG
- Can occur in any limb
- Highly variable night to night
- Can mimic myoclonic seizure activity when severe
- Not perceived by the sleeping patient
- May or may not provoke EEG arousal; and may or may not be a cause of sleepiness or insomnia
- Iron deficiency may play a role, especially in pregnancy

Restless Leg Syndrome

- Known for centuries
- Dysthetic sensations when at rest; must stand and walk for relief
- May prevent sleep onset in 80% of people
- Surveys suggested 40% had symptoms around age 20
- Remissions and recurrence common
- Occurrence of peripheral neuropathy is described

Restless Leg Syndrome

- Check Fe, Mg, and some excerpts suggest levels for B12 and folate
- Pharmacology includes benzodiazepines and opioids (off label) but increasingly has become dopaminergic agents
- Pramipexole, a D3 receptor agonist (widely advertised)
- Ropinirole, a D2 receptor agonist

Bruxism

- Diagnosis of inspection based on damage to tooth enamel
- Familial disposition, up to 50%
- No pharmacology available

Post Traumatic Stress Disorder

- Dissociative states and injury related to “nightmare” behaviors
- Limbic Psychotic Trigger Reaction consisting of motiveless unplanned homicidal acts, may be due to partial limbic seizures triggered by highly individualized events