

# Sleep Apnea: Diagnosis and Treatment Options

**Thomas Minor, MD**

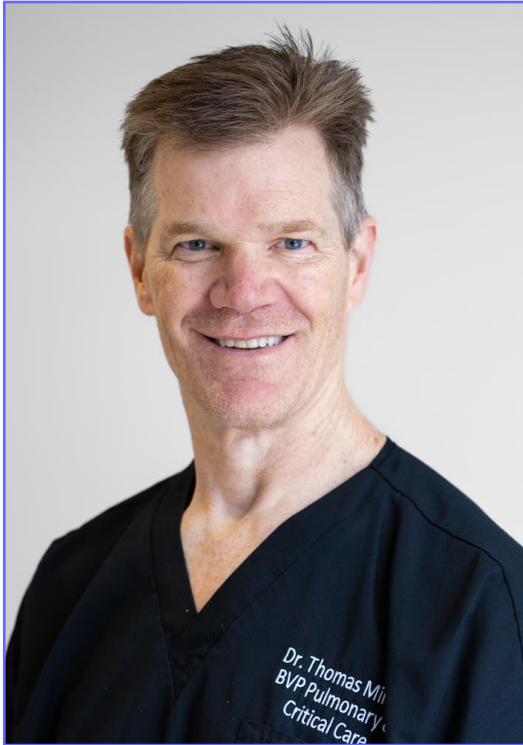
Boulder Valley Pulmonology  
720-902-8003

