Sleep - Hygiene, Importance and How to Get There

Adapted from “Striving to Thriving - A practical resource for reclaiming your life from chronic pain”

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Learning Objectives

• Demonstrate the seriousness of sleep deprivation
• Introduce anatomy and stages of sleep
• Review a case study
• Sleep deprivation and risks
• 16 tips to improve your sleep hygiene
• Q & A
If you experience pain, you’re likely not getting enough sleep.

• The 2015 Sleep in America™ Poll found that 21% of Americans experience chronic pain and 36% have had acute pain in the past week. This dual presentation of pain and sleep disorders occurs quite often, with an estimated incidence of 60% to 80%.

• Results of the 2019 annual survey showed respondents’ average night’s sleep decreased to 5 hours, 30 minutes from 6 hours, compared to the 7 to 9 hours recommended by the National Sleep Foundation.
Sleep deprivation has serious baggage.

- 80% of CP respondents said pain prevented them from getting an uninterrupted night of sleep.
- 60% experienced insomnia due to chronic pain.
- 65% experience difficulties due to either sleep problems or depression.

- On average, how many hour of restful sleep do you get?
Sleep has its own complex anatomy (the “Reader’s Digest” version)

- **Hypothalamus** - the control center affecting sleep and arousal.
- **SCN** (suprachiasmatic nucleus) - processes information about light and dark.
- **Pineal gland** - receives information from the SCN and increases melatonin.
- **Basal Forebrain** - promotes sleep/wakefulness, releases adenosine.
- **Brain Stem** - (pons & medulla) prevents acting out our dreams.
- **Thalamus** - processes information from short- to long-term memory.
- **Amygdala** - processes emotions & active during REM.
Sleep Stages -- **Stage 1** non-Ren

- You transition from wakefulness to sleep.
- Brain waves begin to slow.
- Characterized by comparatively light sleep, respiration, heartbeat and eye movements begin to slow, and muscles relax with occasional twitches.
- Producing Alpha and Theta brain waves
Sleep Stages -- **Stage 2** non-Rem

- Brain wave activity slows but is marked by brief bursts of electrical activity.
- During this stage, your heartbeat and breathing continue to slow, and muscles become more relaxed.
- Body temperature drops and eye movements stop.
- Stage 2 has the longest duration of all four non-rem stages and lasts about 60 minutes.
Sleep Stages -- **Stage 3** non-Rem

- Deep, slow brain waves known as Delta Waves begin to emerge during this stage.
- It is a transitional period between light sleep and a very deep sleep. Brain waves become even slower.
- Stage 3 exists in longer periods during the first half of the night.
- Your heartbeat and breathing slow to their lowest levels during sleep. This is very similar to a coma state.
Sleep Stages -- **Stage 4** non-Rem

- This sleep is sometimes referred to as Delta Sleep because of the delta waves that occur during this time.
- Stage Four is a deep sleep that lasts for about 30 minutes.
- Sleepwalking and bed-wetting typically happen at the end of Stage Four non-rem sleep.
Sleep Stages – Stage 5 REM

• Occurs about 90 minutes after falling asleep
• Eye movements from side to side behind closed eyelids
• Mixed frequency brain waves comparable to being awake
• Breathing BP and heart rate faster and irregular
• Extremities paralyzed
• Spend less time in REM as you age
Sleep Stages -- Stage 3 & 4 non-Rem

- The body repairs muscles and tissues
- Stimulates growth and development
- Boosts immune function and builds up energy for the next day.
- The period of deep sleep needed to feel refreshed in the morning.
- Memory consolidation takes place!
Sleep deprivations affects performance – A Case Study Done by the Military

- Desired Outcome: Can we do more with less staff
- 20-day evaluation 24 hours per day
- Performance = Accuracy x Rounds per day
- Subgroups (teams) slept 4, 5, 6, and 7 hours per day

The effects were more severe than was expected.
Let's examine the tabular data.

