



Alternatives To Positive Pressure In Treating Obstructive Sleep Apnea

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Learning Objectives

- Define and Describe Apnea and Obstructive Sleep Apnea (OSA).
- Review Statistics
- Briefly Review PAP Therapies
- Describe Alternatives to PAP in treating OSA
- Review Impact of Treatment
- Case Review
- Provide Add'l Resources



What is Apnea OSA & Who Cares?

- ▶ Cessation of Breathing in excess of 10-15 seconds.
 - ▶ **Obstructive Sleep Apnea:** If due to airway closure
 - ▶ **Central Sleep Apnea:** If impaired signal from the brain (Pons & Medulla Oblongata)





Sleep Apnea Statistics



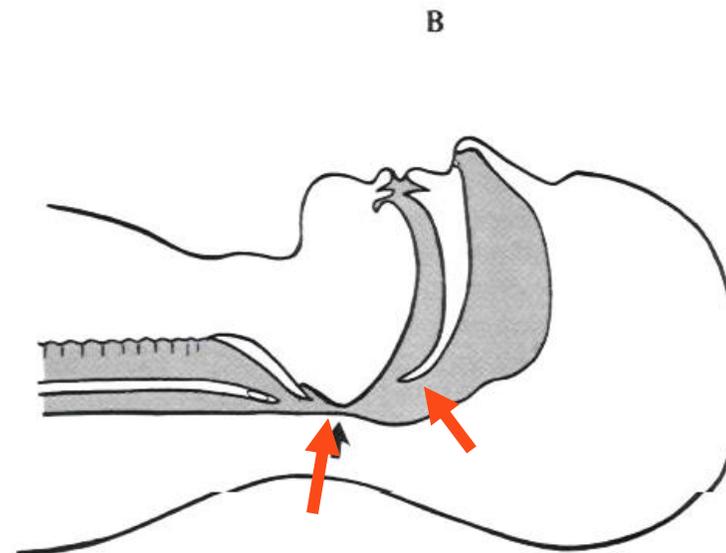
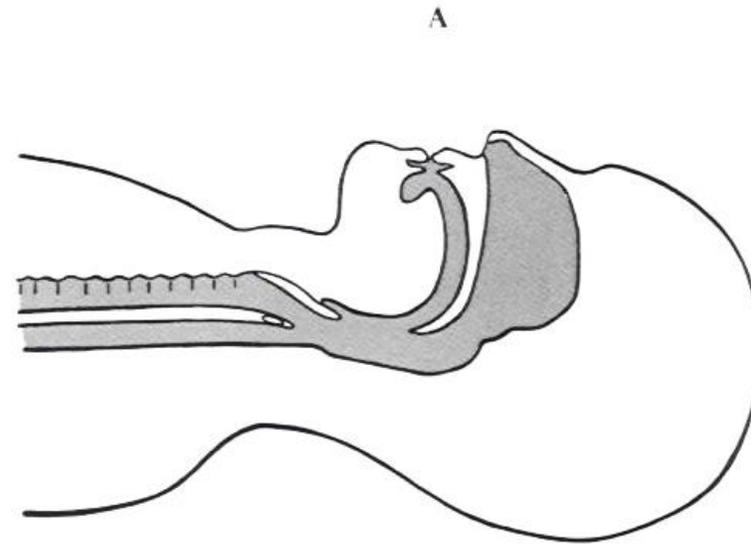
- **50 million to 70 million Americans have sleep or wakefulness disorders, and sleep apnea affects more at least 12 million to 18 million Americans** every year.
- It's most **common among adults over 45 who are overweight**, especially men, but can also affect women, people of normal weight and even children.
- **Men are twice as likely to have sleep apnea** than women. But women have a high chance too if they become obese, are going through menopause or drink excessive alcohol and smoke.
- It's estimated that **four out of every 100 middle-aged men and two out of every 100 middle-aged women** have obstructive sleep apnea.



Sleep Apnea Statistics-Cont.

- ▶ According to the National Institute of Health, **sleep apnea is the leading cause of excessive daytime drowsiness** in adults.
- ▶ Pauses in breathing associated with sleep apnea might last for 10 seconds to one minute and occur dozens of times per night.
- ▶ A Yale University study found that sleep apnea is associated with **double the risk for having a stroke!** It can also increase blood pressure, risk for blood clots and other cardiovascular diseases.
- ▶ People who are **obese have been found to have four times the risk of developing sleep apnea** that people who are a normal weight.