**Angela Paddack, MD**

Boulder Medical Center, Otolaryngology - Ear, Nose & Throat  
720-821-0939



Boulder Community Health



Dr. Thomas Minor  
Pulmonology & Sleep Medicine Specialist



Dr. Angela Paddack  
Otolaryngology & Inspire Surgeon

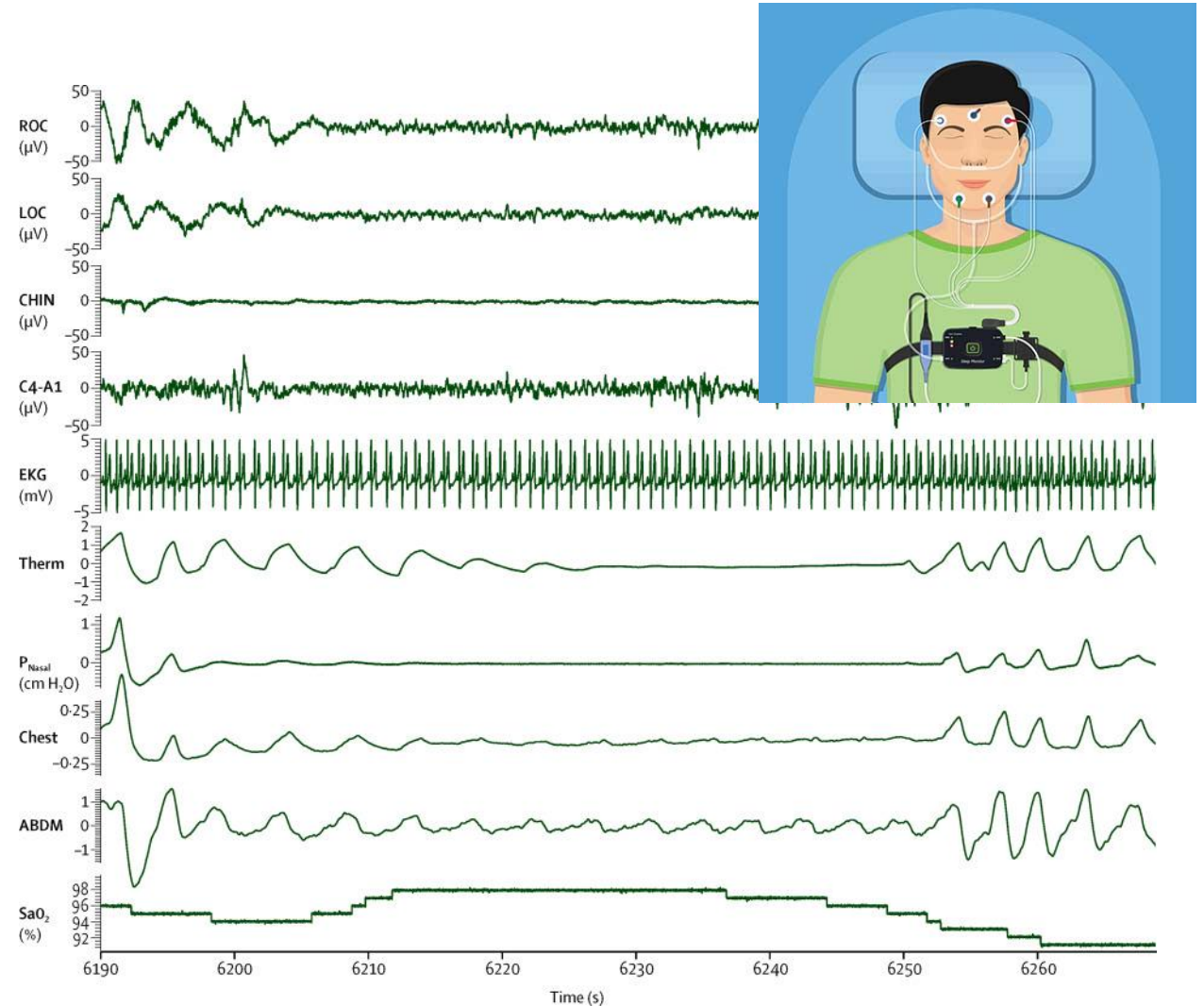
# Tonight's Agenda

- Diagnosis of Sleep Apnea
- Types of Sleep Apnea
- Non-surgical Treatments
- Surgical Treatments-  
Hypoglossal Nerve Stimulation



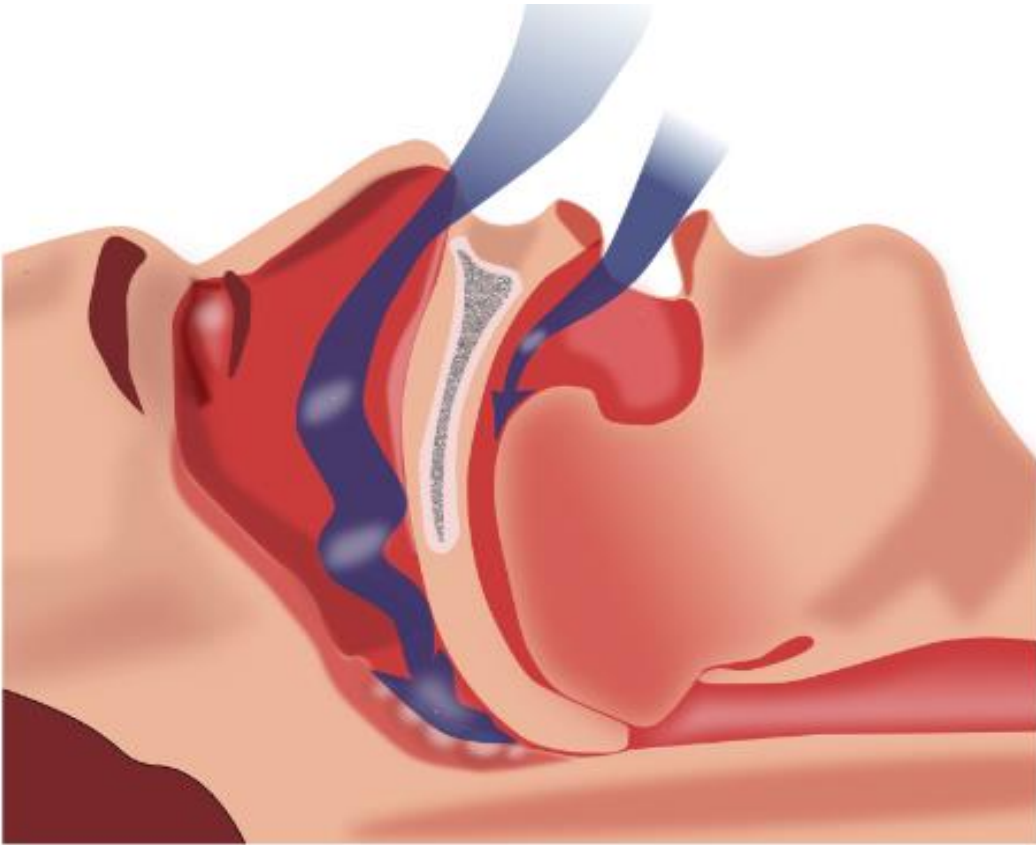
# Diagnosis of Sleep Apnea

- Signs and Symptoms
- Sleep History
- Home Sleep Test (HST)
- Nocturnal Polysomnography

