

Impact of Sleep

Asim Roy

Ohio Sleep Medicine Institute

Rob Kibler

Ohio Sleep Treatment

Objectives

- Importance of Sleep
- Common Sleep Disorders and Medical Issues
- Consequences of Workplace Fatigue
- Shift Work???
- Helpful Tips to Reduce Workplace Fatigue
- OSA – new ways to diagnose and treat
- Questions

Importance of Sleep

- Sleep is Vital for ALL Human Functions
- Physical and Cognitive Performance
- REM sleep is required for Restorative Properties (especially memory/sexual function)
- Improves Learning, Creativity and Memory
- Mood Enhancement
- Protects and Boost Immune System
- Relationship Between Weight Gain and Aging

Sleep Requirements Vary Over Life Span

- 0-2 mo 11-18 hours
- 2-12 mo 14-15 hours
- 12-18mo 13-15 hours
- 18mo - 3yrs 12-14 hours
- 3 – 5 yrs 11- 13 hours
- 5– 12 yrs 10-11 hours
- Adolescents 9- 10 hours
- Adults 7-9 hours

Sleep Disorders and Medical Conditions

- Sleep Apnea may cause \$3.4 Billion in additional medical costs
- HTN
- DM
- CV disease and Stroke
- Dementia/Neurodegenerative disorders
- Obesity
- Depression Anxiety
- GI disease
- Insomnia
- Narcolepsy/Hypersomnia
- RLS

Impact

- Relationship/spousal issue
- MVAs!!!!
- After 20 hours of being awake, drowsy drivers are impaired on a level equitable to a 0.08% blood alcohol content, which is the current legal limit in most states. After 24 hours awake, impairment is equivalent to a blood alcohol content of 0.1%.

Catastrophic Fatigue

- Chernobyl
- Three Mile Island
- Exxon Valdez
- NJ Transit Train
- Tracy Morgan/Walmart Truck Driver

Impact At Work (NSF Poll)

- Sleep Related fatigue costs for US Business is estimated at \$150 billion/year
 - Absenteeism
 - Workplace Accidents
 - Lost productivity
 - 68% report decreased concentration
 - 65% report problems handling stress
 - 57% report having difficulty listening
 - 38% report difficulty relating to their colleagues/friends/family
 - 57% report decreased problem solving skills
 - 56% report decreased ability to make decisions

Impact at Work (contd)

- 14% late to work
- 4% call of from work
- 7% fall asleep at work
- 19% report making errors
- 2% report getting injured due to sleepiness/fatigue

Shift Workers

- \$65 billion dollars lost from shift work
- 15% of the US workforce
- 20 million people work early start time (230a—7a)
- Nurses
 - 74% of nurses work 12 hr shift
 - 15% admit to falling asleep on the job
 - 12 hour shift nurse report 3x more errors per shift vs 8 hour shift
 - Nurses who work 12 hours shifts call of work more than 8 hour shifts

Strategies

- Recognize signs of fatigue
- Avoid building sleep debt
- Monitor sedating medications
- POWER NAPS!!!!
- Take short breaks
- Exercise on breaks
- Eat well/healthy
- Try to do most demanding tasks when most alert
- Caffeine can help but can be overused (stay under 200mg of caffeine per day)