Mechanism of Obstruction with OSA



The *Poster Child* for PAP in Treating OSA



Traditional PAP Therapy—Best Case



Traditional PAP Therapy—*Not So Best Case*



Conservative Treatment

- ▶ Weight Loss—Especially if BMI > 30.
- ▶ Exercise-Promotes healthy sleep hygiene.
- ▶ Positioning
 - ▶ Sleep in a Lateral Position.
 - ▶ Using a Contour pillow-often in addition to PAP.
- ▶ Reduce Alcohol Consumption.
- ▶ Smoking Cessation.



The Contour CPAP Pillow works with all major brands of CPAP masks!





The Contour CPAP Pillow Improves:

- CPAP Ease of use
- Sleep Comfort for all CPAP users
- CPAP Compliance -
- Neck support and spine alignment
- Airway alignment

The Contour CPAP Pillow Reduces:

- Mask leaks
- Pressure on mask and face
- Mask discomfort

Oral Appliances

- Custom-made for each patient.
- Control snoring and sleep apnea by positioning the tongue and jaw, keeping the airway open during sleep.
- Promote better ventilation by relieving obstructed airway during sleep.





Medications--Dopamine/norepinephrine reuptake inhibitors (DNRI)

- SUNOSI (Solriamfetol) was just approved in 2019
- Is a once-daily tablet shown to treat excessive daytime sleepiness (EDS) due to obstructive sleep apnea (OSA) or narcolepsy.
 - **available in 75 mg and 150 mg tablets**
 - Does not treat the underlying cause of OSA
 - Does not take the place of any device prescribed for OSA, such as a continuous positive airway pressure (CPAP) machine.
- For many, SUNOSI improved wakefulness for up to 9 hours and worked in as little as one hour as measured at 12 weeks in two clinical trials.
- SUNOSI was not shown to cause symptoms of withdrawal or dependence in clinical trials.



CNS Stimulants:

- ▶ CNS Stimulants—
 - ▶ Provigil (Modafinil)—200 mg per day
 - ▶ Nuvigil (armodafinil)—150-250 mg per day
- ▶ Side Effects-
 - ▶ Headache and nausea.
 - ▶ **Other side effects include:** anorexia and xerostomia
- ▶ Other considerations:
- ▶ Use with caution with:
 - ▶ angina (chest pain);
 - ▶ cirrhosis or other liver problem;
 - ▶ kidney disease;
 - ▶ high blood pressure, heart disease, or history of heart attack;
 - ▶ a history of mental illness or psychosis; or
 - ▶ history of alcoholism or drug addiction.
- ▶ It is not known whether this medicine will harm an unborn baby. Tell your doctor if you are pregnant or plan to become pregnant.
- ▶ **These medications may make certain birth control (hormones) less effective**



Natural Supplements

- ▶ Ensure adequate Vitamin D - Is often deficient in people with OSA
 - ▶ 2-5,000 IU's per day
- ▶ Increase magnesium intake
 - ▶ 100-200 mg before going to sleep.
 - ▶ More may cause diarrhea
- ▶ Try 5HTP- is a precursor to the hormone serotonin
 - ▶ 50 mg 5HTP along with magnesium