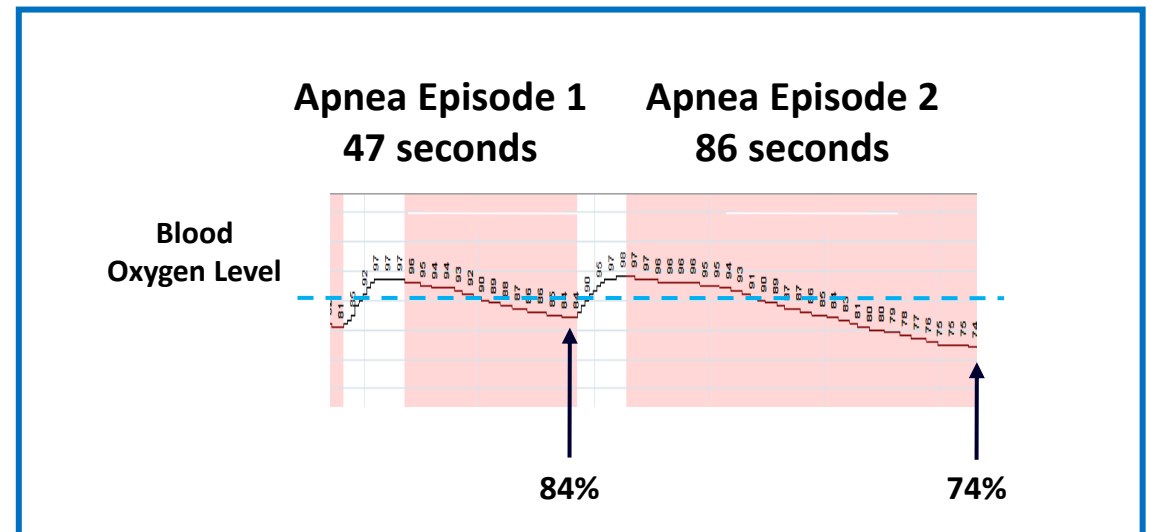




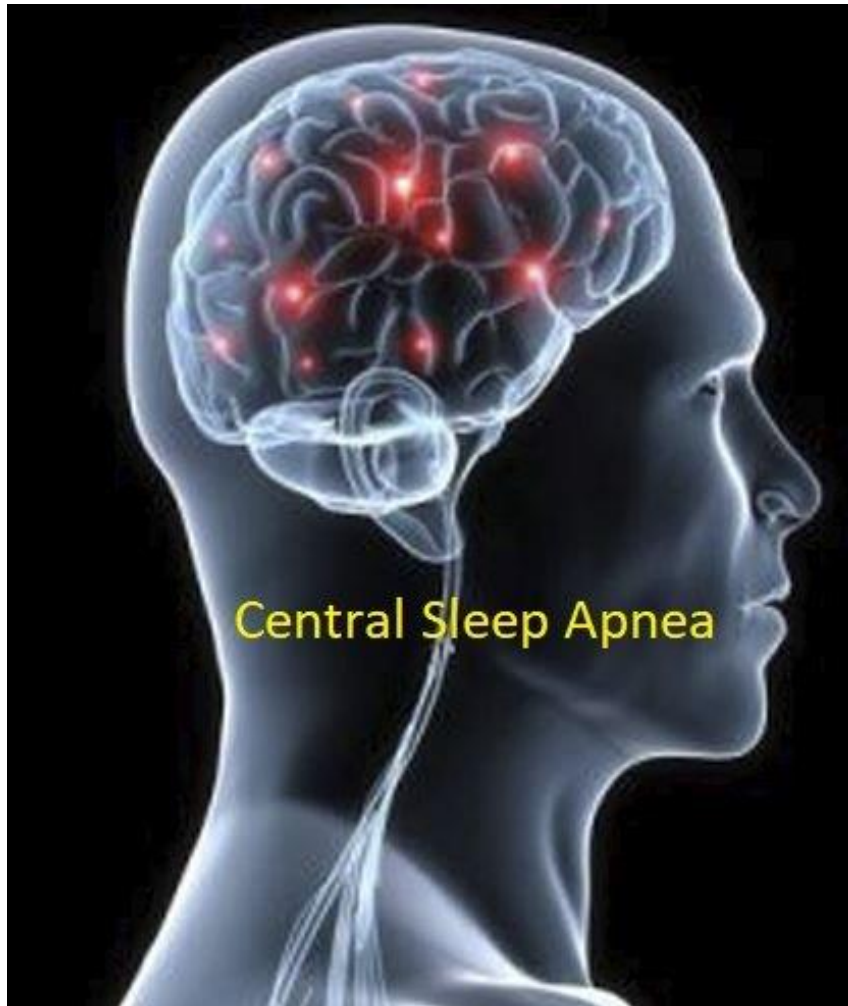
# Obstructive Sleep Apnea (OSA)



- Tongue and soft palate relax during sleep and block airflow
- Over 20 million Americans have moderate to severe (OSA)



# Central Sleep Apnea (CSA)



- Brain fails to send signal to muscles to breathe
- ~1% of adults over 40
- Congestive heart failure, opioids, stroke
- More common with high altitude