Good Sleep Hygiene

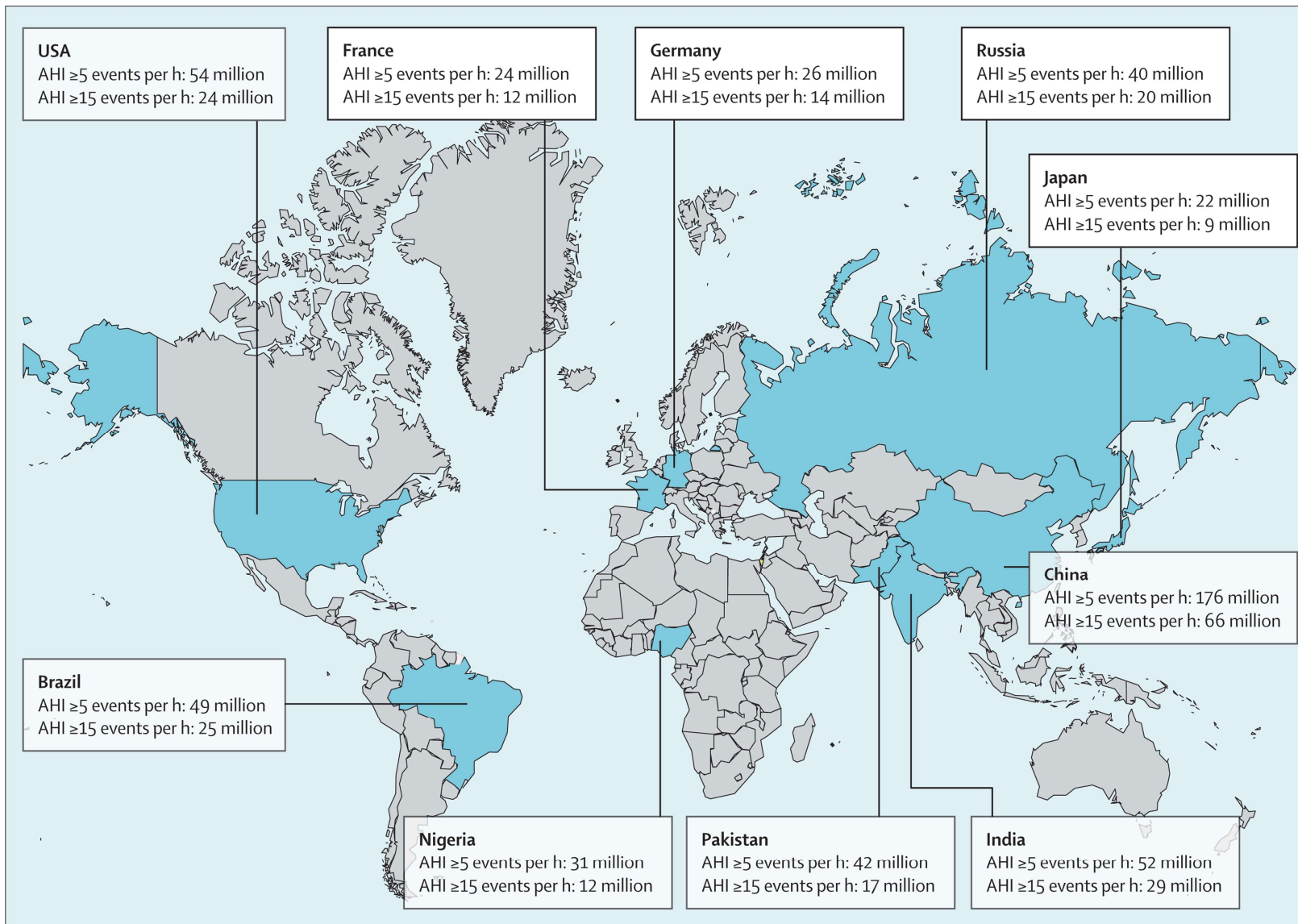
- Maintain regular bedtime/WAKETIME
- Bedroom – dark, cool, quiet and comfortable
- NO working in bedroom
- Avoid any food intake within 3 hours of bedtime
- Avoid caffeine (6 hours or more), nicotine, alcohol before bedtime
- Exercise regularly
- Treat any underlying medical issue

Strategies

- Promote sleep at home
 - Darken bedroom
 - Light blocking/sound absorbing curtains/shades
 - Wear eye shades
 - Wear dark glasses on drive home after shift work (minimize sunlight exposure in am)
 - Ear plugs/noise machine
 - Unplug phone/keep in another room
 - Notify family/friends of your sleep schedule