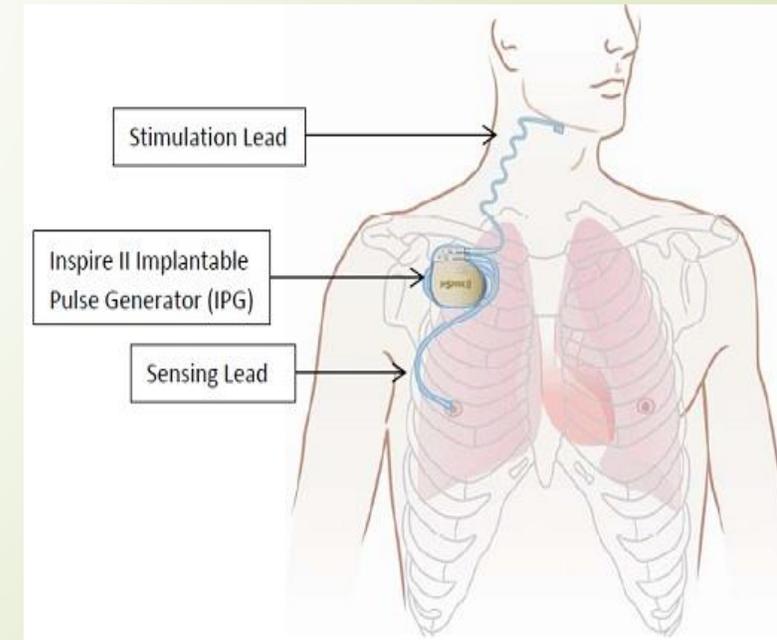


Other Homeopathic Substances

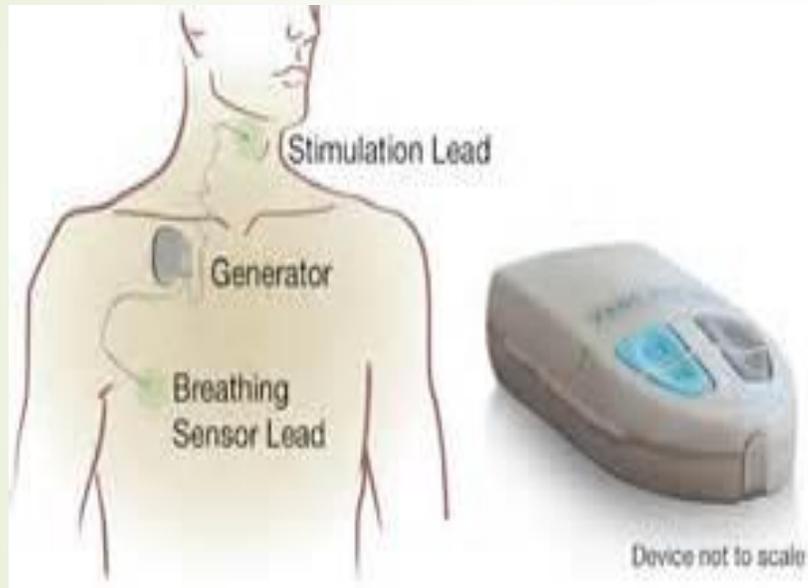
- ▶ **Chamomile Tea**-One of the simplest natural home remedies for sleep apnea is a cup of chamomile tea before you go to sleep. The substances found in chamomile are believed to help the nerves relax, which makes it easier for us to sleep.
- ▶ **Almonds**-Among the best natural home remedies for sleep apnea, we need to mention almond. This small ingredient can supply the body with a high amount of magnesium that enables the muscles to relax more.
- ▶ **Turmeric**-With anti-inflammatory quality, turmeric is claimed to fight against the inflammation that can take place in your respiratory system. This will reduce the times you stop breathing at night. When mixing it with warm milk, you have one of the best natural home remedies for sleep apnea.

A New(er) OSA Treatment: Upper Airway Stimulation (UAS):

- An implantable nerve stimulator used to treat moderate to severe obstructive sleep apnea (OSA).
- Patient must have failed other conventional therapy (CPAP/BiPAP)



Upper Airways Stimulation for OSA



Inspire—Upper Airway Stimulator





Inspire—Upper Airway Stimulator (cont)

- ▶ Inspire works completely inside your body with your natural breathing process.
 - ▶ A small device is placed just under your skin during a short outpatient procedure.
 - ▶ It delivers gentle stimulation to key airway muscles during sleep, allowing your airway to remain open.
 - ▶ Simply turn it on with the Inspire Sleep Remote before bed and off when you wake up.
- 

The Research--Upper Airways Stimulation for OSA

- ▶ Strollo, Soose, Maurer, et, al, NEJM, 2014
 - ▶ Multicenter, prospective, single-group, cohort design, surgically implanted an upper-airway stimulator in 126 patients with OSA apnea who did not tolerate CPAP therapy.
 - ▶ In this uncontrolled cohort study, **upper-airway stimulation led to significant improvements in objective (AHI scores) and subjective measurements.**
- ▶ Soose, Woodson, Gillespie, et al, 2016
 - ▶ Prospective, multicenter, cohort study of patients with moderate to severe OSA .
 - ▶ Patients with moderate to severe OSA and body mass index ≤ 32 kg/m², hypoglossal cranial nerve stimulation therapy **can provide significant improvement in important sleep related quality-of-life outcome measures** and the effect is maintained across a 2-y follow-up period.

