Assessing and Impacting Patient Sleep Across the Continuum of Care

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Objectives

- State the assessments and screening tools related to sleep that can be utilized by physical therapy staff.
- Explain the impact of sleep and strategies to improve sleep during hospitalization.
- Describe diagnosis specific sleep impact.
- Discuss the research on the relationship between sleep and neuroplasticity, pain, exercise and patient outcomes.
- Discuss appropriate education to provide to patients and their families regarding importance of sleep and strategies to improve sleep.

The Importance of Sleep

Healthy People 2020
National Healthy Sleep Awareness Project
APTA’s Population Health Priority
Sleep as a vital sign

What do PTs think about sleep?

<table>
<thead>
<tr>
<th>Statement</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addressing sleep issues may impact PT outcome</td>
<td>95</td>
</tr>
<tr>
<td>Learned about sleep during entry-level PT education</td>
<td>25</td>
</tr>
<tr>
<td>PTs should receive education about sleep</td>
<td>95</td>
</tr>
<tr>
<td>PTs should routinely assess patients' sleep habits/quality</td>
<td>82</td>
</tr>
<tr>
<td>Routinely assess patient sleep habits/quality</td>
<td>57</td>
</tr>
<tr>
<td>Routinely refer patients to a sleep specialist</td>
<td>56</td>
</tr>
<tr>
<td>Routinely educate patients on the importance of sleep</td>
<td>55</td>
</tr>
</tbody>
</table>

What is sleep?
US Sleep Statistics

- 1/3 of US adults usually get < 7 hours of sleep
- Male vs. female
- Geographical location
- Age
- Race/Ethnicity
- Health and quality of life

Sleep is Critical

- Immune Function
- Healing
- Cognitive function (Learning & Memory)
- Weight
- Hydration
- Performance
- Safety (Accidents & Falls)
- Pain Modulation
- Quality of Life

Links to Chronic Conditions

<table>
<thead>
<tr>
<th>Chronic Condition</th>
<th>Short Sleep (&lt;7 hours)</th>
<th>Sufficient Sleep (≥7 hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart attack</td>
<td>4.8%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Coronary heart disease</td>
<td>4.2%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Stroke</td>
<td>3.6%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Asthma</td>
<td>16.5%</td>
<td>11.8%</td>
</tr>
<tr>
<td>COPD</td>
<td>8.6%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Cancer</td>
<td>10.2%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Arthritis</td>
<td>18.8%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Depression</td>
<td>10.9%</td>
<td>14.6%</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>3.3%</td>
<td>2.2%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>15.1%</td>
<td>8.6%</td>
</tr>
</tbody>
</table>

Sleep Efficiency: Being asleep ≥85% of time in bed
Sleep Latency: Fall asleep in ≤30 min
Awakenings: One time
Naps

Epworth Sleepiness Scale (ESS) Calculator

The Epworth Sleepiness Scale (ESS) is a 10-item instrument designed to measure the likelihood of falling asleep during specific, typical situations. A high score indicates greater daytime sleepiness. The scale was developed by John D. Johns, MD, PhD, in 1991 and is widely used in clinical and research settings. The ESS is based on the concept that individuals with more severe sleepiness are more likely to experience episodes of sleep during daily activities.

<table>
<thead>
<tr>
<th>Situation</th>
<th>Likelihood of Falling Asleep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting and waiting</td>
<td>Low (2)</td>
</tr>
<tr>
<td>Small talk</td>
<td>Low (2)</td>
</tr>
<tr>
<td>Driving a car</td>
<td>High (6)</td>
</tr>
<tr>
<td>Walking or standing</td>
<td>High (6)</td>
</tr>
<tr>
<td>Reading</td>
<td>High (8)</td>
</tr>
<tr>
<td>Watching TV</td>
<td>High (8)</td>
</tr>
<tr>
<td>Eating or drinking</td>
<td>High (8)</td>
</tr>
<tr>
<td>Taking a rest in bed</td>
<td>High (8)</td>
</tr>
<tr>
<td>Texting or talking on phone</td>
<td>Low (2)</td>
</tr>
</tbody>
</table>

Scores:
- 0-9: Low sleepiness
- 10-14: Moderately sleepy
- 15-24: Very sleepy
- 25-30: Very sleepy and a risk for dozing
Common Sleep Disorders:

**Insomnia**

- Trouble falling asleep
- Difficulty staying asleep
- Waking up too early in the morning
- Treatment: Sleep hygiene, CBT, short-term use of medications