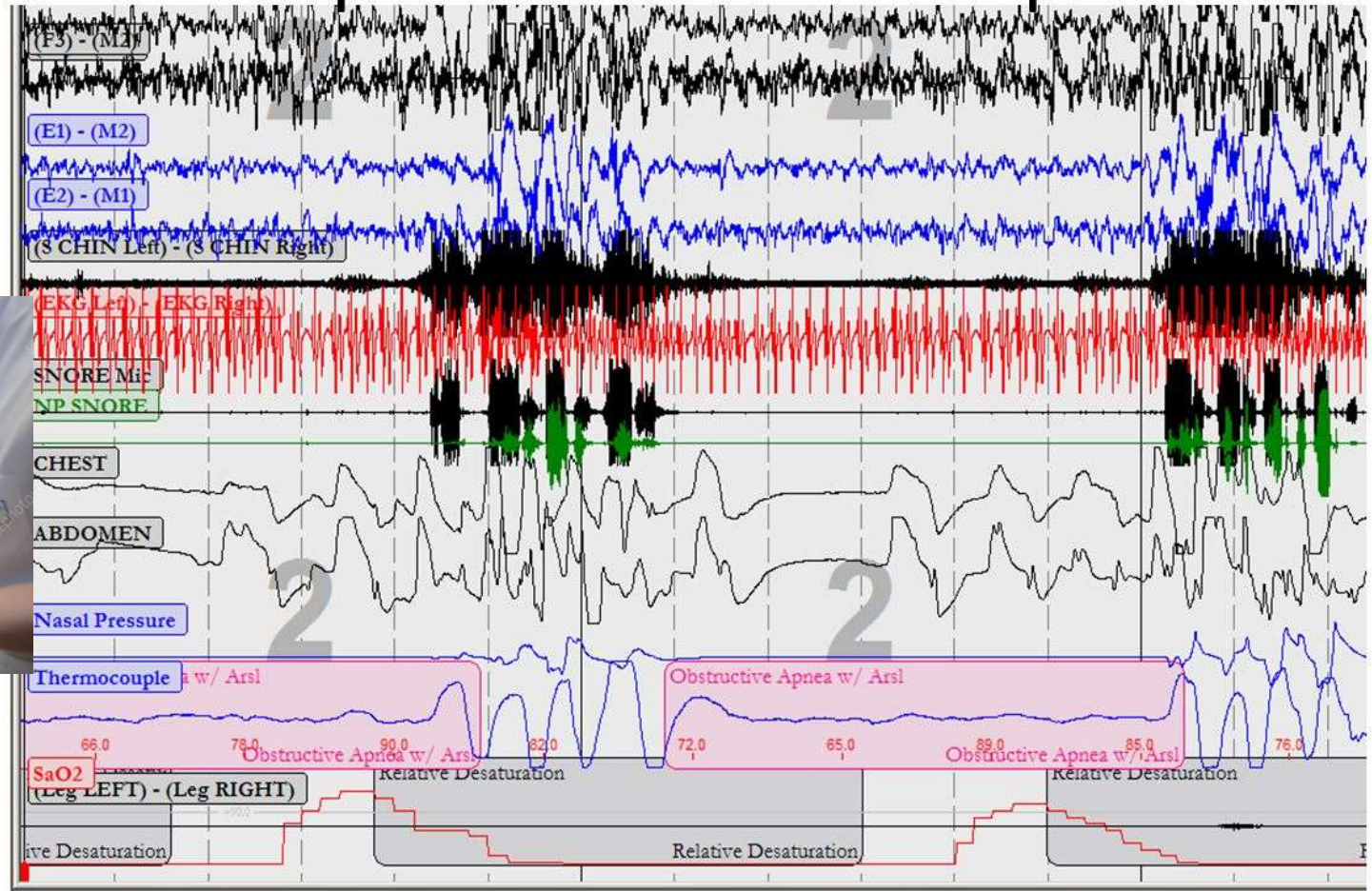
How many people have sleep apnea??





Modernizing Sleep Testing and Treatment

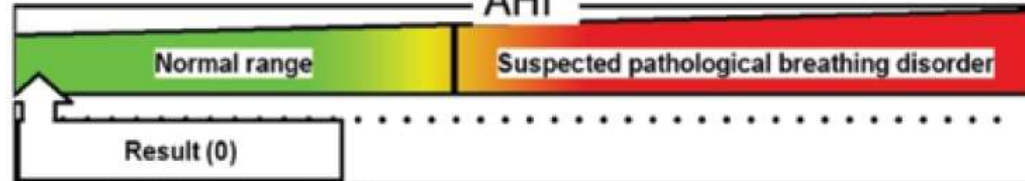
PSG



Apnealink

ApneaLink - Report of 08/26/2014:01 PM

AHI*



Points evaluation from AHI (see Clinical Guide for more details)

