Treatment Options for Obstructive Sleep Apnea

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Treatment Options for Obstructive Sleep Apnea

- Lifestyle changes - weight loss, elevate head of bed, side sleeping, avoid sedatives
- CPAP, BiPAP, AutoPAP
- Nasal surgery
- UPPP
- Hypoglossal nerve stimulator (HNS)

Positive Airway Pressure Therapy

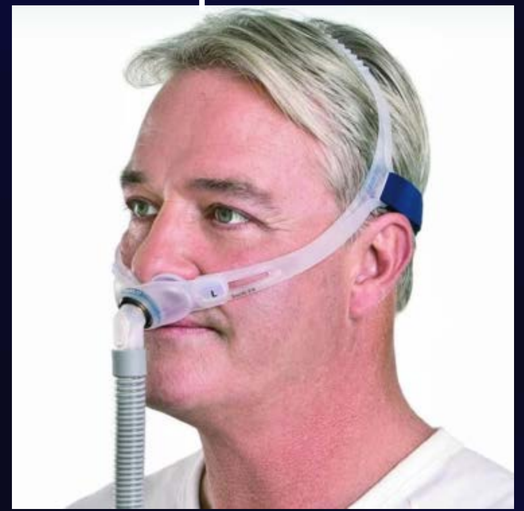
- CPAP, BiPAP, AutoPAP, Pressure 4-20 cm H20 (CWP), Humidity