# Consequences of Untreated Sleep Apnea



## Fatigue, Diminished Productivity



## Snoring – Bed Partner



## Accident Risk – Community Safety



## Heart and Brain Health





# OSA and CSA: PAP Therapies (CPAP, BiLevel, ASV)

**Great results when used regularly**



**Intolerance a significant problem**





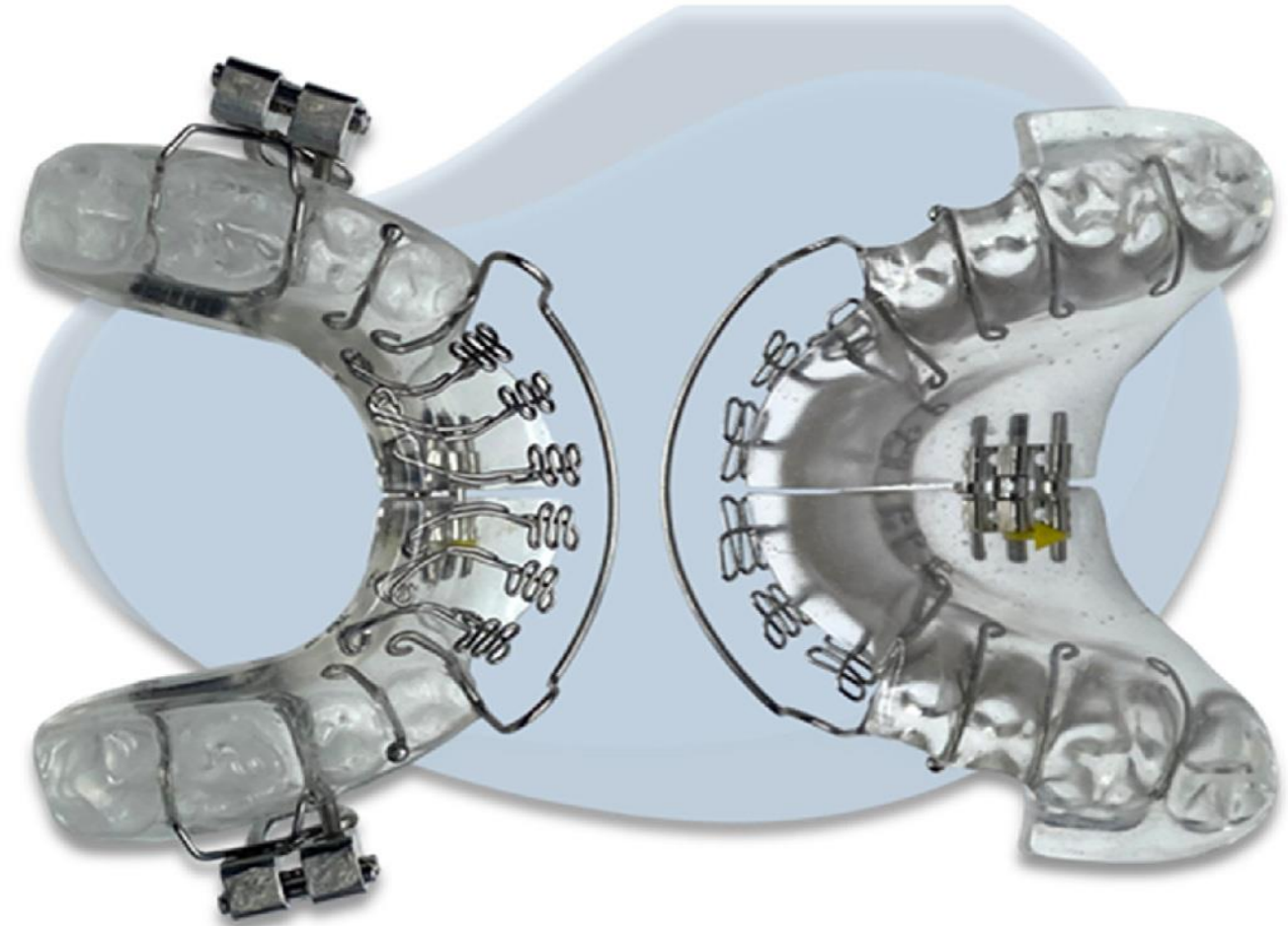
# OSA: Oral Appliances

- **Oral Appliances:** Custom mouthpieces intended to pull the jaw forward during sleep.
- Indications
- Limitations



# OSA: Palatal Expansion

- 9-16 months
- 49% overall reduction in AHI (17.3  $\rightarrow$  9.6 events/hour)
- 25% had “resolution” of OSA



# OSA: Positional Therapy

- **Positional Therapy** is designed to keep the sleeper in a position that minimizes their obstruction.
- Indications
- Limitations



- Historically had been challenging to get significant sustained weight loss
- Tirzepatide (Zepbound, Mounjaro) for OSA. NEJM 2024
  - Moderate-Severe Obstructive Sleep Apnea (AHI>15 events/hour). BMI>30 kg/m<sup>2</sup>
  - Average AHI 50 events/hour, BMI 39 kg/m<sup>2</sup>, weight 250#
  - At 1 year:
    - 17% reduction in weight
    - Reduction in AHI of 58%
    - 50% of patients reduced to normal or mildly elevated AHI
    - Blood pressure, inflammatory markers, symptoms all improved
    - FDA approved December 2024
    - Cost: \$350/month direct from Lilly



# OSA: Coming Soon:

- Aroxybutynin 2.5 mg/atomoxetine 75mg
- Enhance upper airway muscle tone
- Mild, Moderate, and Severe OSA (AHI>5 events/hour)
- 50% reduction in AHI
- 23% achieved AHI<5 events/hour
- Well tolerated
- Applying for FDA approval early 2026