Analysis (Flow evaluation period: 6 h 11 min / SpO2 evaluation period: 10 h 32 min)

Indices	Normal	Result	
AHI*	0 < 5 / h	0	Average breaths per minute [bpm]: 11.68
RI*	4 < 5	4	Breaths: 4336
Apnea index:	0 < 5 / h	0	Apneas: 1
UAI:	0	0	Unclassified apneas: 0 (0%)
OAI:	0	0	Obstructive apneas: 1 (100%)
CAI:	0	0	Central apneas: 0 (0%)
MAI:	0	0	Mixed apneas: 0 (0%)
Hypopnea index:	0 < 5 / h	0	Hypopneas: 3
% Flow lim. Br. without Sn (FL):	40 < Approx. 60	40	Flow lim. Br. without Sn (FL): 1734
% Flow lim. Br. with Sn (FS):	3 < Approx. 40	3	Flow lim. Br. with Sn (FS): 140
			Snoring events: 863
ODI Oxygen Desaturation Index*:	0 < 5 / h	0	No. of desaturations: 3
Average saturation:	96 94% - 98%	96	Saturation [] 90% : 0 min (0%)
Lowest desaturation:	94 -	94	Saturation [] 85% : 0 min (0%)
Lowest saturation:	92 90% - 98%	92	Saturation [] 80% : 0 min (0%)
Baseline Saturation:	97 %	97	Saturation [] 89% : 0 min (0%)
			Saturation [] 88% : 0 min (0%)
Minimum pulse frequency:	46 50 - 70 bpm	46	
Maximum pulse frequency:	85 60 - 90 bpm	85	
Average pulse frequency:	57 bpm	57	
Proportion of probable CS epochs:	0 0%	0	

Analysis status: Analyzed automatically

Analysis parameters used (Default)

Apnea [20%: 10s; 80%: 1.0s; 20%: 60%: 8%] Hypopnea [70%: 10s; 100%: 1.5s] Snoring [6.0%: 0.3s; 3.5%: 0.5s]; Desaturation [4.0%]; CSR [0.50]

Comments

SpO2 <90%: 0%



Watchpat



- **AHI- Apneas per hour**
- **Central AHI- Apneas per hour**
- **Apnea Episodes through the night**
- **Snoring and Body Position**
- **Oxygen & Heart Rate**
(note precipitous drops)
- **Sleep Stages**
(unique to WatchPAT)



Nightowl - Ectosense (PPG based)