Chin strap

Full face mask

Nasal mask

Nasal pillows

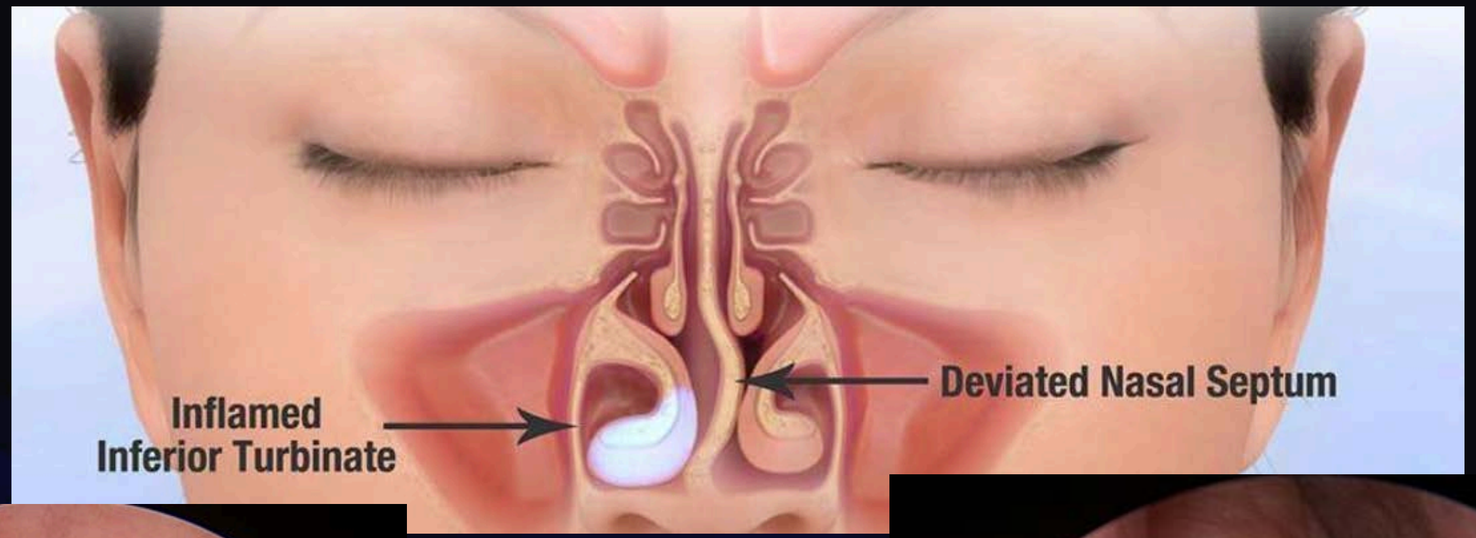


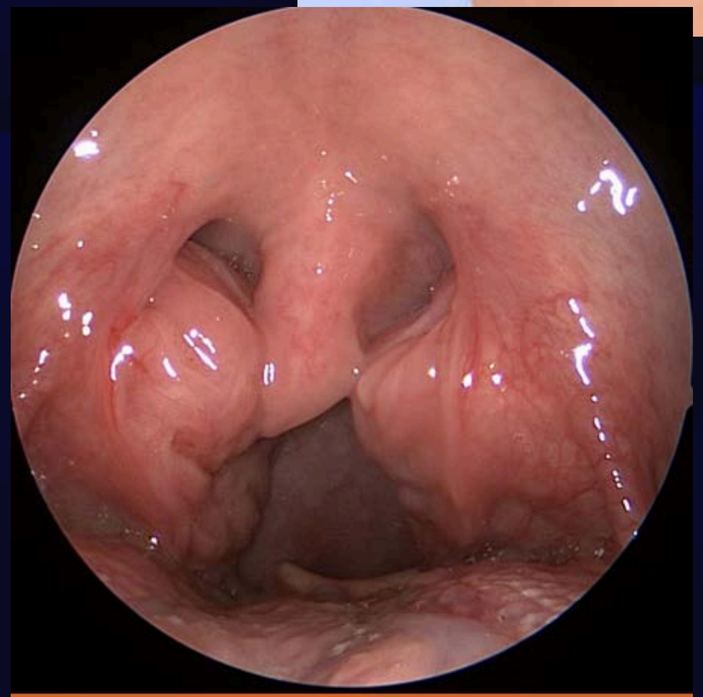
Hybrid
oral mask

Reasons for CPAP failure

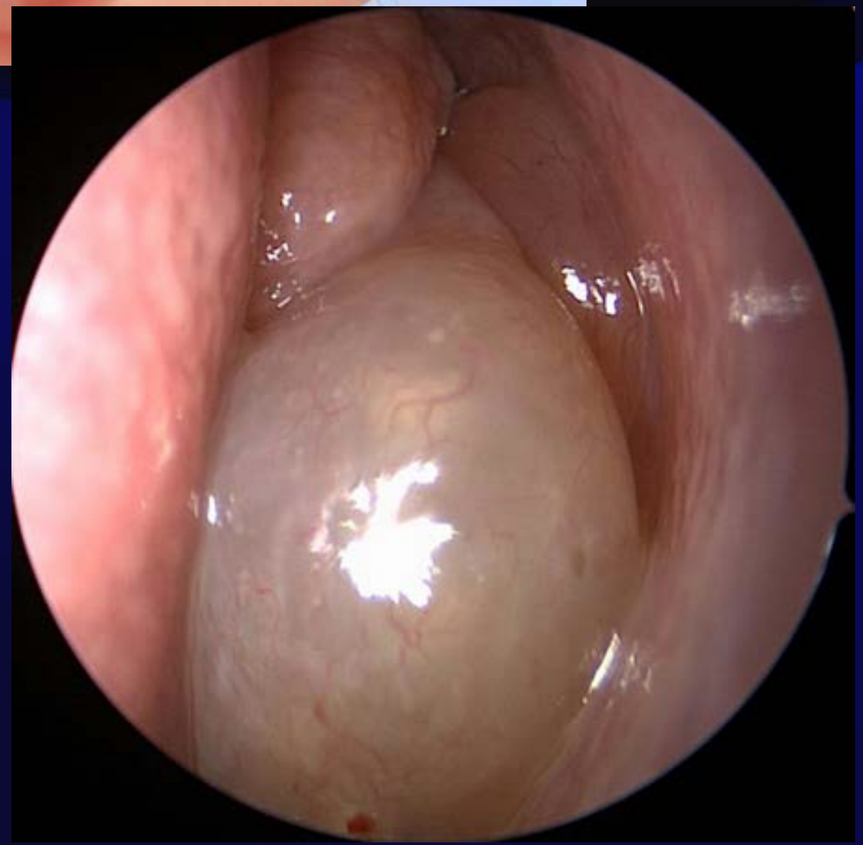
- Claustrophobia
- Fragmented sleep due to constant mask adjustment
- Aerophagia
- Unable to fall asleep with mask discomfort
- Camping, power outage, frequent traveling
- Noisy for patient or bed partner