<table>
<thead>
<tr>
<th></th>
<th>Day-1</th>
<th>Day-20</th>
<th>Delta</th>
<th>% Capability</th>
<th>% Capability Lost</th>
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</thead>
<tbody>
<tr>
<td>7 Hours</td>
<td>348</td>
<td>310</td>
<td>38</td>
<td>89.1</td>
<td>10.9</td>
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<tr>
<td>6 Hours</td>
<td>365</td>
<td>200</td>
<td>165</td>
<td>54.8</td>
<td>45.2</td>
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<tr>
<td>5 Hours</td>
<td>385</td>
<td>115</td>
<td>270</td>
<td>29.9</td>
<td>70.1</td>
</tr>
<tr>
<td>4 Hours</td>
<td>405</td>
<td>60</td>
<td>345</td>
<td>14.8</td>
<td>85.2</td>
</tr>
</tbody>
</table>

Conclusions

• 4-Hour group was a danger to themselves and everyone around them

• 7-hour group experienced only a 10.9% loss in capability

• 6-hour group had a **34.3% drop in capability from just one hour less** than the 7-hour group, for almost a 50% drop in capability

• **How many restful hours of sleep are you getting?**
Let’s compare task complexities.

- **Artillery Fire**
  - Load
  - Close the breach
  - Aim and Fire
  - Eject
  - **One task per person**

- **Driving**
  - Maintain following distance
  - Spatial awareness of traffic around you
  - Positioning for tactical lane change avoiding collision
  - Monitoring speed
  - Scanning your mirrors for traffic around you
  - Navigation and positioning for safe lane changes
  - Reading signage
  - Looking for the unexpected
  - **Many tasks, one person**
You’re operating a 3000 – 4000-pound steel vehicle...

• Being awake for 18 hours straight is equal to a BAL (blood alcohol level) of 0.05%

• After a sleepless night, you’ll function as though you blew at 0.10% BAL.

• Drunk drivers might break while driving slowly, but asleep drivers don’t swerve or break.

• Do you have any medications still in your system when driving?
Sleep is important because:

1. Poor sleep can make you fat.
2. Poor sleepers have a 45% greater risk of coronary disease, 3X risk of cardiac event.
3. Poor sleepers 45 or older have a 200% more likely to have a stroke.
4. Poor sleep increases heart rate leading to 200% to 300% more likely to have calcification of arteries.
5. Poor sleepers have overactive sympathetic nervous system leading to excessive cortisol levels.
Sleep is important because:

6. Poor sleep affects glucose metabolism and Type 2 diabetes risk.
7. Poor sleep affects reproduction functions in men and women.
8. Poor sleep compromises your immune system.
9. Poor sleep is linked to depression and other psychological challenges.
10. Poor sleep is linked to increased inflammation.
11. Poor sleep is linked to shorter life span.
Sleep is important because:

1. Good sleepers tend to eat fewer calories.
2. Good sleep can improve concentration and productivity.
3. Good sleep can maximize athletic performance.
4. Good sleep improves your immune function.
5. Good sleep positively affects emotions and social interactions.
Sleep deprivation can ...

- Inhibit learning and recall because the brain does not store or consolidate memories, which would otherwise become long-term memories as we slumber.
- Cause oxidative stress, points to mitochondria as a possible target of the physiological effects of sleep deprivation.
- Increase risk of cancer, atherosclerosis, HBP, inflammation, neurodegenerative diseases, enhance asthma and COPD, increase Alzheimer’s risk, contribute to depression, anxiety and suicidality.
Pain related side effects of sleep deprivation include:

- Increased cortisol levels
- Reduces dopamine
- Lowers one’s pain threshold thereby increasing pain sensitivity
- Causes chronic pain and depression to feed each other
- Exacerbation of chronic back pain
16 ways to improve your sleep hygiene:

1. Set a bedtime that is early enough for you to get at least 7 hours of sleep. Get early sun exposure.
2. Keep a consistent sleep schedule. Get up at the same time every day, even on weekends or during vacations.
3. Don’t go to bed unless you are sleepy.
4. If you don’t fall asleep after 20 minutes, get out of bed and do something relaxing or quieting to your mind.
5. Establish a relaxing bedtime routine.
16 ways to improve your sleep hygiene:

6. Use your bed only for sleep and sex. Get the TV out of the room.

7. Make your bedroom quiet and relaxing. Keep the room at a comfortable, cool temperature.

8. Limit exposure to bright light in the evenings.

9. Turn off electronic devices at least 30 minutes before bedtime.

10. Don’t eat a large meal before bedtime. If you are hungry at night, eat a light, healthy snack.
16 ways to improve your sleep hygiene:

11. Exercise regularly and maintain a healthy diet but exercise several hours before sleeping.
12. Avoid consuming caffeine in the late afternoon or evening.
13. Avoid consuming alcohol before bedtime.
14. Reduce your fluid intake before bedtime.
15. Practice controlled deep breathing and meditation to calm you and clear your head from stress.
16. Turn off your internal computer, use pad & pen to capture important thing for tomorrow.
Q & A

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