# CSA (Central Sleep Apnea)

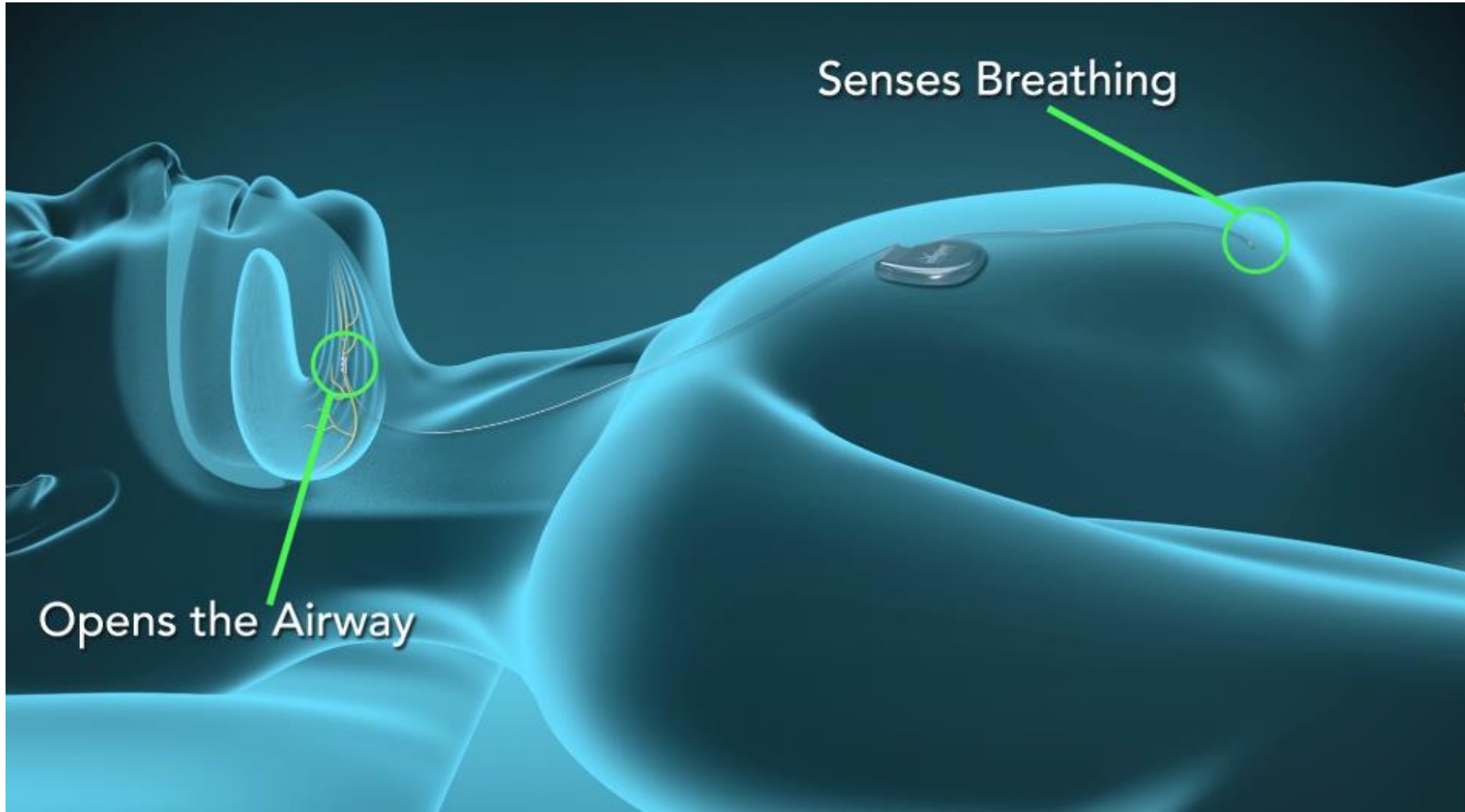
- Treat the underlying condition (CHF, opioids)
- ASV (adaptive Servoventilation): Most effective PAP treatment for combined OSA and CSA
- Oxygen
- Acetazolamide (Diamox)

# Surgical Treatment Options

- **Anatomy Altering Surgery** is surgery to change or remove parts of the nose, jaw, tongue, or throat to improve the airway.
- Types
- Indications
- Limitations



# Hypoglossal Nerve Stimulation - Inspire





# Inspire Indications

- Moderate to severe obstructive sleep apnea
  - $AHI < 100$
- Unable to get consistent benefit from CPAP
- Not significantly overweight
  - $BMI < 40$
- Pass an airway anatomy exam
- Drug Induced Sleep Endoscopy (DISE)
- Age 18+



***If you have not had a recent sleep study, you may need a new one.***

# Inspire – How It Works

## Outpatient procedure



## Press a button – Go to sleep



# Inspire – A Safe Outpatient Procedure Boulder Community Health



- Inserted through 2 incisions
- Fast recovery
  - Typically, OTC meds for post-op pain
  - Return to non-strenuous activities within a few days
- ~11 year battery
- NEW: Inspire now approved for full-body MRI