Surgery for Nasal Obstruction





Large Tonsils

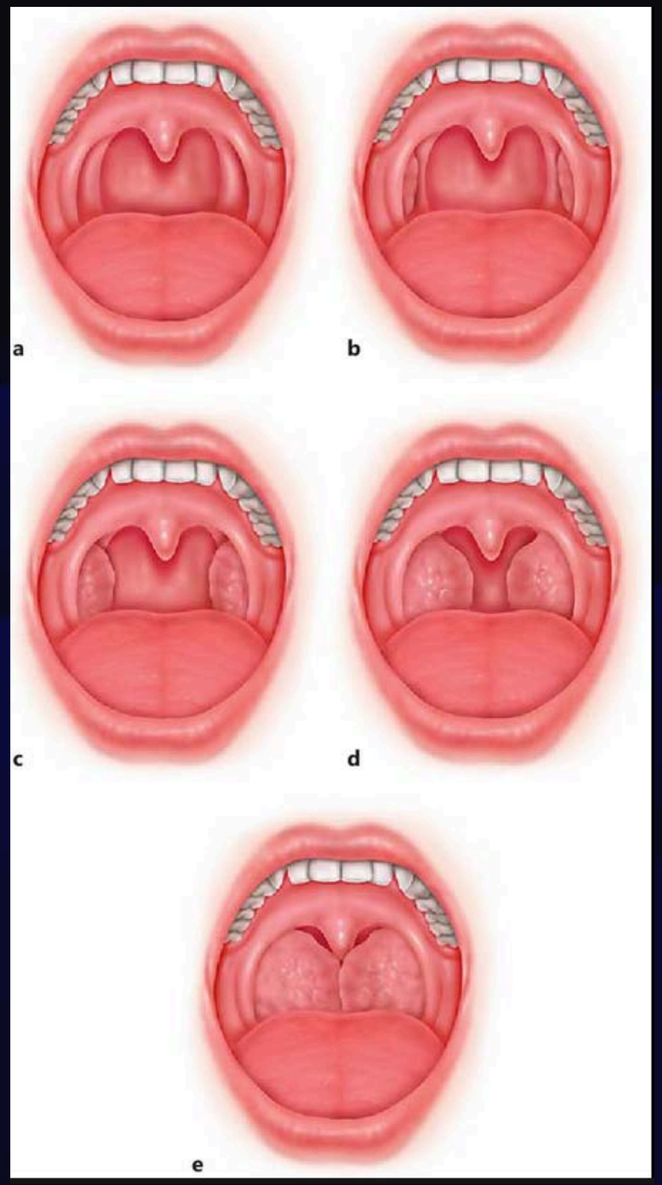


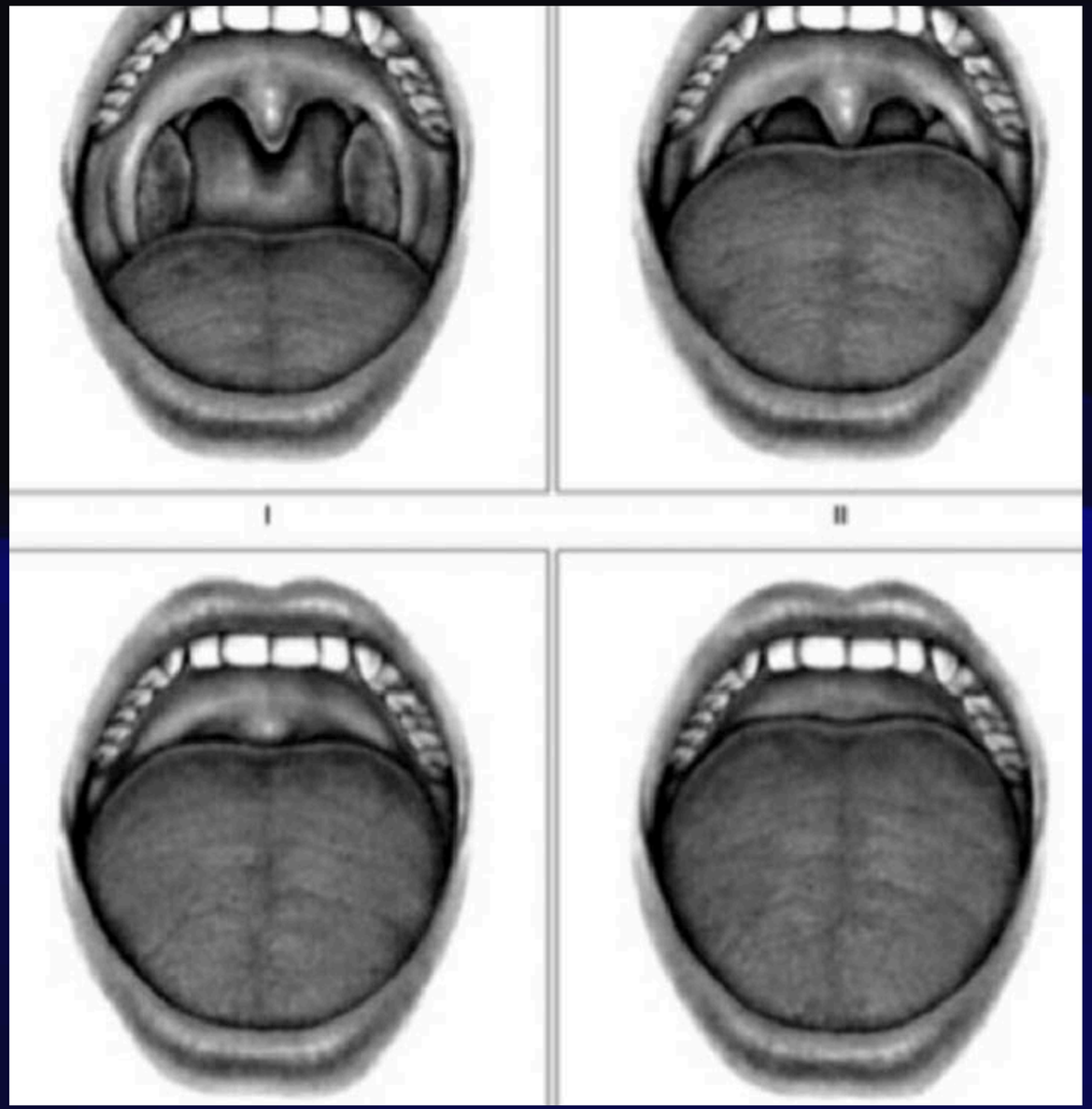
Tonsillectomy & UPPP
(Uvulopalatopharyngoplasty)

- Risk of VPI (velopharyngeal insufficiency)
- Low success rate/severe postop pain for 3 weeks. 1/4 achieve AHI <5, 1/3 achieve AHI <10
- Those with postop residual OSA, pressure setting on CPAP decreased by 1.4cm CWP
- Higher success rates:
  - large tonsils
  - lower starting AHI, BMI, and age
  - smaller tongue

Khan, Akram et al. Uvulopalatopharyngoplasty in the management of obstructive sleep apnea: the mayo clinic experience. Mayo Clinic Proc. 2009 Sep;84(9):795-800.