**Sleep Apnea**

- What is it? Temporary pause in breathing during sleep
- Central vs. obstructive
- Risk Factors
- Symptoms: Snoring, pause in breathing, choking noises, daytime sleepiness
- Long-term consequences: Cardiac, CVA, DM, depression
- Treatment: Positive airway pressure, weight loss

**Restless Legs Syndrome**

- Neurological disorder: Overwhelming urge to move the legs
- Sensation: Ache, pain, unpleasant “creeping”, burn, itch
- May be relieved by walking or kicking
- Difficult to fall asleep and/or stay asleep
- Treatment: Meds for dopamine abnormality and sleep continuity
Steps for a Physical Therapist¹

- Screen all patients
- Assess with formal questionnaire as needed
- Refer to sleep specialist as needed

Goals: Assess how sleep is impacting rehab
Prevent or identify sleep disorders

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Patient Interview: General Questions¹

1. How much sleep do you generally get?
2. Do you feel well rested when you get up?
3. Is your condition impacting your sleep? If so, how?
4. How would you rate your sleep quality?
5. Does being sleepy during the day interfere with your daily function?
6. Do you have difficulty falling asleep, difficulty returning to sleep if you wake up in the middle of the night, or difficulty with waking up too early?
7. Do you snore loudly or frequently? Has anyone observed you stop breathing while you sleep?
8. Do you have a strong urge to continually move your legs while you are trying to sleep?

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Preparing to See the Sleep Specialist²³

Objective Sleep Testing⁵²

- Polysomnography: In-lab or home sleep study
- Multiple sleep latency test (MSLT)
- Maintenance of Wakefulness Test
- Actigraphy

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Home wearables for additional information

Inpatient Sleep⁵⁶-⁶²
Impact of Inpatient Sleep\textsuperscript{6,56-57,62-67}

- Patient Satisfaction
- Reimbursement
- Delirium
- Weaning from mechanical ventilation
- Increased length of stay/ICU stay
- Disability at time of discharge
- Health outcomes after hospitalization
- Short- and long-term function
- Readmission
- Mortality

Strategies to Improve Inpatient Sleep

<table>
<thead>
<tr>
<th>Environment</th>
<th>Internal</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise</td>
<td>Relaxation</td>
<td>Interdisciplinary</td>
</tr>
<tr>
<td>Layout</td>
<td>Music</td>
<td>Policies</td>
</tr>
<tr>
<td>Light</td>
<td>Aromatherapy</td>
<td>Order Sets</td>
</tr>
<tr>
<td>Temperature</td>
<td>Acupuncture</td>
<td>Education</td>
</tr>
<tr>
<td>Care Coordination</td>
<td>Light Therapy</td>
<td>Interviews</td>
</tr>
<tr>
<td>Comforts of home</td>
<td>Melatonin</td>
<td></td>
</tr>
</tbody>
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Hospital Sleep Quality Improvement\textsuperscript{6,19,56,65,75}

**Multimodal Improvement Programs**

- Bartick (2010): 49\% decrease in number of patients who were given sedatives
- Growden (2018): HELP Decreased use of hypnotics and better sleep quality
- Knauert (2019): \(\frac{1}{3}\) fewer room entries at night and length of time between entries increased from 16.4 min to 45.8 min
- Norton (2015): Improvement from 47\% of patients reporting good/excellent sleep to 69\%. Disturbance by noise and light fell significantly.

Hospital Sleep Scales

- Verran and Snyder-Halpern Sleep Scale (VSH)\textsuperscript{76}
- Richards-Campbell Sleep Questionnaire (RCSQ)\textsuperscript{77}
- Self-constructed

Pain and Sleep\textsuperscript{78}

- **Bidirectional relationship**
  - Poor sleep\(\leftrightarrow\)increased pain

  Sleep disturbance in chronic pain is occurs in two-thirds of patients

- **Pain and Sleep**\textsuperscript{79-80}
  - 23\% Chronic pain, average 42 min sleep debt, 37\% report good/very good sleep quality, 23\% report higher stress levels, >50\% of people with chronic pain and sleep difficulties reported those difficulties interfered with their work, 23\% diagnosed with sleep disorder
  - 26\% Acute pain in the past week, average 14 min sleep debt, 45\% report good/very good sleep quality, 6\% diagnosed with sleep disorder
  - People with pain: Far more apt than others to report that lack of sleep interferes with their mood, activities, relationships, and enjoyment of life overall. People with pain also feel less control over their sleep, worry more about lack of sleep affecting their health, and exhibit greater sleep sensitivity. More likely to say environmental factors make it more difficult to get a good night’s sleep.
  - **Vicious cycle**
Stroke

Sleep Disordered Breathing in 50-70% of Stroke patients.
CVA pts with Dysphagia predictive of OSA.
Screen with OSA screening questions, clinical symptoms, overnight continuous oximetry.

