Sleep Changes Through Aging & Behavioral Approaches To Improve Sleep

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Overview

- Normal sleep & Why we sleep
- Sleep architecture – changes with aging
- Sleep disruptors
- Evidence based sleep interventions
- Taking control of your sleep-wake cycle
What is normal sleep &
Why do we do it?
Sleep Stages

- Wake
- REM
- Stage 1
- Stage 2
- Stage 3
- Stage 4

First Cycle
Second Cycle
Third Cycle
Fourth Cycle
Fifth Cycle

Deep Sleep (SWS)
Dreaming (REM)
Physical Recovery
Mental Recovery
Greatest urge to sleep = Greatest distance between Process-S and Process-C
What we know so far..

- Sleep is strictly regulated in all animal species
- Prolonged sleep deprivation is fatal
- Impossible to naturally deprive an animal of sleep for more than 24h – (sleep-wake occurs)

Why do we sleep?
- We need off-line time
- Clean, Organize, Refresh
- Preserve synaptic efficiency & brain plasticity
How does sleep change as we age?
Sleep Architecture

- **NREM- 75% - 80% sleep time**
  - Stage 1 – (3-8%) transition from wakefulness
  - Stage 2 – (45-55%) muscle activity decreases
  - Stages 3 & 4– (15-20%) slow wave sleep

- **REM- 20-25% sleep time**
  - First episode occurs 60-90 min after onset of NREM
<table>
<thead>
<tr>
<th></th>
<th>Awake</th>
<th>Sleep stage 1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>REM</th>
</tr>
</thead>
<tbody>
<tr>
<td>EOG</td>
<td></td>
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<td>EMG</td>
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</tbody>
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*Appleton & Lange*
*Kandel/Schwartz/Jessell*
*Principles of Neural Science*
*Fig. 47.01*
## SLEEP CYCLES CHANGE WITH AGE

<table>
<thead>
<tr>
<th></th>
<th>Age 20</th>
<th>Age 40</th>
<th>Age 60</th>
<th>Age 70</th>
<th>Age 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to fall asleep</td>
<td>16 minutes</td>
<td>17 minutes</td>
<td>18 minutes</td>
<td>18.5 minutes</td>
<td>19 minutes</td>
</tr>
<tr>
<td>Total sleep time</td>
<td>7.5 hours</td>
<td>7 hours</td>
<td>6.2 hours</td>
<td>6 hours</td>
<td>5.8 hours</td>
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<tr>
<td>Time in regular sleep</td>
<td>47%</td>
<td>51%</td>
<td>53%</td>
<td>55%</td>
<td>57%</td>
</tr>
<tr>
<td>Time in slow wave sleep</td>
<td>20%</td>
<td>15%</td>
<td>10%</td>
<td>9%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Time in REM sleep</td>
<td>22%</td>
<td>21%</td>
<td>20%</td>
<td>19%</td>
<td>17%</td>
</tr>
<tr>
<td>Time asleep while in bed</td>
<td>95%</td>
<td>88%</td>
<td>84%</td>
<td>82%</td>
<td>79%</td>
</tr>
</tbody>
</table>

JamesClear.com

Source: Sleep, Nov. 1, 2004, pp. 1255-73
What are the recommendations for sleep as we age?
Sleep in Infants/Babies

- Newborns – 3mo
  - sleep 16-18 hours/24
  - Polyphasic sleep
    - 50 – 300 minutes sleep
    - 90 – 180 minutes wake

- 1-2 months hunger drives wake/sleep
- 3 months cue to light/dark cycle
- 6 months consolidate sleep at night
  - need 14-15 hours / 24 hours
    - 9-12h/night + 2-4.5h/naps
Sleep in Adolescents

- 13 – 18 years need 9.5 to 11 hours
- Naps reappear to curtail sleep debt
- Sleep patterns shift to later sleep-wake cycle
Sleep in Adults & Older Adults

- Sleep patterns change through adulthood... the quantity remains the same
- 18 – 50+ years need 7.5 to 9 hours
- Sleep becomes more fragmented with age... may need naps to fill gaps
Physical

- Age
- Gender
Physical

- Illnesses
  - Cardiac
  - Respiratory
  - Musculoskeletal
  - Gastrointestinal
Mental/Emotional

- Depression
- Schizophrenia
- Bipolar (manic-depression)

Every day stressors can be problems too
Lifestyle
- Timing
  - Jet lag
  - Exercise
  - Work
- Chemicals
  - Tobacco
  - Caffeine
  - Alcohol

Environment
- Noise
- Light
- Temperature
- Mixed signals

You talkin to me?
sorry but i'm too tired now...
www.coolmyspacecomments.com
Common Sleep Disorders

- Insomnia

- Sleep Movement Disorders (RLS)
  - Restless leg syndrome

- Sleep Disordered Breathing
  - Obstructive Sleep Apnea (OSA)
Insomnia

- Difficulty falling asleep, staying asleep, &/or non-restorative sleep a majority of nights for greater than 1 month duration

- Affect 35% of the general population & 69% of the medical population
Sleep Movement Disorders

- **Restless leg syndrome (RLS)**

- Predisposing factors – pregnancy, anemia, rheumatoid arthritis

- Diagnosis – self report, PSG record movement @ sleep onset

- Treatment – Individualized
  - Vite B12, Folate, Iron
  - Healthy Sleep Habits
  - Prescriptions
What does OSA look like?

Opened Upper Airway

Closed Upper Airway

Clear and open upper airway allows air to flow freely to and from the lungs.

Snoring and apnoeas (breathing pauses) are observed when the upper airway collapses.

OSA video
OSA and Memory

- Decreased oxygen to the brain
- Increased brain inflammation (oxidative stress)

- Structural changes
  - Amyloid plaque build up
  - White matter brain loss
Taking Control of your Sleep-Wake Cycle
Getting Good Sleep

- Pharmacotherapy/Devices
- Behavioral therapy
- Good sleep habits
  - Exercise in your AM
  - No caffeine 5-8 hrs of bed
  - Know your light sources
  - Quiet, Cool, Dark
  - Establish a ‘bedtime’ routine
  - Leave the stress outside the bedroom

http://www.sleepeducation.org
Application

- Setting goals for good sleep
- Activity
- Timing
- Frequency

A good laugh and a long sleep are the two best cures for anything.

Irish Proverb

Schulz
Give it a try

- I will exercise for 30 minutes in the first half of my day 4 of 7 days of the week.

- **Activity** = exercise for 30 minutes
- **Timing** = first half of day
- **Frequency** = 4 of 7 days of the week
Now it is your turn

- Write down two goals you would like to try in the next few weeks to improve your sleep.

- Activity/Timing/Frequency

- Be realistic and kind to yourself
Thank you

Any Questions