Tonsil Size & Friedman Classification





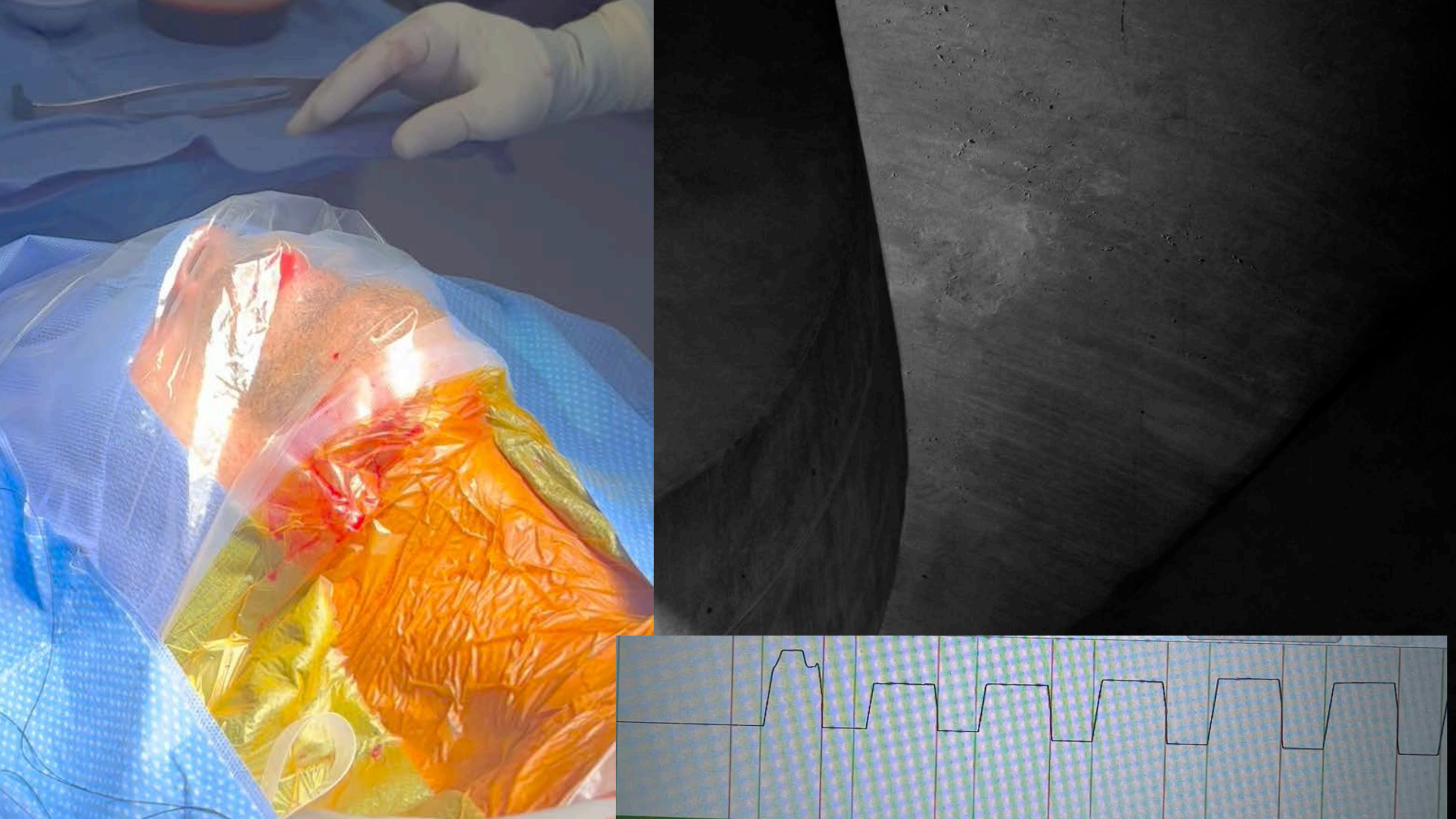
Friedman classification correlates with severity of OSA

DISE (Drug Induced Sleep Endoscopy)

- Sleep induced with propofol only in order to best simulate natural sleep
- Titrated til the patient is snoring but still breathing
- VOTE
  - Velum: need less than 75% lateral wall collapse, AP or circumferential collapse
  - Oropharynx: tonsils and palate
  - Tongue base: space between BOT and posterior pharyngeal wall, effect of jaw thrust
  - Epiglottis: position and shape, effect of jaw thrust

Dijemeni, E. Et al. Drug-induced sedation endoscopy (DISE) classification systems: a systematic review and meta-analysis. Sleep Breath. Jun 6, 2017; 21(4): 983-994.

inSpire
Model 3028
Inspire Medical Systems



Efficacy of Hypoglossal Nerve Stimulator

- STAR Trial (2014): 126 patients, multi center, prospective, 12 months

  - AHI decreased 68%: preop AHI 29.3 down to postop AHI 9.0 ($p<0.001$)
  - ODI decreased 70%: preop ODI 25.4 down to postop ODI 7.4 ($p<0.001$)
  - Procedure related serious adverse events < 2% required repositioning and fixation of the neurostimulator to resolve discomfort
  - Exclusion criteria: BMI >32, AHI <20, AHI >50, central apnea >25%, CCC on DISE, tonsils 3-4+, serious comorbidities
  - Study was sponsored and designed by Inspire Medical Systems

Strollo, Patrick J et al. Upper Airway Stimulation for Obstructive Sleep Apnea. NEJM 2014 Jan 9, 370: 139-149