Baclofen and Sleep

Single dose of baclofen did not aggravate OSA, bolus of intrathecal baclofen did increase CSA.
Has been shown to increase sleep efficiency and time in REM sleep.
Most impact on daytime sleepiness is in first week after increasing dosage.

Neuroplasticity/Stroke

Role of REM and SWS
Active system consolidation theory
Synaptic downscaling theory
Energy allocation model of sleep and wakefulness.

Brain Injury/Concussion

68% of TBI patients have moderate to severe SWCD < 35 days post injury. Down to 28% after 1 month post injury
More sleep disorder correlates w/ longer length of stay and poorer outcomes
With mTBI (including concussion) vicious cycle of disordered sleep and anxiety, headaches, fatigue and irritability.

Caregiving Impact on Sleep

Caregivers for patients with dementia lose between 2.4 and 3.5 hours each week
Sleep hygiene and CBT has been demonstrated to improve this loss
Sleep and Spinal Cord Injury

- Have higher rate of sleep apnea even in incomplete injuries, although with prevalence higher with tetraplegia
- Continuous pain has more of an impact on quality of sleep than intermittent pain with SCI or SCI alone

Sleep and Multiple Sclerosis

- Fatigue and Daytime sleepiness primary complaint
- CBT and relaxation exercises had positive impact
- Not exercise alone
- Fatigue has significant impact with cognitive tasks in real world setting

Parkinson’s disease

Sleep Disturbances occur 60-98% of patients w/PD
Dopamine agonists can play a role in sleep disruption

Chronic Fatigue Syndrome and Fibromyalgia

2 distinct syndromes
However both report sleep disturbances and non restorative sleep
20-50% of those diagnosed w/CFS have concurrent sleep disorder (OSA, RLS)
Some Sleep studies do show reduced time in slow wave (most restorative sleep) however not fully conclusive
When medications controlled for REM showed no differences
Sleep differences can not be noted as causality for reports of fatigue and non restorative sleep

Treatment of Choice

Combination of sleep hygiene education, cognitive behavioral therapy, and relaxation training

2 Meta-analyses: Behavioral therapy produced similar results to pharmacotherapy across all sleep measures without any of the side effects, and reduced sleep onset latency more effectively than medication.

Sleep Hygiene

Schedule
Keep it consistent
It’s bedtime!
Can you make up for lost sleep?
Gradual change is better
Sleep Hygiene: Environment

Quiet... shhh
Nice and dark
Calm and relaxing
Keep it cool
Clean it up
Adios electronics
To recline or not to recline?

Sleep Hygiene: Daytime Routine

A bright start to the day
Eat and drink to help your sleep
What to avoid
Is evening exercise okay?
To nap or not to nap

Exercise Impact on Sleep

Most studies done on healthy adults and impact on sleep
Moderate to vigorous activity 150 min a week
Some indications that vigorous aerobic exercises <4 hours prior to sleep can have negative effect
Yoga, stretching can be part of a relaxing routine prior to sleep

Sleep Hygiene: Bedtime Routine

Practice a relaxing bedtime ritual
Keep it dim
Does warm milk help?
Turn the electronics off
What should I do if I can't fall asleep?
Do weighted blankets work?

Treatment: Cognitive Behavioral Therapy

Cognitive Behavioral Therapy for Insomnia (CBT-I)

Medications to Decrease Excessive Daytime Sleepiness

Modafinil (Provigil)
Armodafinil (Nuvigil)
Amphetamine (Adderall)
Dextroamphetamine (Dexedrine)
Methylphenidate (Ritalin, Concerta, others)
Sodium oxybate (Xyrem)
OTC Sleep Aids

- Melatonin
- Valerian root
- Diphenhydramine (Benadryl), Doxylamine (Unisom)
- Meant for temporary use

Reference List


Prescription Sleep Aids

<table>
<thead>
<tr>
<th>Drug Type</th>
<th>Common names</th>
<th>How works</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opiates</td>
<td>Hydroxyzine (Xanax)</td>
<td>Enhances GABA to slow brain activity</td>
</tr>
<tr>
<td>Antidepressants</td>
<td>Amitriptyline (Elavil)</td>
<td>Increases chemical responsible for sleep/wake cycle</td>
</tr>
<tr>
<td>Antidepressants</td>
<td>Zaleplon (Sonata)</td>
<td>Makes you feel calm and helps you fall asleep</td>
</tr>
</tbody>
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