
Snore No More

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The Importance of Sleep

- Daylight Saving (March 11 - November 4, 2018)
- National Sleep Awareness Month (March)

The Importance of Sleep

“You snooze you lose”

Unusual Facts Associated with Daylight Saving Time

- Increase in MVA's?
 - Environmental Journal of Public Health (2010)
- Increase in work place accidents
 - Journal of Applied Psychology-2009 (5.7% increase)
- Increase in heart attacks
 - New England Journal of Medicine 2008 (5% increase)
- Increase in Cyberloafing at work
 - Journal of Applied Psychology-2012
- Increase in cluster headaches

The Importance of Sleep

- Sleep is involved in the healing and repair of the heart and blood vessels
- Ongoing sleep deficiency associated with increase in “stress” hormones that cause inflammation
- Sleep deficiency is linked to an increased risk of heart disease, kidney disease, hypertension, diabetes and stroke (NHLBI, NIH)
- Sleep deprivation causes elevation of proteins, Amyloid beta and Tau, which are elevated in Alzheimer’s disease and brain damage in Alzheimer’s disease and other neurological diseases

The Importance of Sleep

- Sleep is just as important as eating healthy and exercising
- Western environment interferes with natural sleep patterns
- People are sleeping less and the quality of sleep is less

Top Ten Reasons Why Sleep is Important

- 1) Poor sleep can make you fat
- 2) Good sleepers eat fewer calories
- 3) Sleep deprivation disrupts daily fluctuation of appetite hormones (Ghrelin, Leptin)
- 4) Good Sleep can improve concentration
(Sleep deprived medical interns made 36% more serious medical errors)
- 5) Good Sleep can maximize athletic performance (Basketball players: increased speed, more accurate, improved reaction times, improved mental well being)

Top Ten Reasons Why Sleep is Important

- 6) Sleep deprivation: affects glucose metabolism and increases risk of developing type 2 diabetes
- 7) Poor Sleep is linked to Depression
- 8) Sleep improves Immune Function
- 9) Poor Sleep is linked to long term Inflammation of the Digestive Tract
- 10) Sleep deprivation affects emotions and Social interactions

Sleep Awareness

What can Interfere with a good nights sleep?

- Voluntary
- Work or Study commitments
- Environmental
- Insomnia
- Sleep apnea
- Short term illness

Sleep Apnea: Definition

- **Obstructive:**
 - Decrease or halt in airflow despite efforts to breathe
- **Central:**
 - Diminished or absent effort to breathe
- **Mixed:**
 - Combination of both of the above

Sleep: A National Health Priority

Healthy People 2020 strives to:

- Identify nationwide health improvement priorities.
- Increase public awareness and understanding.
- Improving treatment of Sleep apnea

Prevalence of Sleep apnea

- Afflicts at least 25 million adults in the US
(National Healthy Sleep Awareness Project)
- 26% of adults between ages 30 and 70
(American Academy of Sleep Medicine)

Sleep Apnea Costs

- \$67-165 Billion in annual costs
- \$87 Billion in lost productivity
- \$26 Billion in traffic accidents
- \$6.5 Billion in workplace accidents
- \$2-10 Billion to diagnose and treat moderate obstructive sleep apnea per year

Sleep Apnea: A National Health Concern

- “Obstructive Sleep Apnea is destroying the health of millions of Americans”
 - Dr. Timothy Morgenthaler National spokesman for Healthy Sleep Project
- “The effective treatment of sleep apnea is one of the keys to success as our nation attempts to reduce health care spending and improve chronic disease management”
 - Dr. Timothy Morgenthaler National spokesman for Healthy Sleep Project

Sleep Apnea: Co-morbidities

- Cardiovascular: HTN, MI, arrhythmias
- Neurologic: stroke, memory loss, ADD
- Endocrine: DM
- Psychiatric: Depression
- Sexual Dysfunction: Decreased libido
- Society: Increased incidence in MVA
- Obesity

Sleep Apnea: Negatively affects the brain

- Significant reduction in white matter fiber integrity
- Impaired cognition, mood, and daytime alertness
- After one year of CPAP therapy this brain damage was almost completely reversed

Sleep Apnea: At Risk Groups

- Elderly (56-70%)
- Older Veterans (88%)
- Obese (51%)
- Congestive Heart Failure (50%)
- Hypertension: uncontrolled (80%)
- Chronic Renal Failure (66-80%)

Sleep Apnea: Diagnosing

- History
- Video or tape recording
- Overnight Oximetry
- In-Home Sleep Studies (\$150-500)
- In-Lab Sleep Studies (polysomnograms) (\$600-5000)

Shaq Attacks Sleep Apnea



Sleep Apnea: Diagnostics

- Apnea and Hypopnea Index (AHI) (>15 moderate, >30 severe)
- Oxygen desaturations (3-4%)
- Decreases in air flow of 25-50%
- Increased number of arousals