Efficacy of Hypoglossal Nerve Stimulator

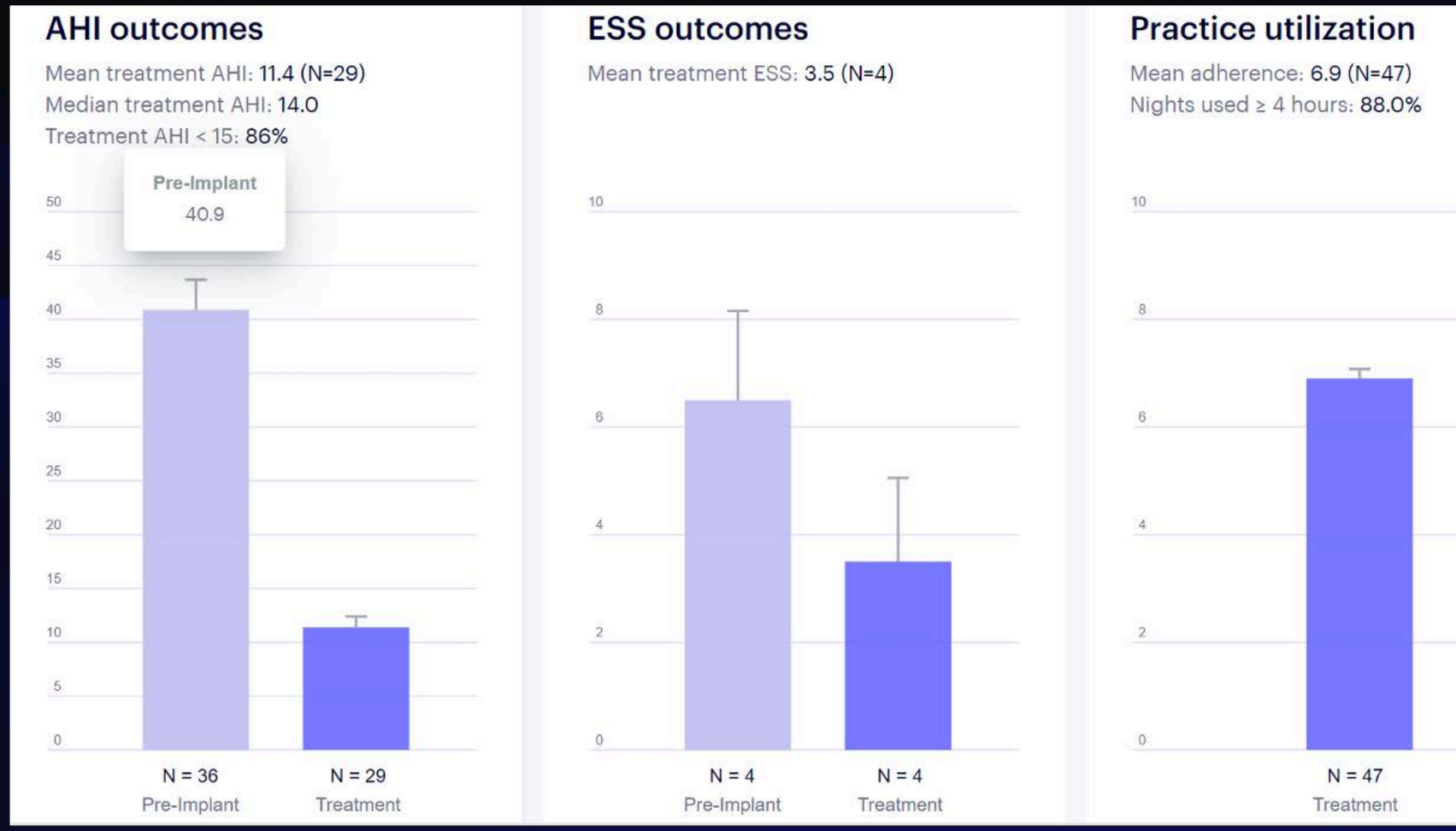
- ADHERE Trial (2019): 1017 patients, prospective, multi center
  - AHI decreased: preop AHI 32.8 down to postop AHI 6.3 at 6 months and postop AHI 9.5 at 12 months
  - 83% at 6 months and 69% at 12 months had both 50% reduction in AHI and achieved AHI <20.
  - ESS improved from 11.0 down to 7.0
  - Median device use was 5.7 hours after 12 months
  - 95% preferred HNS over PAP therapy, 94% would choose HNS again
  - Exclusion criteria: BMI >32, AHI <15, AHI >65, central apnea >25%, CCC on DISE
  - Study was sponsored by Inspire Medical Systems