Night Balance Lunoa—by Philips





Night Balance Lunoa—by Philips

- ▶ Mask-free treatment that helps you stay in a side-sleeping position to reduce breathing disturbance.
- ▶ Night Balance Lunoa is a clinically proven therapy for positional OSA.
 - ▶ Has been found to be *non-inferior* to PAP therapy.
- ▶ It is a palm-sized, compact and discreet device that is worn comfortably across the chest in a soft, adjustable belt under your nightclothes.
- ▶ During your sleep, it delivers auto-customized, gentle vibrations that prompt you to move off your back without disturbing your sleep.

Surgical Approaches to Obstructive Sleep Apnea



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KEYWORDS

• OSA surgery • OSA • CPAP failure • Multilevel surgery • Effectiveness • Evidence

KEY POINTS

- Contemporary obstructive sleep apnea (OSA) surgery is a key salvage treatment option for patients who have failed device use (ie, continuous positive airway pressure [CPAP] or mandibular advancement splint [MAS]).
- Nasal surgery should be considered a prephase option to facilitate subsequent CPAP or MAS or airway surgery.
- Newer variants of modified palatal and tongue surgeries are increasingly supported for their ability to achieve improved outcomes with less sacrifice of functional tissue.
- New modalities such as cranial nerve stimulation show significant promise.
- The current status of high-level literature supports a role for contemporary airway surgery in OSA, but ongoing level I and level II studies are still necessary.

INTRODUCTION

Surgery in adult obstructive sleep apnea (OSA) has undergone significant advancement in recent years and continues to evolve. It is a modality of treatment used in the context of failed device use, specifically, failed continuous positive airway pressure (CPAP) or mandibular advancement splint (MAS). In this context, the role of surgery is as salvage therapy to improve outcomes^{1–3} or to facilitate better tolerance of device use. Other treatments such as weight loss, adjuvant nasal therapy (medical ± prephase nasal surgery), and positional devices may be combined with airway surgery. Both pediatric OSA, being a separate entity to adult OSA, and bariatric surgery are discussed and are considered elsewhere. In general, patients with OSA are managed with in-hospital monitoring perioperatively, but where ambulatory considerations are realistic, they are highlighted in this article.

DEFINITION OF OBSTRUCTIVE SLEEP APNEA SURGERY

Adult OSA surgery includes an array of operative procedures to open or stabilize the upper airway and is outlined in **Box 1**. It is much more than just uvulopalatopharyngoplasty (UPPP) or maxillo-mandibular surgery as a fall back. Procedures are rarely isolated or directed to a single level of the airway and are often concurrent or staged. Pre-phase nasal surgery is used to facilitate return to device use with better adherence, or before multi-level surgery.

PHILOSOPHY OF SURGERY

In real clinical context, patients who fail primary device use therapy would remain otherwise untreated without salvage options such as upper airway OSA surgery.⁴ Many such patients are usually desperate for an alternative, at least to reduce

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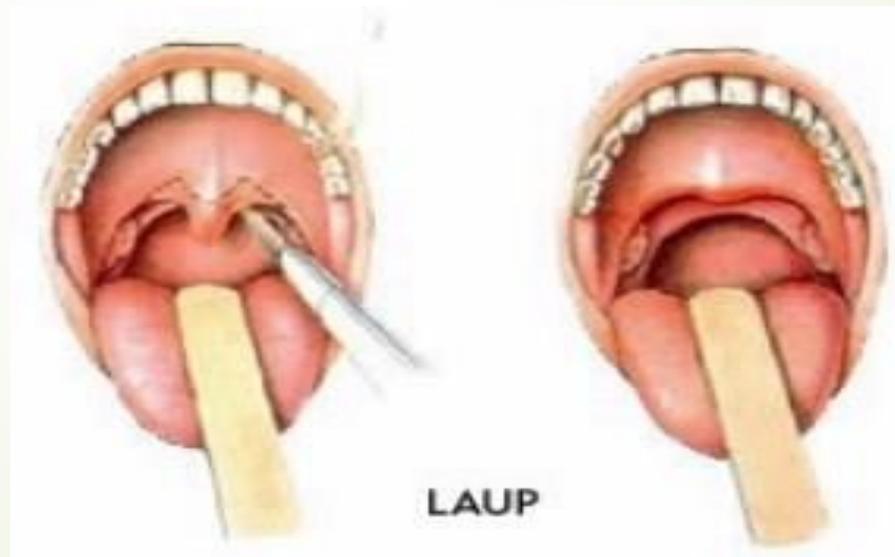
Surgery

- ▶ Tonsilectomy--If a patient's tonsils and adenoids are enlarged, removal is the recommended.



