Sleep. Why is it important?

Honda Sleep Conference

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Sleep 101

• One third of our life is spent asleep
• Sleep is not a passive process
• Sleep is a highly organized and regulated physiologic process involving many complex neural and hormonal systems
Wake: Fast, low voltage, minimal synchrony

Light NREMS: Slower, higher voltage, little synchrony

Slow wave sleep: Really slow, huge voltage (especially in toddlers), primarily synchrony

REMS: Slightly slower than waking, low-voltage, desynchronized
Sleep is a relatively predictable pattern of the behavioral states

A Histogram of Sleep Stages

Stages | Awake
--- | ---
1 | 
2 | 
3 | 
4 | 

Hours of Sleep | REM | NREM
--- | --- | ---
0 | 
1 | 
2 | 
3 | 
4 | 
5 | 
6 | 
7 | 
8 | 

Courtesy of David Dinges
The depth of Slow-wave (deep NREM sleep) is age-dependent and best in toddlers.

Age:

3 y.o.

23 y.o.

75 y.o.

SWS:

The Circadian Clock Impacts You

• It is easier to stay up later than to try to fall asleep earlier.

• It is easier to adapt to shifts in forward (clockwise) direction (day → evening → night).

• Night owls may find it easier to adapt to night shifts.
Insufficient Sleep
Sleepiness in residents is equivalent to that found in patients with serious sleep disorders. Mustafa and Strohl, unpublished data. Papp, 2002
Insufficient sleep

• Sleep is to sleepiness as food is to hunger
• Mood disturbances
  – Depression, anger, irritability, emotional lability
• Fatigue and increased somatic complaints
• Cognitive impairment
  – Poor memory, attention, concentration, decision making
• Behavior problems
  – Impulsivity, noncompliance, hyperactivity
• Stimulant usage
  – Caffeine, nicotine
Functions of Sleep

- Adequate sleep is essential for survival and optimal functioning
- Slow-wave sleep (SWS) is the most restorative
- Growth hormone is released during SWS
- REM (dream) sleep is vital for higher cognitive functions
- Sleep effects immune function and metabolism
- “Rest” is not a substitute for sleep and stimulants (caffeine) do not restore the physiologic benefits of sleep
Functions of Sleep: Cognition

• Sleep is needed to:
  – Remember what we learned
  – Organize our thoughts, be goal directed
  – React quickly
  – Work accurately and efficiently
  – Be creative
  – Think abstractly
Sleep and Depression

- Depression causes insomnia
- Insomnia worsens depression
  - Insomnia increases risk of depression 10X’s
- Depression and sleep apnea
  - 5X’s more likely to suffer from apnea
  - Treatment of apnea improves depression
- Anxiety increases sleepwalking
  - Neurology, May15, 2012
- Seasonal Affective Disorder
  - Dysfunction of the body’s internal clock directly impacts mood and sleep cycles
Sleep Hygiene

- Go to bed and get up at about the same time every day.
- Develop a pre-sleep routine.
- Use relaxation to help you fall asleep.
- Protect your sleep time; enlist your family and friends!
- Avoid nicotine, esp. near bedtime
- Regular exercise and exposure to early AM sun