NIGHTOWL Examination Report

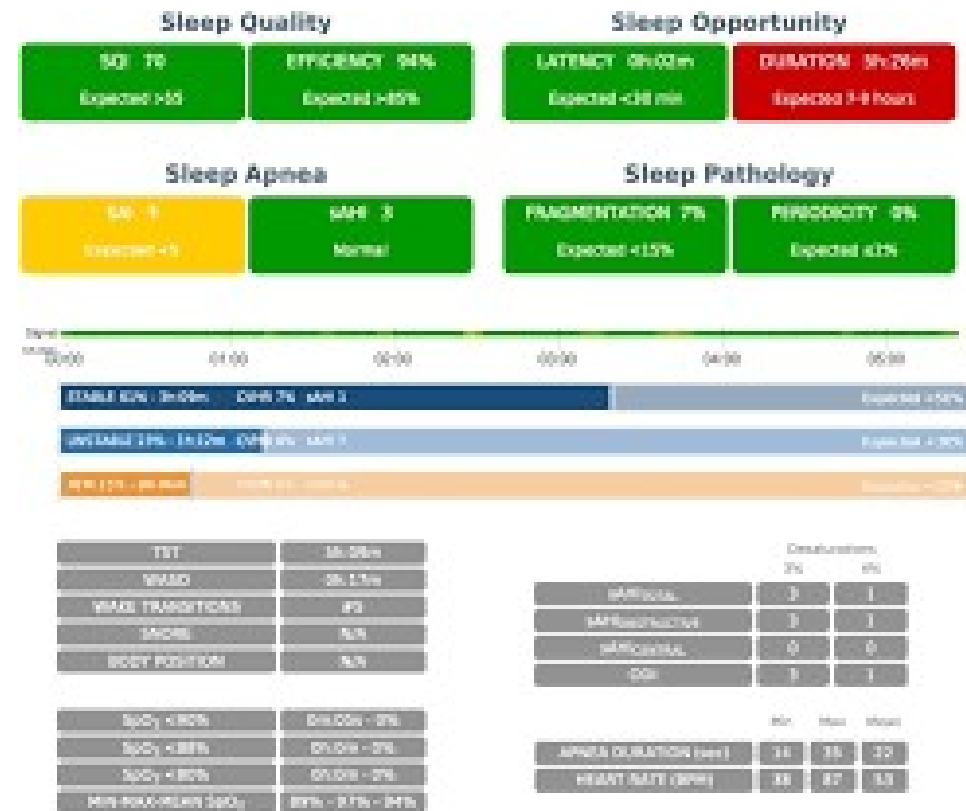


Recording Info		Apnea-Hypopnea Index		Other	
Patient ID	John Doe			Rejected recording	4%
Patient DOB	1960-01-01	pAHI			
Patient height	5 ft, 9 in	31			
Patient weight	198 lbs				
Patient BMI	29.39				
Recording start	2020-06-24 22:31				
Recording end	2020-06-25 05:44				
Recording duration	07:12				
Pulse Rate		SpO ₂		Sleep Time	
Mean PR	55 bpm	ODI (≥ 3%)	27 events/h	TST	04:47
Max PR	121 bpm	ODI (≥ 4%)	18 events/h	REM Time	00:13
Min PR	40 bpm	T90	3%		
Pulse Rate > 100 bpm	0%	Minimum SpO ₂	83%		
Pulse Rate < 40 bpm	0%	Maximum SpO ₂	100%		

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Software version: 1.21
Sensor Serial: A1904223

Sleep image – ppg based but CPC based algorithm



Nasal Continuous Positive Airway Pressure (CPAP)



Oral Appliance/Mandibular Advancement Devices

Thorton Adjustable Positioner (TAP)