# Office Visit After the Procedure

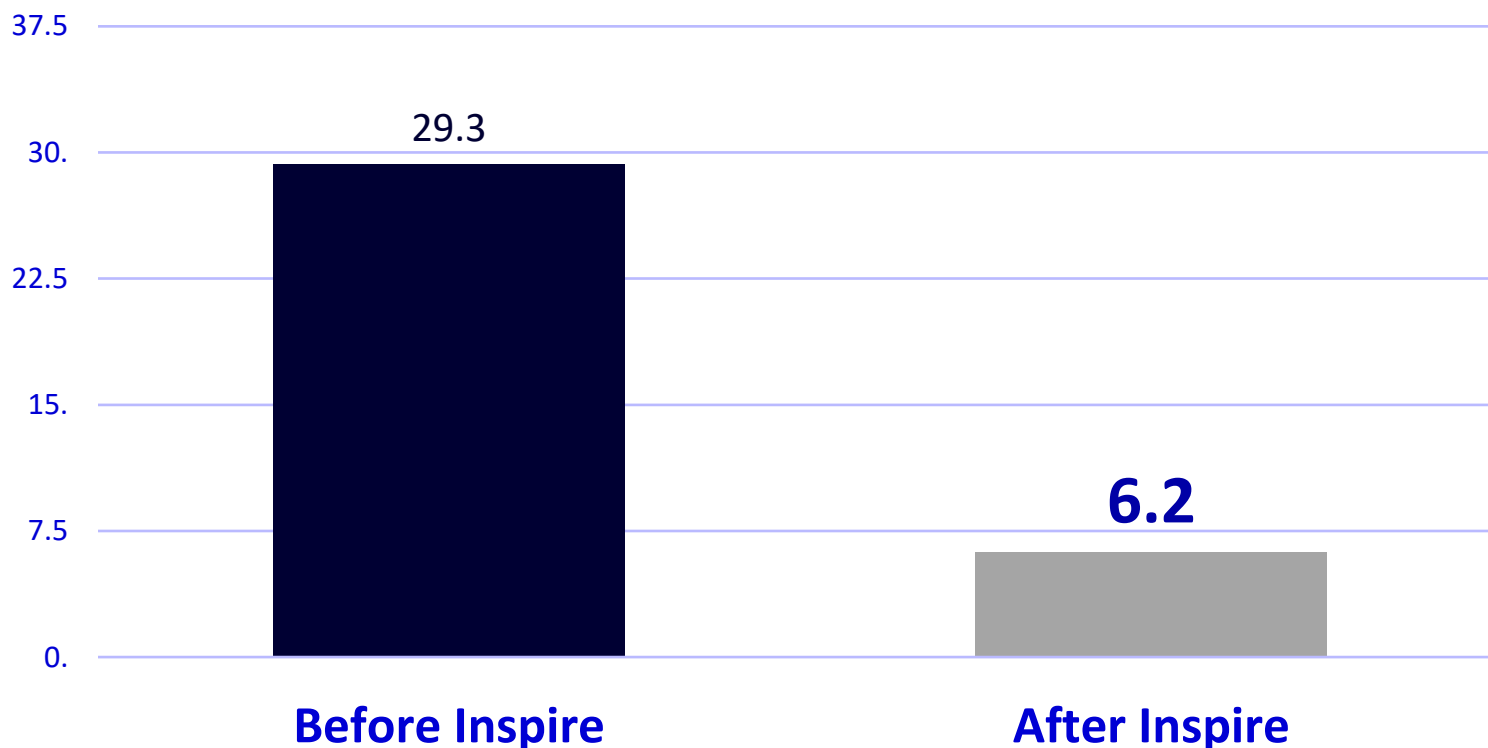


- Turn on Inspire therapy for the first time
- Establish initial settings
  - Comfortable
  - Effective
- Learn how to use the Inspire sleep remote