Strollo, Patrick J et al. Upper Airway Stimulation for Obstructive Sleep Apnea. NEJM 2014 Jan 9, 370: 139-149

Efficacy of Hypoglossal Nerve Stimulator

- Our Results: 61 patients implanted since November 2021

- Avg. preop AHI= 40.9 —> avg. postop AHI= 11.4
- Average of use per night = 6.9 hours
- Green patients = 79%
  - Postop AHI<15 and > 50% AHI reduction
  - Using device >4 hours per night
  - Subjective benefit



- Complications (3%): One pneumothorax and one patient explanted x2 due to implant rejection

Efficacy of Hypoglossal Nerve Stimulator

Yellow Pathway Patients (21%)

- Type 1: poor adherence
  - Rule out over titration
  - Extend start delay/pause times
  - Adjust pulse width (90-120 us) and rate (33 to 40 Hz) of electrical stimulation (comfort settings) allows a reduction in amplitude while still maintaining similar tongue protrusion
- Type 2: suboptimal postop AHI and/or symptom response
- Type 3: both issues
  - Confirm adequacy and reliability of sleep study
  - Increase amplitude range
  - Adjust electrode configuration
- Awake upper airway endoscopy: study effects of various settings on airway anatomy
- Positioning, weight loss, chin straps, nasal surgery

Soose, Ryan J, et al. Post-implant care pathway: lessons learned and recommendations after 5 years of clinical implementation of hypoglossal nerve stimulation therapy. SleepJ, 2021, S4-S10.

Epworth Sleepiness Scale

	Would never nod off 0	Slight chance of nodding off 1	Moderate chance of nodding off 2	High chance of nodding off 3
Sitting and reading				
Watching TV				
Sitting, inactive, in a public place (e.g., in a meeting, theater, or dinner event)				
As a passenger in a car for an hour or more without stopping for a break				
Lying down to rest when circumstances permit				
Sitting and talking to someone				
Sitting quietly after a meal without alcohol				
In a car, while stopped for a few minutes in traffic or at a light				

0-7: normal

8-9: average

10-15: situational sleepiness

16-24: excessively sleepy

Johns MW. A new method for measuring daytime sleepiness: The Epworth Sleepiness Scale. Sleep 1991; 14(6):540-5.

Risks of Hypoglossal Nerve Stimulator Surgery

- Bleeding, pain, infection, scarring, risks of general anesthesia
- Pneumothorax
- Injury to hypoglossal and marginal mandibular nerve
- Electronic device malfunction
- Battery change every 11 years requires surgery
- MRI safe (1.5 Tesla)
- Failure to cure OSA

Insurance criteria to qualify for Hypoglossal Nerve Stimulator Surgery

Caution: these are constantly changing

- All insurances require age 18+ years old
- All require CPAP trial and documented PAP intolerance
- All require the patient to pass DISE (drug induced sleep endscopy)
  - Less than 75% lateral wall collapse
- Sleep study showing central/mixed less than 25% of total AHI
- Moderate to severe OSA

Insurance criteria to qualify

INSURANCE	CRITERIA
BlueCross BlueShield of Illinois	AHI: 15 and above BMI: less/equal 32 No updated sleep study time frame
Anthem BlueCross BlueShield	AHI: 15-65 BMI: less/equal 32 No updated sleep study time frame
Humana	AHI: 15-100 BMI: < 40 Sleep study within 24 months 3% or 4% scoring accepted
UnitedHealthcare	AHI: 20-65 BMI: < 40 No updated sleep study time frame (need diagnostic in-lab PSG study for auth submission) 3% or 4% scoring accepted Oral appliance failure
Cigna	AHI: 15-65 BMI: less/equal 32 No updated sleep study time frame
aetna	AHI: 15-100 BMI: < 40 Sleep study within 24 months Desaturation in policy at 4% 1 month documented CPAP trial
Medicare	AHI: 15-65 BMI: < 35 Sleep study within 24 months Desaturation in policy at 4% *Advantage plans follow Medicare guidelines*