SomnoMed Avant



Herbst

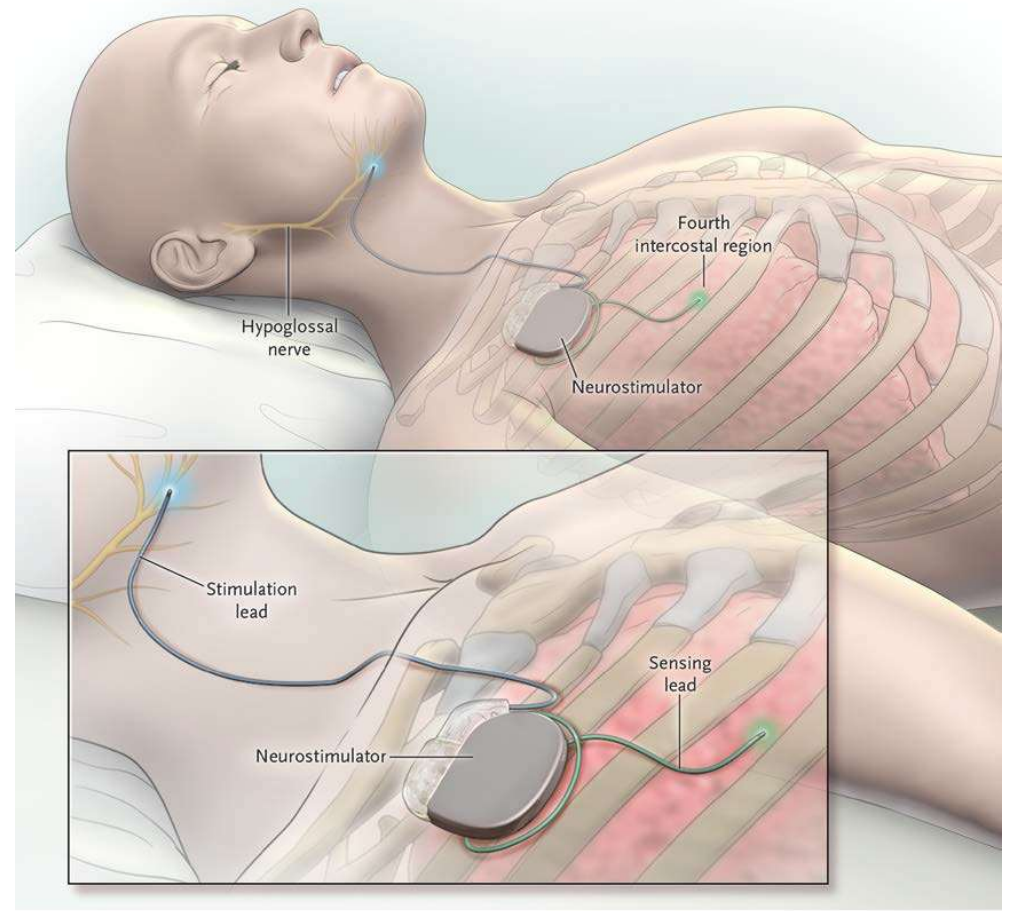


Covered by CMS and Commercial payors

Dentist should be AADSM qualified and in network with payors

Can be considered first line in mild to low moderate OSA

Inspire



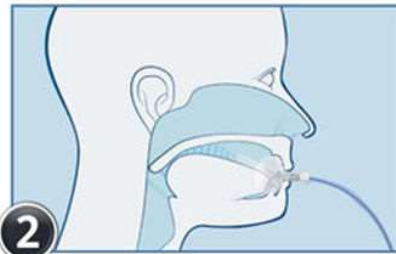
eXciteOSA – NMES



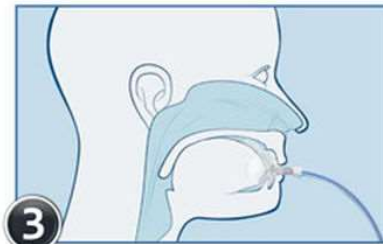
Clinically Proven Efficacy 80% OF PATIENTS reported more than 50% REDUCTION in snoring

eXciteOSA® has been clinically proven to improve the quality of sleep by reducing snoring and sleep apnea significantly, when used for 20 minutes, once a day for 6 weeks

iNAP



iNAP creates negative pressure within the oral cavity itself.



The negative pressure pulls the tongue and soft palate forward to keep the airway open.

FDA approved

Pharmacotherapy

- **N=20**
- **80mg of atomoxetine (NE) and 5mg of oxybutynin (muscarinic)**
- **Average age 53, BMI = 24.8, lowered AHI by 63% from 28.5 to 7.5**
- **Neither effective alone**



Biographical Information

**Dr. Asim Roy, Medical Director
Ohio Sleep Medicine Institute
4975 Bradenton Ave., Dublin, OH 43017
614-766-0773
aroy@sleepmedicine.com**

Asim Roy, MD is the medical director of the Ohio Sleep Medicine Institute. Board certified in sleep medicine and neurology, he works in close collaboration with health care providers to deliver continuous and coordinated sleep medicine care to adult and pediatric patients. Dr. Roy brings a thorough and thoughtful approach to patient care, in line with the comprehensive standards of our institute. He is the author of various articles, chapters and books, covering, among other topics, sleep and neurological disorders, restless legs syndrome, idiopathic hypersomnia, confusional arousals and sleep walking, cataplexy and REM sleep behavior disorder. Dr. Roy completed his neurology residency at Georgetown University as Chief Resident and his sleep and neurophysiology fellowship at the Cleveland Clinic Foundation.

**Rob Kibler, Chief Operating Officer
Ohio Sleep Treatment
450 Alkyre Run Dr. Ste. 300, Westerville, OH 43082
614-396-8286
robk@sleepreatmentoh.com**

Kibler is the Chief Operating Officer at Ohio Sleep Treatment, a Dental Sleep Medicine practice specializing in treating Obstructive Sleep Apnea using Oral Appliance Therapy (OAT). Rob has a demonstrated history of success in entrepreneurship and business development working in a range of fields including physical fitness, e-commerce, and commercial insurance. He is a co-founder of Dianyx Innovations, a medical technology start-up creating sensor technology to monitor key biomarkers for patients using Oral Appliance Therapy. Rob is a graduate of The Ohio State University with Bachelors's degrees in Security & Intelligence and Psychology and is a proud father.