Sleep Apnea: Treatment

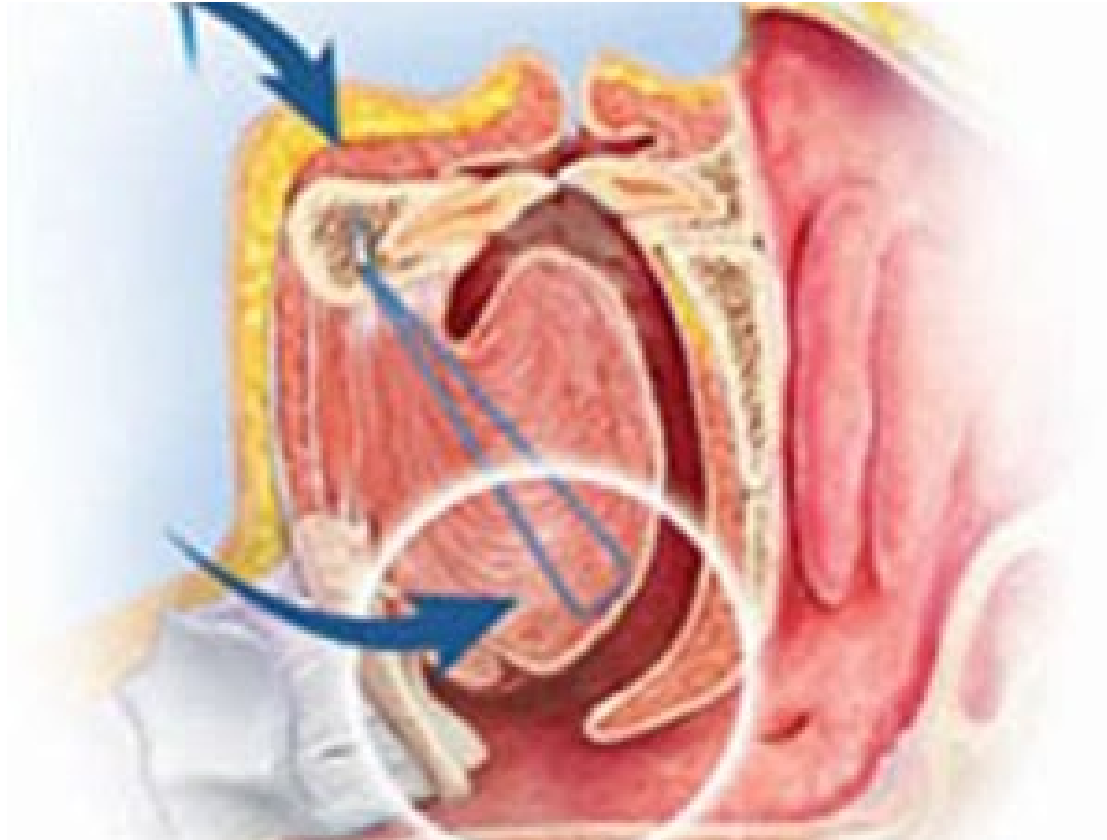
- Weight loss
- Avoid alcohol or sedating medications
- Positive airway pressure devices (C-Pap, autopap, BiPap)
- Oral Appliances
- Nasal surgery, decongestants Breathe Right tapes
- Positional therapy

Sleep apnea: Treatment

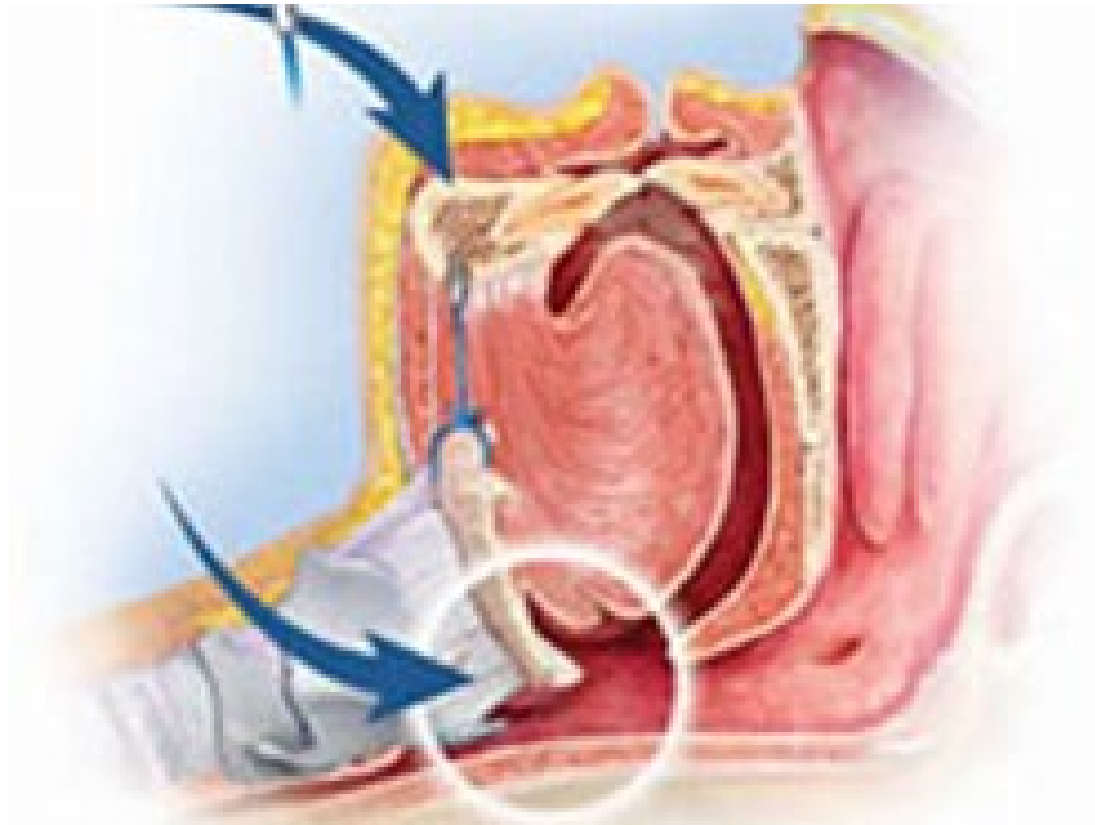
Upper airway surgeries:

- Uvulopalatopharyngo plasty (UPPP),
- Partial glossectomy (base of tongue)
- Tonsillectomy and adenoidectomy
- Hyoid suspension
- Tongue suspension
- Maxillary and mandibular osteotomies with advancement and re-fixation
- Tracheotomy

Tongue Suspension Procedure



Hyoid Suspension Procedure



Uvulopalatopharyngoplasty

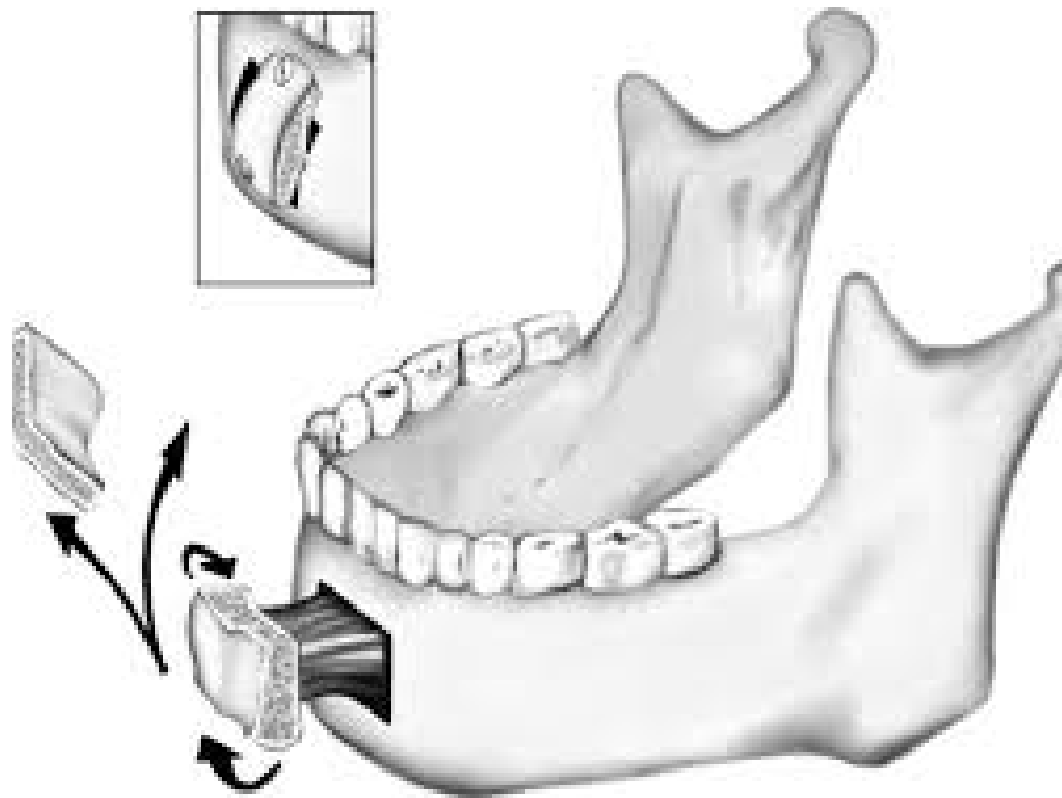


UPPP

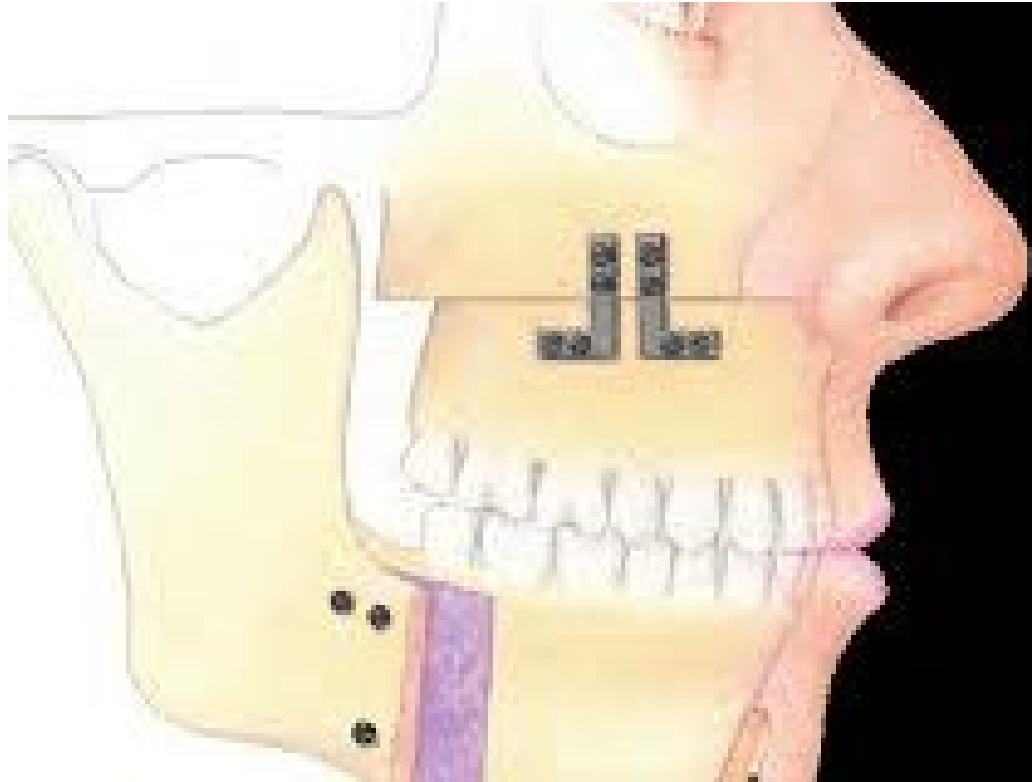
Oral Appliance Therapy



Mortise Osteotomy with Genioglossus advancement



Maxillary-Mandibular Advancements



Nasal CPAP



Nasal CPAP



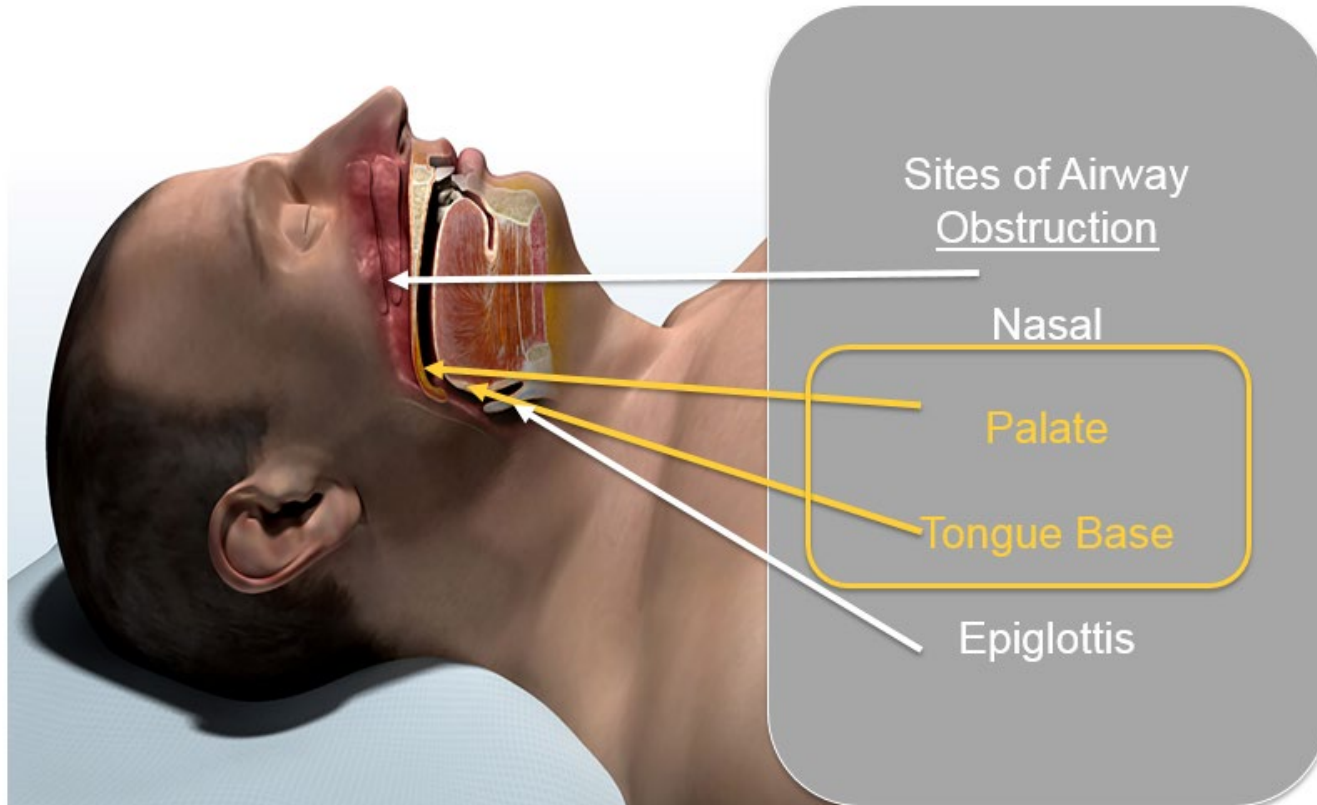
