Chronophysiology and Sleep Hygiene

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LEARNING OBJECTIVES

- Identify the basic principles of chronophysiology.
- Discuss the biology and psychosocial implications of sleep deprivation.
- Recognize the biopsychosocial principles and practice of sleep hygiene.
How important do you think your sleep hygiene is?

- Low importance: 67%
- Slightly important: 33%
- Moderately important: Very Important
- Extremely important: 33%
Matthew Paul Walker is an English scientist and professor of neuroscience and psychology at the University of California, Berkeley. As an academic, Walker has focused on the impact of sleep on human health.

https://www.ted.com/talks/matt_walker_sleep_is_your_superpower
WHERE WE ARE WITH SLEEP

U.S. Sleep Epidemic
40% sleep < 6 hours

- 6.8 hours average sleep/night
- 44% of doctors reported disrupted Sleep
- 1/3 of doctors fall asleep while driving
- 24 hour shifts- 36% more medical errors
- Double risk for vehicle crash
- Have less empathy for patients
- Increase in family/marital stress

Gallup poll 2013
Psycho-Oncology 2017
BMA News 2017
- Increased risk for stroke
- Obesity
- Elevated risk of diabetes
- Permanent cognitive deficits
- Mental status changes
- Quality of life is reported as worse
- Osteoporosis
- Increased risk for colorectal and breast cancer
- Risk of cardiovascular disease
- Increase in mortality

The Institute of Medicine Committee on Sleep Medicine and Research (2006)
Sleep Deprivation & Circadian Misalignment on Cortisol, inflammatory markers, & cytokine balance.

Circadian Misalignment:

- Significantly increases:
  - Plasma tumor necrosis factor alpha (TNF-a)
  - Interleukin 10 (IL-10)
  - C-reactive protein (CRP)

- Increases plasma concentrations of pro- and anti-inflammatory proteins

THE SLEEP DEPRIVED HUMAN BRAIN

Krause and colleagues (UC Berkely) studied sleep deprivation neural signatures on neuroimaging studies.

Negative Impact:

- Attention
- Working memory
- Positive, reward related affect
- Negative affect regulation
- Hippocampus-dependent memory

Ref: Buysse, D. Sleep Health: Can We Define It? Does It Matter? Sleep. 2014.
Recent study in Current Biology compared 3 groups of healthy normal weight adults (18-39 yrs.).

Control group slept up to 9 hours per night for 9 nights.

Sleep restriction group without weekend recovery sleep had up to 5 hrs. sleep per 9 nights.

Sleep restriction group with weekend recovery sleep had 5 hrs. of sleep per week night, unrestricted sleep on weekend, followed by another 2 week nights of sleep restriction.

Notable findings included rapid diet and metabolic changes in the sleep deprived groups (decreased insulin sensitivity, increased caloric intake and weight gain).

Assessment: Sleep debt consequences probably cannot be fully corrected by weekend compensation.

Ref: Rubin, R. JAMA. 2019
A surgeon in the OR is irritated and was disgruntled with his/her assistant. Is this a sign of sleep deprivation?

- Yes: 67%
- No: 33%
- Maybe
- Doesn't apply
POOR SLEEP HYGIENE

- Use Alcohol to sleep
- Maladaptive thoughts
- Command yourself to sleep
- Taking someone else’s Sleeping Pills
- Engage in stimulating activities
- Exercise before bed
- Long naps
- Read or watch television in bed
- Go to bed hungry or full
- Lie in bed awake
- Watch the clock
- Caffeine
- Change daytime routine
How long are your naps?

- 5-10 min: 25%
- 10-20 min: 25%
- 20-30 min: 25%
- 30 min or more: 25%
- I don't nap: 50%
Naps longer than 30 minutes suggest...sleep deprivation.

Short naps (10-30 minutes):
  - Restore wakefulness
  - Promote cognitive sharpness
    - With improved performance and learning
  - Body and mind can be entrained to awaken after a short nap.

Is getting a good night's sleep achievable?

- Never: 50%  
- Rarely: 50%  
- Sometimes: 50%  
- Often: 50%  
- Always: 50%
KEY SLEEP PHYSIOLOGY FACTORS

- Temperature
- Light
- Hormones
EXERCISE AND SLEEP

- Release of human growth hormone (GH) related to slow, synchronous sleep (slow wave sleep (SWS))

- SWS provides:
  - Restorative function
  - Repairing processes
  - Restoration of energy

GOOD SLEEP HYGIENE

- Use bed to sleep
- Quiet & dark bedroom
- Regular exposure to light
- Go to Bed & get up at the same time
- Establish a regular bedtime routine
- Get regular exercise
- Keep your hands & feet warm

Designate a time 2 or more hours **before** sleep to write down your problems or solutions

Use relaxation exercises, meditation, and imagery
What works for you to get a good nights sleep?

- Meditation
- Read meditation right before to sleep + SleepyTime Tea (really works!)
- Herbal tea
- Relaxing music
- Read a bit
- Go to bed
- Stay off phone/devices
- Nothing really works
THANK YOU FOR ATTENDING

NEXT WELLNESS SESSION

- Stress and Substance Use – Nov. 17