Sleep
Pain and anxiety make it hard to sleep. Lack of sleep makes pain worse and decreases energy.

Energy
Coping with pain drains energy. Lack of energy makes it hard to be active and stay in shape.

Activity
Pain and lack of energy make it hard to be active. Lack of exercise worsens pain.

Mood
Chronic pain and the limits it puts on your life can lead to depression, anger, and anxiety. These feelings make coping with pain harder.
Sleep and Chronic Pain

- Common problem in people with pain = fatigue and non-restorative sleep.
- Chronic pain, persistent fatigue, and poor sleep constitute major health threats to quality of life.
- Predictors of poor sleep = Depressive mood and pain severity
- 50% and 88% of patients with chronic nonmalignant pain disorders have significant sleep complaints.
Chronic sleep deprivation is not good for our health

- The brains of people with Alzheimer’s have build ups of amyloid beta and tau protein, which cause brain tissue to die.
- Just one night of disrupted sleep in healthy adults causes an increase in amyloid beta, a brain protein associated with Alzheimer’s disease.
- Study found a link between a week of disrupted sleep and an increase in another brain protein, tau, which has been linked to brain damage in Alzheimer’s and other neurological diseases.

Slow wave sleep disruption increases cerebrospinal fluid amyloid-β levels Yo-EI S Ju Sharon J Ooms Courtney Sutphen Shannon L. Macauley Margaret A. Zangrilli Gina Jerome Anne M. Fagan Emmanuel Mignot John M. Zempel Jurgen A.H.R. Claassen Brain, Volume 140, Issue 8, 1 August 2017, Pages 2104–2111,
The Consequences of Obstructive Sleep Apnea

Obstructive Sleep Apnea afflicts 1 in every 5 Americans. What other problems arise for OSA patients?

- **84%**
  - Stroke
  - Patients with moderate to severe OSA are 5x more likely to have a stroke.
  - The risk of stroke rises with the severity of the disease.
  - OSA is often found in patients following a stroke.

- **82%**
  - Drug resistant hypertension
  - Sleep Apnea is an identifiable cause of high blood pressure.

- **76%**
  - Congestive heart failure
  - Newly diagnosed patients should be screened for OSA.

- **58%**
  - Cardiac arrhythmias
  - 4x as likely to have atrial fibrillation.

- **30%**
  - Sudden death
  - OSA sufferers have a 30% higher risk of heart attack or premature death.
  - More than 50% of sudden deaths from OSA occur between 10pm and 6am.

- **65%**
  - Cancer
  - Severe forms of Sleep Apnea have a 65% greater risk of developing cancer.

- **80%**
  - Medical costs
  - Untreated Sleep Apnea costs Americans an extra $4.3 billion per year.
  - Treating Sleep Apnea can cut a patient's healthcare costs in half.

- **80%**
  - Obesity
  - As sleep shortens or diminishes in quality, appetite for high-calorie food increases.
  - Approximately 80% of OSA patients are overweight.

- **75%**
  - Gastroesophageal reflux disease (GERD)
  - Possible treatment options are:
    - Weight loss
    - Heartburn medications
    - CPAP therapy (constricts positive airway pressure)

- **58%**
  - Mood disturbance
  - Depression
  - Anxiety
  - Loss of motivation
  - Shortened attention span
  - Moodiness and bad temper
  - Low testosterone

- **70%**
  - Daytime sleepiness
  - 7x more likely to have a car accident
  - Impaired concentration and memory loss
  - Reduced work-efficiency
  - Reduced alertness
  - Slower reaction time

- **87%**
  - Loud snoring
  - Relationship discord
  - Morning headaches

- **80%**
  - OSA patients have as much of an effect as prescribed oral medications.

- **75%**
  - Sexual dysfunction
  - Loss of libido
  - Impotence

- **48%**
  - Nocturia
  - Frequent urination at night

- **75%**
  - Chronic pain
  - Up to 80% of patients with fibromyalgia have Sleep Apnea.
  - 75% of patients treated with moderate to high doses of opioids have Sleep Apnea.
2015 Sleep in America™ Poll: How Pain Affects Sleep

57% of Americans have experienced pain in the past week.