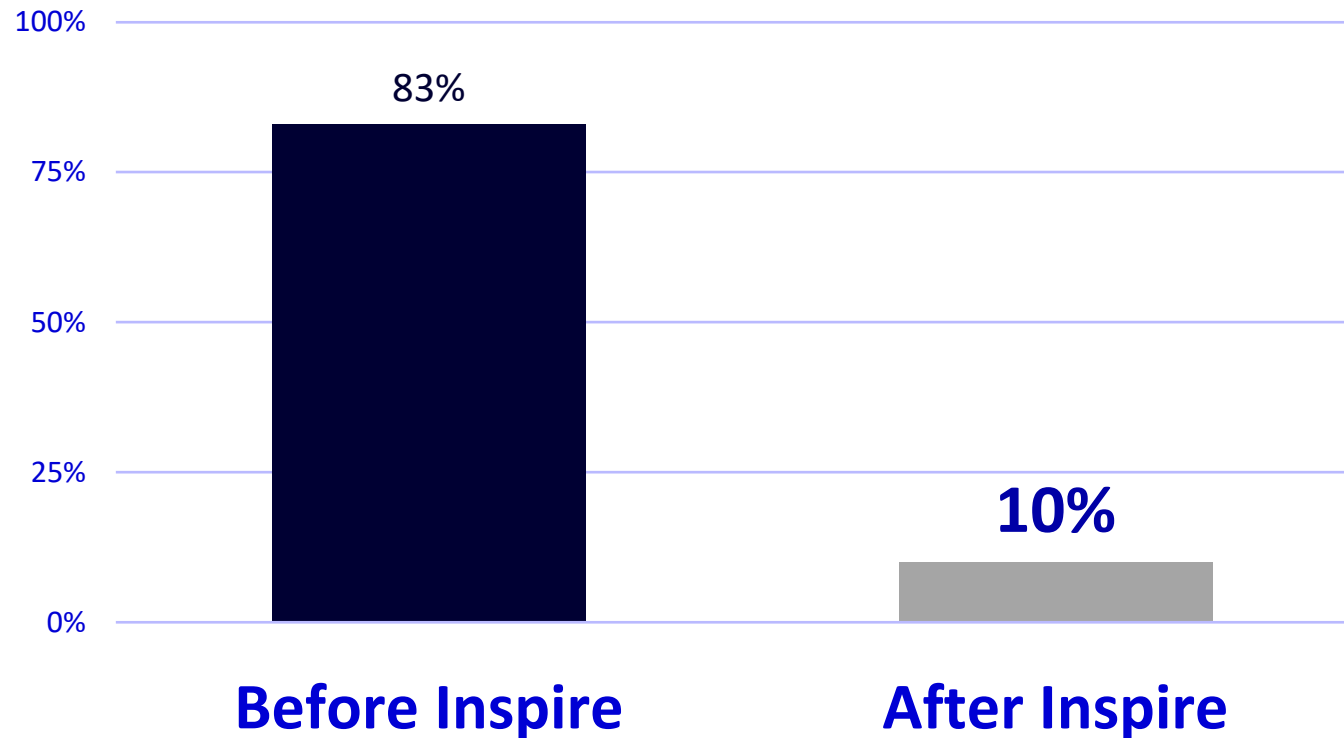
- Significant and sustained reduction in sleep apnea events