Full Mask CPAP



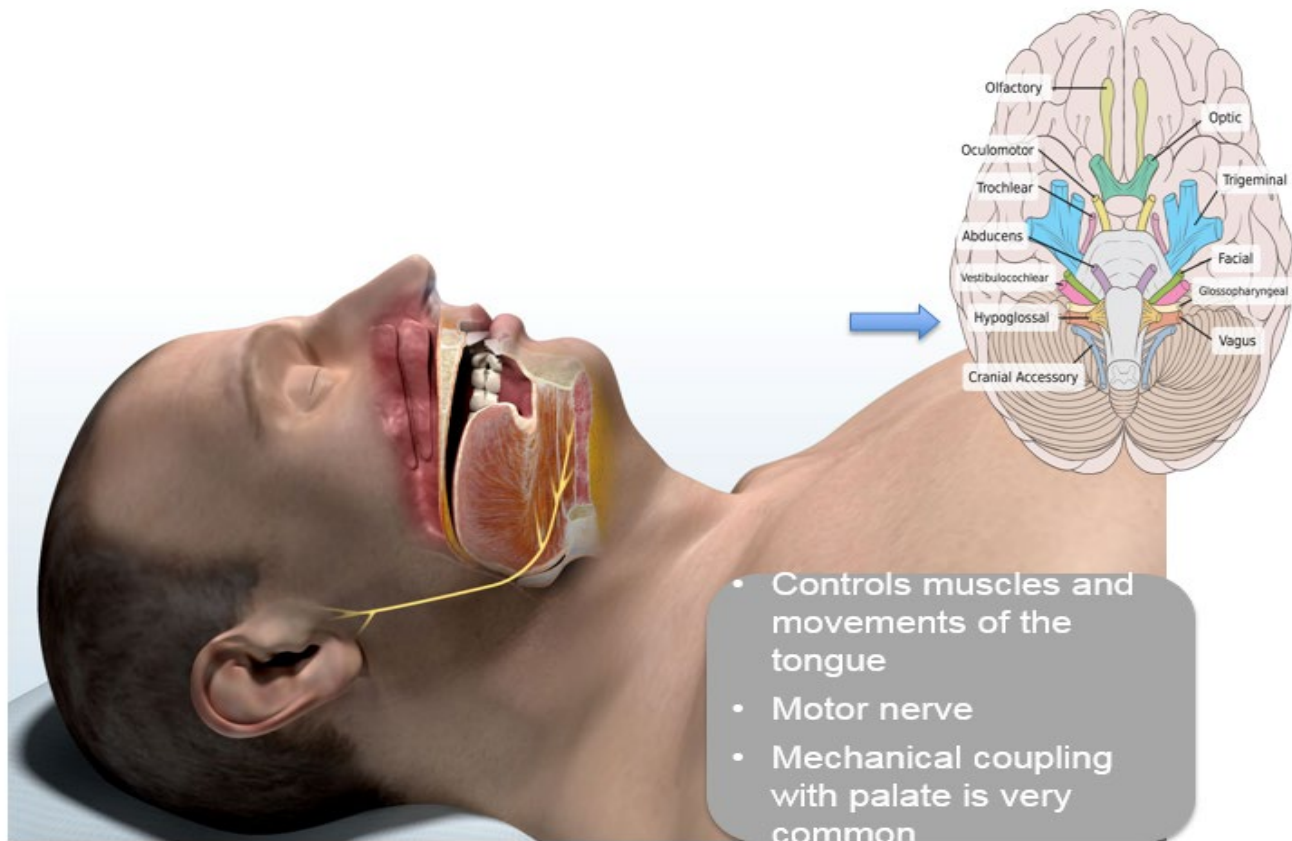
Inspire: Hypoglossal Nerve Stimulator

- Hypoglossal nerve stimulator is a new approach to treating sleep apnea
- The Cleveland Clinic ranked the Hypoglossal nerve stimulator device #2 on the list of top ten medical innovations for 2018