23% of Americans with chronic pain report higher stress levels. Stress, pain and poor health are correlates of shorter sleep durations.

40% of those with chronic pain say sleep difficulties interfere with work.

Pain is a key factor in Americans' sleep debt.

21% have experienced chronic pain.

21% have experienced chronic pain.

36% have experienced acute pain.

1 in 3 people without chronic pain still don't get the sleep they need to in order to feel their best.

Making sleep a priority can help everyone. Learn more at sleepfoundation.org & sleep.org.
Poor Sleep and Sleep Interruptions

- Decrease your energy levels and your ability to function.
- Sleep interference and anxiety over not getting a restful night’s sleep are huge problems for people in pain.
- People who can’t sleep have a lot of valid complaints, but most fall into two categories:
  - inability to initiate or maintain sleep at night (insomnia),
  - and inability to maintain wakefulness during the day (excessive daytime sleepiness).
Pain intake evaluation questions

- SLEEP PROBLEMS: YES/NO PAST___
  BEDTIME______AWAKE_______ ONSET TIME_______

- INTERRUPTIONS/ YES/NO _______DURATION PAST___
  NOW_____ NAPPING YES/NO

- HOW RESTED? SNORING? DAYTIME FATIGUE AND SLEEPINESS? Headaches in morning?

- OBSERVE: NECK CIRCUMFERENCE; JAW; WISDOM TEETH REMOVED

- NOCTURIA?

- MALLAMPATI SCORE
The Mallampati Score

**CLASS I**
Complete visualization of the soft palate

**CLASS II**
Complete visualization of the uvula

**CLASS III**
Visualization of only the base of the uvula

**CLASS IV**
Soft palate is not visible at all
**Symptoms**

1. **Snoring:** Does the pt. snore loudly on most nights (> than 3 times/week)?
2. **Apnea:** Is there any report of witnessed apnea by the pt. or bed partner?
3. **EDS:** Does the pt. have any daytime sleepiness or fatigue?

**Exam**

4. **BMI:** > 30

5. **Mallampati Score of Class III or IV**

6. **Neck Size:**
   - Male: > 17 inches
   - Female: > 16 inches

**Medical History**

7. **Comorbidities:** Does the pt. have a personal history of:
   - (score only 1 point, even if multiple present)
     - Hypertension
     - Atrial fibrillation
     - CHF
     - Stroke
     - Coronary artery disease

**Treatment Plan**

Score:
- **4-7:** High Risk - Refer ASAP to a Board-Certified Sleep Specialist
- **2-3:** Moderate Risk – Consider referral or screening with home PSG
- **1 or less:** Low probability of sleep apnea – Counsel about risk reduction
The following questionnaire will help you measure your general level of daytime sleepiness. You are to rate the chance that you would doze off or fall asleep during different routine daytime situations. Answers to the questions are rated on a reliable scale called the Epworth Sleepiness Scale (ESS). Each item is rated from 0 to 3, with 0 meaning you would never doze or fall asleep in a given situation, and 3 meaning that there is a very high chance that you would doze or fall asleep in that situation.

How likely are you to doze off or fall asleep in the following situations, in contrast to just feeling tired? Even if you haven’t done some of these activities recently, think about how they would have affected you.

Use this scale to choose the most appropriate number for each situation:
- 0 = would never doze
- 1 = slight chance of dozing
- 2 = moderate chance of dozing
- 3 = high chance of dozing

It is important that you circle a number (0 to 3) on each of the questions.