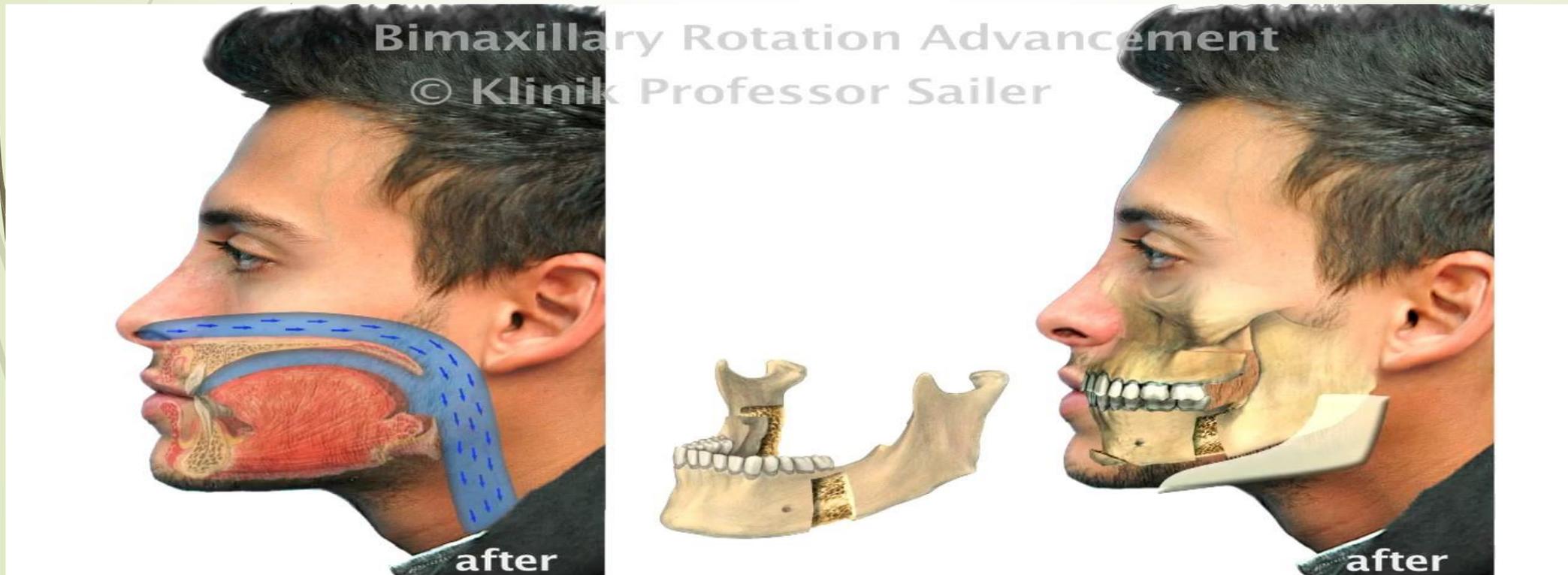
Surgery-Cont.

- ▶ UP3 (uvulopalatopharyngoplasty) or uvulectomy —
 - ▶ a procedure used to remove excess tissue in the soft palate to widen the airway.
 - ▶ may be effective in mild to moderate cases of OSA



Surgery-Cont.

- ▶ MMA surgery -- Maxillomandibular advancement:
 - ▶ the upper jaw (maxilla) and the lower jaw (mandible) are lengthened and moved forward.
 - ▶ Patients with shortened upper or lower jawbones may benefit



Surgery-Cont.

- ▶ Tongue reduction surgery—
 - ▶ May be helpful when the tongue is abnormally enlarged.
- ▶ Tracheostomy- A last Resort





Take Home Points--Conclusions

- OSA is widespread condition.
- The consequences of OSA are much more than daytime somnolence.
- However, OSA is treatable and PAP is still the mainstay
- However, many people can't tolerate PAP or are simply not compliant.
- There are alternatives to PAP; some have been around for a while and others are quite new.
- Alternatives should be tailored to suit the individual.
- More Work still to be Done!!!



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