## Average Sleep Apnea Events per Hour (Apnea-Hypopnea Index)



- Significantly decreased bed-partner reported snoring

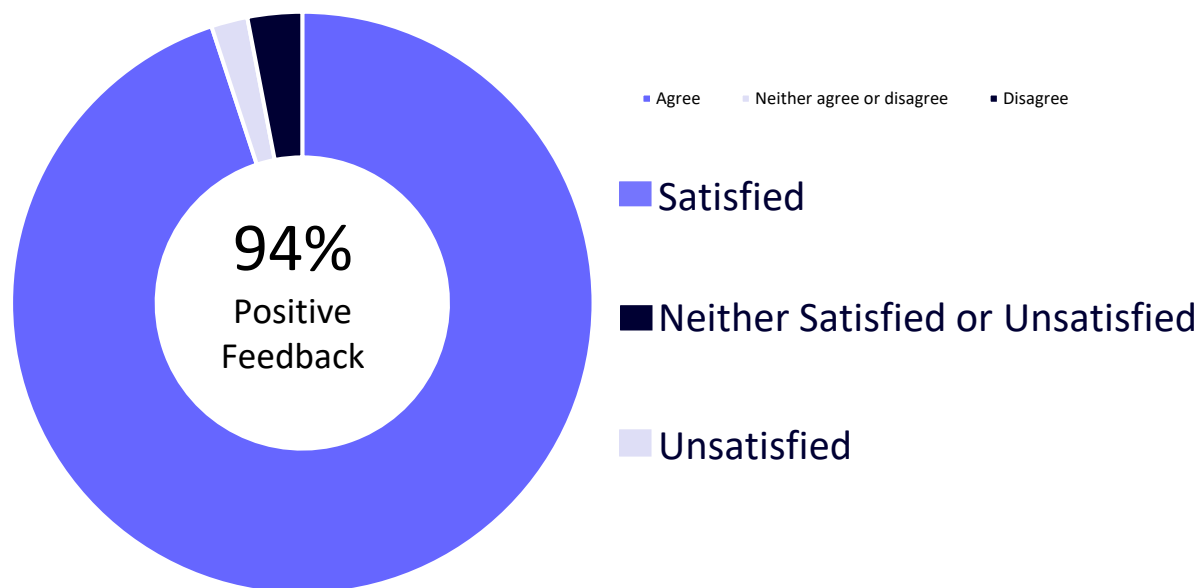
## Bed Partner Reported Snoring



88%  
Reduction

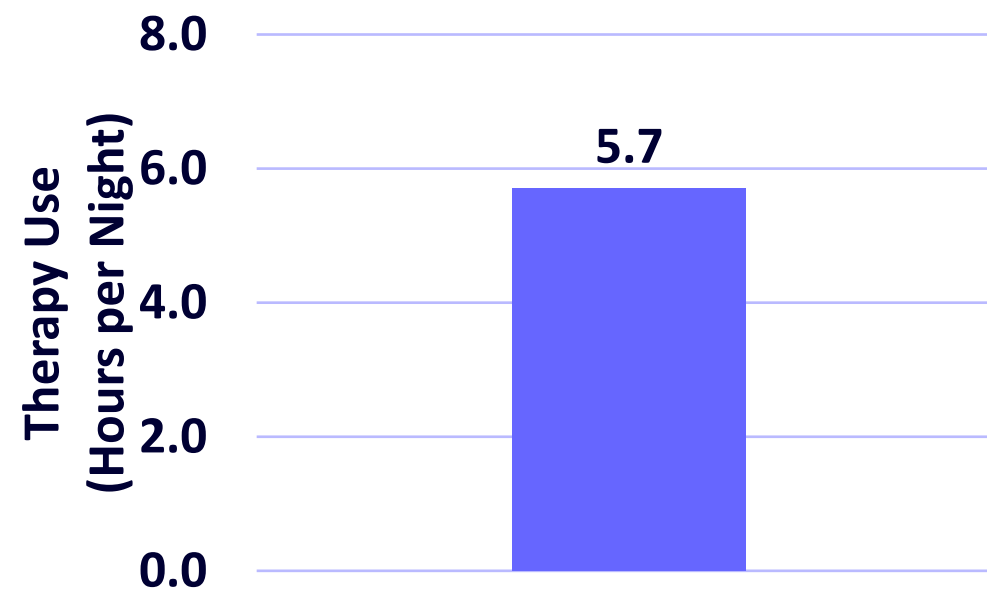
## Patients Like It

### Patient Satisfaction At Final Visit

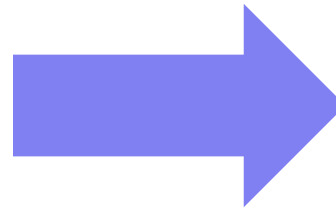
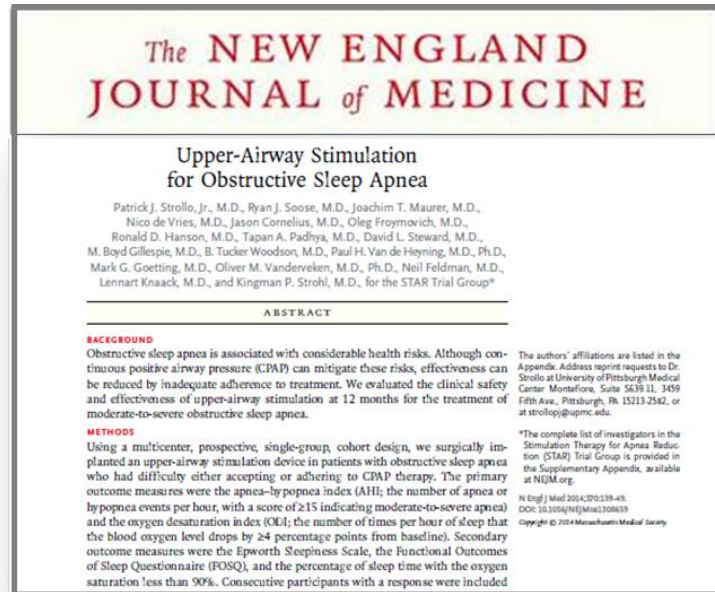


## Patients Use It

### Patient Adherence At Final Visit



## Sustained Clinical Results



## Most US Insurance Covers Inspire



- Over 100 Peer-Reviewed Publications
- 5-Year Follow-Up Data; STAR Trial
- Enrollment goal of 5,000 pts in ADHERE Registry

- Broad private insurance coverage
- Medicare coverage across the US
- Many VA and military hospitals



**Dr. Angela Paddack**  
**Call: 720-821-0939**

**Office Locations:**

- **Boulder:**
  - 4745 Arapahoe Ave
  - Suite 200
  - Boulder, CO 80303
- **Longmont:**
  - 1551 Professional Lane
  - Suite 270
  - Longmont, CO 80501

**Dr. Thomas Minor**  
**Call: 720-902-8003**

**Office Location:**

- **Boulder:**
  - 4820 Riverbend Drive
  - Suite 100
  - Boulder, CO 80301

- **For detailed insurance questions, call 844-515-6182.**
- **For VA questions, call 1-800-739-6805.**



# Sleep Apnea: Diagnosis and Treatment Options

**Thomas Minor, MD**

Boulder Valley Pulmonology  
720-902-8003

**Angela Paddack, MD**

Boulder Medical Center, Otolaryngology - Ear, Nose & Throat  
720-821-0939



Boulder Community Health



Boulder Community Health Foundation

*Over 40 Years of Community Impact*

Enhancing the quality and availability  
of health care in our community

## COMMUNITY

**We believe** everyone should have a fair and just opportunity to reach their full health potential, both physically and mentally.

## PATIENTS

**We believe** providing the community with the highest value in health care requires an innovative, patient-centered environment.

## WORKFORCE

**We believe** it's imperative to invest in the professional growth and physical and mental health of BCH's greatest asset—the staff and physicians providing care to the community.

Learn more at [bch.org/foundation](https://bch.org/foundation)