<table>
<thead>
<tr>
<th>Situation</th>
<th>Chance of dozing (0-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting and reading</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Watching television</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Sitting inactive in a public place—for example, a theater or meeting</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>As a passenger in a car for an hour without a break</td>
<td>0 1 2.3</td>
</tr>
<tr>
<td>Lying down to rest in the afternoon</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Sitting and talking to someone</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>Sitting quietly after lunch (when you’ve had no alcohol)</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>In a car, while stopped in traffic</td>
<td>0 1 2 3</td>
</tr>
</tbody>
</table>

**Total Score:**
Scoring your results

Now that you have completed the questionnaire, it is time to score your results and evaluate your own level of daytime sleepiness. It’s simple. Just add up the numbers you put in each box to get your total score.

The Epworth Sleepiness Scale key

A total score of less than 10 suggests that you may not be suffering from excessive daytime sleepiness.

A total score of 10 or more suggests that you may need further evaluation by a physician to determine the cause of your excessive daytime sleepiness and whether you have an underlying sleep disorder.

Your next steps

This scale should not be used to make your own diagnosis. It is intended as a tool to help you identify your own level of daytime sleepiness, which is a symptom of many sleep disorders.

If your score is 10 or more, please share this information with your physician. Be sure to describe all your symptoms, as clearly as possible, to aid in your diagnosis and treatment.

It is important to remember that true excessive daytime sleepiness is almost always caused by an underlying medical condition that can be easily diagnosed and effectively treated.
Obstructive Sleep Apnea vs. Central Sleep Apnea

- **Obstructive Sleep Apnea**
  - You can't breathe normally because of upper airway obstruction.
  - Caused by a blockage of the airway, usually when the soft tissue in the back of the throat collapses during sleep.

- **Central Sleep Apnea**
  - Occurs because your brain doesn't send proper signals to the muscles that control your breathing.
  - Is less common than obstructive sleep apnea.
Sleep Apnea: What Does AHI Mean?

- “Apnea” = complete loss of breath for 10 seconds or longer.
- “Hypopnea” is a partial loss of breath that lasts 10 seconds or longer.
- Apnea-hypopnea index (AHI) tells if you have the sleep disorder and, if so, how serious it is.

- AHI
  - Normal sleep: Fewer than 5 events per hour
  - Mild sleep apnea: 5 to 14 events per hour
  - Moderate sleep apnea: 15 to 29 events per hour
  - Severe sleep apnea: 30 or more events per hour
Medications

- Pharmacotherapy remains the most widely used treatment for sleep disturbances - even though long-term efficacy has not been established.
- The prolonged use of sleep medication creates its own problems.
<table>
<thead>
<tr>
<th>Drug</th>
<th>Effects on Sleep</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barbiturates Acute:</td>
<td>↑TST</td>
<td>Rapid development of tolerance</td>
</tr>
<tr>
<td></td>
<td>↓WASO</td>
<td>• Withdrawal insomnia</td>
</tr>
<tr>
<td></td>
<td>↓REM</td>
<td>• Daytime sedation</td>
</tr>
<tr>
<td></td>
<td>↑Stage II, ↑spindles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↑ or ↓Delta</td>
<td></td>
</tr>
<tr>
<td>Withdrawal: Barbiturates</td>
<td>↓TST</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↓SL (most agents)</td>
<td>Agents vary in onset and duration of action</td>
</tr>
<tr>
<td></td>
<td>↑TST</td>
<td>Daytime sedation (with long-acting agents)</td>
</tr>
<tr>
<td></td>
<td>↓WASO</td>
<td>Tolerance develops (with short-acting agents)</td>
</tr>
<tr>
<td></td>
<td>↓REM</td>
<td>Withdrawal insomnia (with short-acting agents)</td>
</tr>
<tr>
<td></td>
<td>↑Stage II, ↑spindles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↓Delta (most agents; some ↑delta)</td>
<td></td>
</tr>
<tr>
<td>Benzodiazepines Acute:</td>
<td>↓TST</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↓SL</td>
<td>Sleep architecture not typically altered</td>
</tr>
<tr>
<td></td>
<td>↑TST</td>
<td>Withdrawal effects inconsistently seen</td>
</tr>
<tr>
<td>Withdrawal: Benzodiazepines</td>
<td>↓TST</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↓SL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↑TST</td>
<td></td>
</tr>
<tr>
<td></td>
<td>→REM</td>
<td></td>
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<tr>
<td></td>
<td>→Delta</td>
<td></td>
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<tr>
<td>(zolpidem)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acute:</td>
<td>Chronic:</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>----------</td>
</tr>
<tr>
<td>ETOH</td>
<td>↑TST 1st half of night, ↓2nd half</td>
<td>→TST</td>
</tr>
<tr>
<td></td>
<td>↓WASO 1st half of night, ↑2nd half</td>
<td>→REM</td>
</tr>
<tr>
<td></td>
<td>↓REM</td>
<td>↓Delta</td>
</tr>
<tr>
<td></td>
<td>↑Delta</td>
<td>↓Delta</td>
</tr>
<tr>
<td>Opioids</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>↑WASO</td>
<td>↓WASO</td>
</tr>
<tr>
<td></td>
<td>↓REM</td>
<td>→WASO</td>
</tr>
<tr>
<td></td>
<td>↓Delta</td>
<td>→Delta</td>
</tr>
<tr>
<td>Aspirin</td>
<td></td>
<td></td>
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</tbody>
</table>
Basic education about sleep and the nature and causes of chronic insomnia should be discussed.