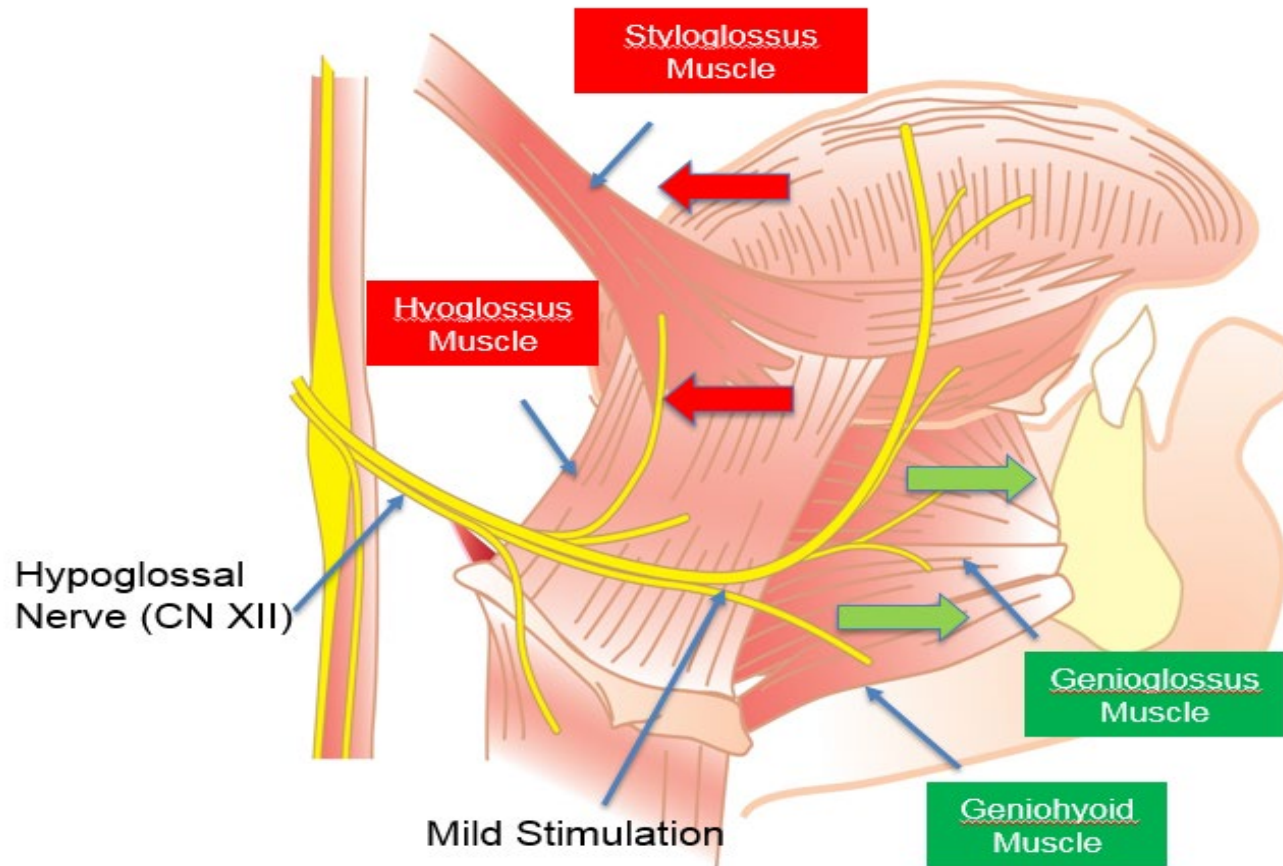
Airway Obstruction



The Hypoglossal Nerve (Cranial Nerve XII)

