Snoring and Sleep Apnea
What is it and how do I stop?

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Breathing in Sleep
- How air flows: the anatomy of the nose and throat
- Discuss symptoms related to snoring
- Discuss what happens when breathing during sleep is altered
- Steps for evaluation of snoring and sleep apnea
- Treatment for sleep apnea and snoring

Snoring
- Chronic habitual snoring
  - 20% women; 40% men
  - Most common symptom of sleep apnea (35% of those who snore have obstructive sleep apnea)
- Snoring risk factors
  - Age, sex, obesity, ETCH or sedative use, smoking, nasal obstruction, asthma, lung disease.

Breathing in Sleep
Upper Airway

Collapsing Pipe
- Upper Airway – Throat
- Lined by muscles you use to swallow and talk
- Muscles of the throat relax during sleep

Snoring - Acoustics
- Snoring = noise generated when air flows through a narrowed upper airway
- Sound source: flutter or vibration of soft tissues, can be from multiple sites

Fiberoptic Exam
- Done in the office
- Numbing spray
- Look at the nose and throat
Awake Upper Airway Exam

Pipe Collapse

Sleep Endoscopy: Patterns of collapse

Effects of primary snoring

https://www.youtube.com/watch?v=rwdhbfJ3niI
Social Impact

- Bed partner
  - Impaired sleep quality
  - Relationship disharmony
- Second-hand snoring
  - Once treated, bed-partner QOL increased, sleepiness, and depression scores improved (Parish & Lyng. Chest 2003)

More Snoring Relates to Worse Sleepiness

- Sleep Heart Health Cohort Study
- 6000 self-reported snoring and ESS
- Sleepiness increases with snoring frequency and loudness

<table>
<thead>
<tr>
<th>Table 1: Relation of Sleepiness to Snoring Frequency and Respiratory Disturbance Index (RDI)</th>
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<tbody>
<tr>
<td>Snoring Frequency (nights/week)</td>
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<td>0</td>
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<td>0.1</td>
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Louder Snoring Related to Worse Sleepiness

- Sleep Heart Health Cohort Study
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Obstructive Sleep Apnea

- Repeated collapse of the upper airway during sleep
- Leads to reduced oxygen delivery to the lungs and body
- Impacts sleep type/depth and quality
- Measured with a sleep study test
  - Number of times airflow is reduced
  - Oxygen level changes
  - Sleep stage
  - Sleep position
  - AHI = Apnea Hypopnea Index
Health Risks of untreated OSA

- High blood pressure
- Heart disease
- Stroke
- Obesity
- Motor Vehicle Accidents
- Daytime sleepiness
- Impaired work performance

What Happens in Sleep Apnea

Spectrum: What does snoring mean?

<table>
<thead>
<tr>
<th>Normal nighttime breathing</th>
<th>Mid sleep apnea (AH 5-15)</th>
<th>Severe sleep apnea (AH &gt;30)</th>
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<tbody>
<tr>
<td>Primary snoring (AH &lt;5)</td>
<td>Moderate sleep apnea (AH 15-30)</td>
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Is Louder Snoring Associated with Sleep Apnea Severity?

- 1600 Habitual snorers
  - Sleep Study and objective measures
- Significant correlation between loudness of snoring and AH:
  - AH < 5: 46dB
  - AH > 50: 60dB
Evaluation of Snoring

- Screen for OSA
- Sleepiness, daytime symptoms
- Bed partner report
  - Gasping, Pauses in breathing
  - Goals of treatment
- Exam
- Treatment options

Things That Impact Sleep Apnea and Snoring

- Being overweight = more collapse
- Sleep position (back is worse than the side)
- Alcohol/sedative use at nighttime: especially 3-4 hours prior to bedtime
- Acid Reflux

The Effects of Weight Loss

- BMI = \( \frac{\text{Weight (kg)}}{\text{Height (m)}^2} \)
- Associated with worse outcomes after most surgical procedures
- Tongue fat correlates with BMI (Nashi 2007)
- 10% weight loss = up to 47% AHI drop (Johansson 2009)
- 10% weight gain = 32% AHI increase (Peppard 2000)

Positive Pressure – Why does it work?

- First line treatment – CPAP (continuous positive airway pressure)
- Applies positive pressure during sleep to prevent collapse
- Different mask interfaces exist
How to improve CPAP use

- Getting used to it before sleep
- Improving breathing through the nose
  - Treating allergies and congestion
- Helps determine how symptoms of fatigue will change when the sleep apnea is treated.
- CPAP is adjustable and titratable
- Other Sleep Issues
  - Insomnia
  - Sleep amount

Oral appliances

- Mouth guard designed to support the jaw and prevent tongue collapse
- Designed by dental providers
- Sleep test done after the guard is made to determine how well it works for sleep apnea

Exercises for Snoring?

- Snoring and sleep disordered breathing are less common in singers and musicians who played the digeridoo
- Oropharyngeal exercises done routinely for 3 months (8 mins 3x/day) showed decrease in snoring by 50%

Surgery for OSA

- Directed at the sites of obstruction
  - More space
  - Prevent collapse
  - Support muscle tone loss
Types/Classes of Surgery

- When non-invasive measures fail
- Goals: Reduce collapse that happens during sleep
- Create space
- Support tissues
- Improve muscle tone

Soft Tissue Surgery

- Tonsil and palate surgery
- Lingual tonsil surgery
- Base of tongue surgery
- Epiglottis surgery

Snoring and OSA in Kids

- Most commonly due to enlarged tonsils and adenoids
- Tonsil and adenoid tissue shrink in size as we age

Bone/Jaw Surgery

- Maxillomandibular Advancement
Hypoglossal Nerve Stimulation

- FDA approved first device – Inspire II 4/2014
- Fully implanted system with sleep remote
- Unilateral (right) Hypoglossal Nerve stimulation
- Improves neuromuscular tone during sleep

Nerve Stimulation Therapy

Goals of Treatment

- Reduce symptoms: daytime fatigue, snoring
- Improve quality of life
- Minimize health risks: mortality, cardiac, motor vehicle accidents
- Treatment starts with positive pressure trial
- Treatment is individualized
  - Snoring and sleep apnea severity
  - Health factors
  - Patient choice

Conclusions

- Not all snoring is the same.
- Things to try:
  - Weight reduction
  - Positional sleep (side-sleeping with positioner)
  - Watch alcohol use prior to bedtime
  - Manage acid reflux
- If there are signs of sleep apnea: get tested!
- Sleep apnea treatment starts with positive pressure, & other options exist if that doesn’t work.