These interventions are intended to reestablish the bed as the dominant cue for sleep, regulate sleep-wake schedules, and consolidate sleep over a shorter period of time.
Key Strategies

- strengthen the association between patient beds and sleeping.
- avoid napping
- go to bed only when sleepy
- use the bedroom only for sleep and sex
- establish a pre-sleep routine to be used every night
- get out of bed whenever they were unable to fall asleep within 20 min.
- maintain a regular sleep-wake schedule regardless of nightly variations in the quantity or quality of your sleep.
Key Strategies

- Sleep restriction
- Relaxation training
- Cognitive restructuring
- Sleep hygiene education.
Obstructive Sleep Apnea: Treatment

- Losing weight
- Avoiding alcohol and sleeping pills.
- Changing sleep positions to improve breathing.
- Stopping smoking – it increases the swelling in the upper airway, which may worsen both snoring and apnea.
- Avoiding sleeping on your back.

- Continuous Positive Airway Pressure (CPAP). CPAP is the most common treatment for sleep apnea. There's also bi-level positive airway pressure, or BPAP, which is similar to CPAP but the air flow changes when you breathe in and then breathe out.
- Dental devices can be made that help keep the airway open during sleep.
- Surgery for Sleep Apnea
Central Sleep Apnea: Treatment

- Addressing associated medical problems.
- Reduction of opioid medications.
- Continuous positive airway pressure (CPAP).
- Adaptive servo-ventilation (ASV).
- Bilevel positive airway pressure (BPAP).
- Supplemental oxygen.
- Medications.
CASE PRESENTATION

• PT. IS A 55 YEAR OLD MALE COMPLAINTS OF CHRONIC PAIN, SHORTNESS OF BREATH, GAINED 10 LBS OVER THE PAST 6 MONTHS

• HAS FATIGUE AND IS TIRED MOST OF THE DAY IS IRRITABLE AND CRANKY

• WIFE AND FEELS THAT HE WILL PROBABLY BE BACK TO NORMAL IF HE LOSES THE EXTRA WEIGHT.

• HISTORY OF CHILDHOOD ASTHMA BUT HAS NOT HAD ANY EXACERBATIONS AS AN ADULT.

• HIS PAST MEDICAL HISTORY IS RELEVANT FOR HYPERTENSION - NON-INSULIN-DEPENDENT DIABETES, AND HYPERLIPIDEMIA.

• EX-SMOKER AND QUIT 10 YEARS AGO WITH A 10 PACK-YEAR HISTORY OF SMOKING - TROUBLE CONCENTRATING ON TASKS - DOZED OFF IN FRONT OF THE TV - HAS RESTLESS SLEEP DURING THE NIGHT - LOUD SNORES – URINATES FOUR TIMES AT NIGHT-MINIMAL URINE VOIDING