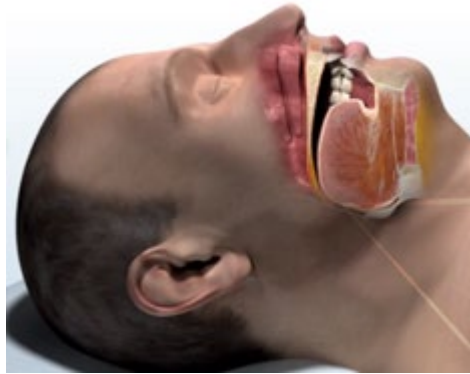


The Distal Hypoglossal Nerve



Hypoglossal Nerve Stimulation Effect

No Stimulation



Base of Tongue



Palate



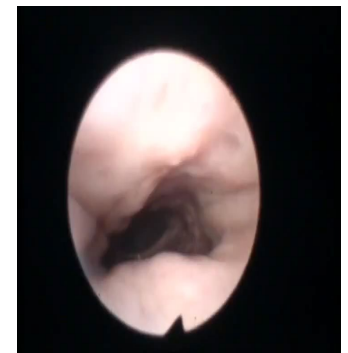
Mild Stimulation



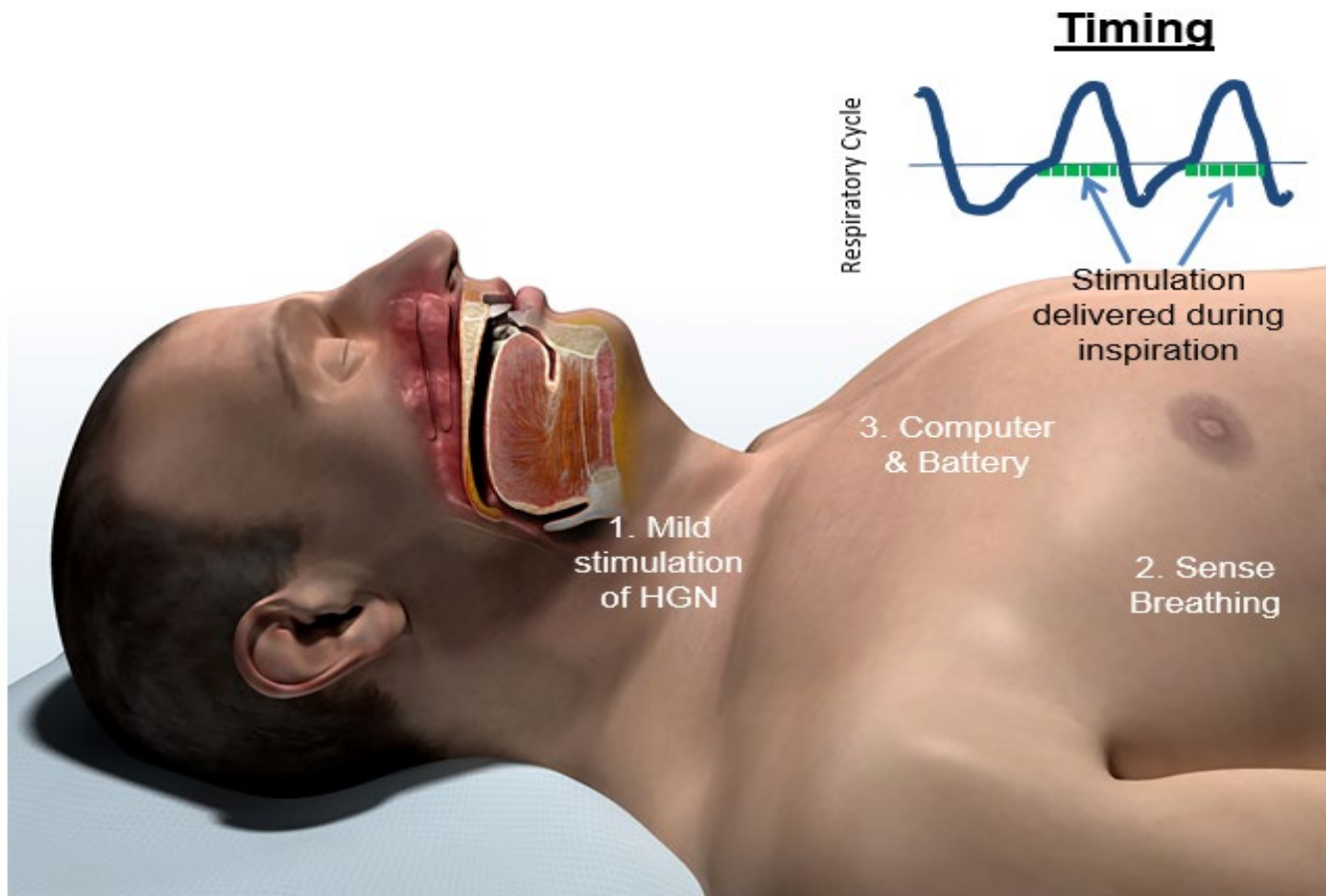
Base of Tongue



Palate

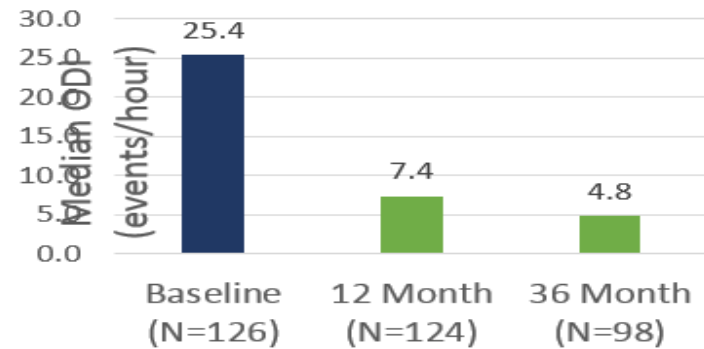
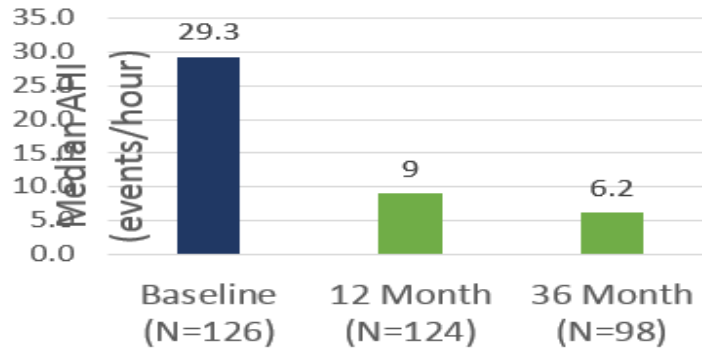


Stimulation Timed With Breathing

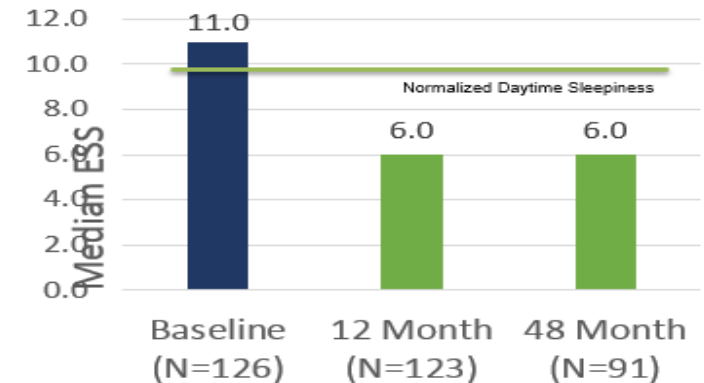
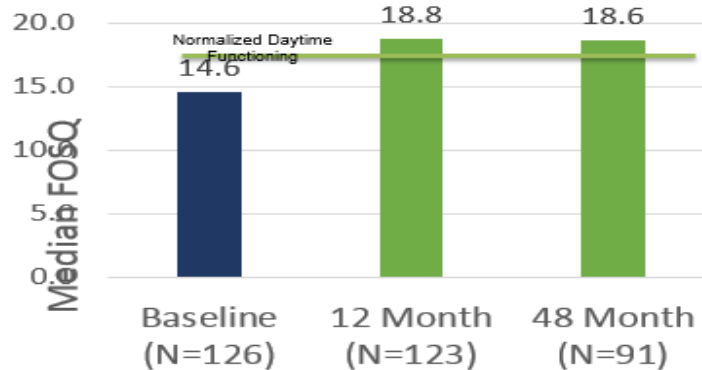


STAR Trial: Long-Term Outcome Summary

Objective Outcomes (AHI and ODI)

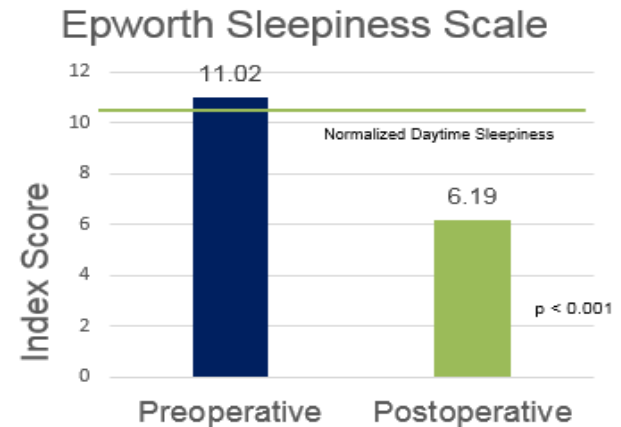
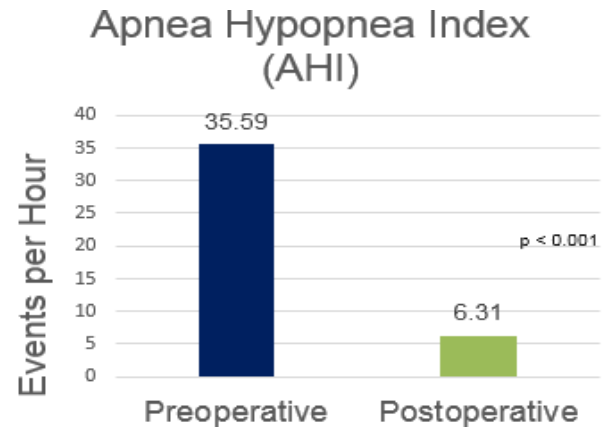


Patient Reported Outcomes (FOSQ and ESS)



Independent Two-Center Cohort Study

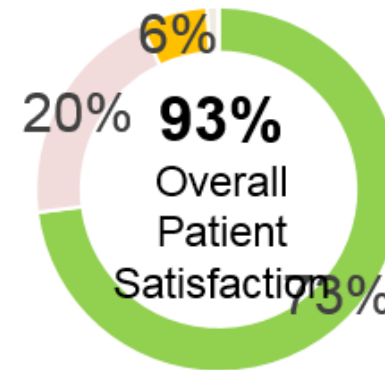
- Thomas Jefferson University & University of Pittsburgh Medical Center
 - Total 97 patients (60 male/37 female)
- Baseline BMI: 28.5 ± 3.7 kg/m²
- AHI reduction: 35.6 to 6.3
 - > 90% surgical success
 - ~80% AHI less than 10 post-op
 - ~60% AHI less than 5 post-op
- ESS improvement: 11.0 to 6.2
- High therapy usage of 6.3 hours per night
 - 76.10% use therapy 40+ hours/week



ADHERE Post-Market Registry – June 2017

Early results from the ADHERE registry show Inspire UAS therapy is an effective treatment for OSA in a real world setting

UAS Therapy Adherence	Hours/Night
Six-months (n=180)	6.6 ±1.8
Twelve-months (n=101)	5.8 ±2.0



- Strongly satisfied
- Satisfied
- Neither

Satisfied Customer



Hypoglossal Stimulator Indications

- Adults 22 years of age and older
- Diagnosed OSA with an AHI range of 15-65 per hour
- BMI < 32
- CPAP failure or inability to tolerate CPAP treatment:
 - PAP failure is defined as an inability to eliminate OSA (AHI of greater than 15 despite PAP usage)
 - PAP intolerance is defined as inability to use PAP (greater than 5 nights per week of usage; usage defined as greater than 4 hours of use per night)
 - Unwillingness to use PAP (for example, a patient returns the PAP system after attempting to use it)
- Appropriate airway anatomy (Drug-Induced Sleep Endoscopy)

Questions
