Treatment for Snoring and Obstructive Sleep Apnea

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**Nonsurgical treatment**
- Weight loss
- Avoidance of alcohol, sedatives, tobacco
- Positional devices
- Oral or nasal appliances
- Nasal continuous or bilevel positive airway pressure

**Surgical treatment**
- Nasal procedures
- Palatal procedures, tonsillectomy
- Tongue base reduction procedures
- Maxillofacial procedures
- Tracheotomy
Drugs, Devices, and Oral Appliances for Snoring and OSAS
Drugs

- So far, no pharmacological agents have emerged as proven, consistent remedies for snoring or obstructive sleep apnea.
  - Some are worth discussing
  - Some may improve the results of other partially effective therapies
Stimulants

- **Caffeine, nicotine:**
  non-snoring companion to fall asleep first, keep off deep stage of sleep, but when stimulant has worn off, snoring returns

- **Modafinil (Provigil):**
  to treat daytime sleepiness
  it was recommended as therapy adjunctive to CPAP
Ventilatory Stimulants (1)

- **Medroxyprogesterone acetate:**
  - Premenopausal women are less likely than men (of the same age) to snore.
  - Only afford small degree of improvement, in most part, MPA fail to either male or postmenopausal female OSA patients (PO 1tab/day).

- **Flutamide:** short-term androgen blockade
  - Failed.
Ventilatory Stimulants(2)

- **Theophylline:**
  
  used for central apnea and periodic breathing, increase cardiac contractility, decease circulating time, thus stabilizing respiration

  small improvement has been observed at the cost of creating even greater sleep disruption

- **CO2:**
  
  electrolyte and acid base imbalance. systemic acidosis
Antidepressants

- **Protriptyline**: TCA antidepressants suppress REM sleep, improve daytime alertness without correction nocturnal oxygenation, probably by antidepressant effect, but anticholinergic effect limit its use.

- **Fluoxetine (Prozac)** 20mg/tab: SSRI, effect like Protriptyline, but less side effect (5-20mg/day for major depression)可行?

- Central serotonine medications have been used experimentally to directly stimulate hypoglossal nucleus and nerve activity.
Endocrine Therapy

- **Hypothyroidism:** among hypothyroid patients a high prevalence of OSA exists. Screening people of OSA for hypothyroidism was little more than normal population.

- **Acromegaly:**
Weight-Reducing Agents

- Two medications have been approved by FDA for therapy, adjunctive to diet and physical activity, for body weight reduction
  - **Sibutramine (Reductil):** anorexiant (10mg/day in the morning initially, max 15mg/day)
  - **Orlistat (Xenical):** a lipase inhibitor (120mg/tab, 1#tid with meal containing fat)
Oxygen Therapy

- Oxygen, delivered by nasal prongs but not CPAP or BiPAP, is effective in SaO2 <90%
- No effect on SaO2 > 90%
- Daytime use: improve daytime sleepiness
- Nocturnal use: worsen apnea and acidosis
Devices for Snoring and OSAS

- Sleep positioners
- Neck extenders
- Tongue repositioners
- Oral appliances
- Nasal dilators
- Neuromuscular stimulators
Sleep Positioners

- Snore ball
Neck Extenders (1)

- A neck-sprain collars
Neck Extenders(2)

- Antisnore pillows

*FDA Approves New Pillow To Treat Sleeping Problems*

LOS ANGELES, Calif. Posted 5:10 p.m. July 2, 1999

-- Is your partner's snoring keeping you up at night? Consider changing the pillows,
suggests CBS2 News. The Food and Drug Administration recently approved a new pillow
that's actually supposed to help stop snoring and allow sleepers to breathe easier.
Tongue repositioners

Fig 1. Depiction of technique of pharyngeal suspension suture with the “Repose” device. A, Inserter is placed in the midline floor of mouth posterior to the orifice of Wharton’s duct. The screw is placed firmly against the mandible with the screw perpendicular to the lingual cortex and inserted. B, Suture passer is placed through the stab wound and a double looped suture is placed through the tongue lateral to the midline into the hypopharynx. Point of insertion is approximately 1 cm from the midline and 1 cm below the foramen cecum. C, Single strand of the suspension suture is then passed opposite the double loop with the suture passer (asterisk). D, Curved Mayo needle is used to pass the suspension suture across the base of the tongue (double asterisk). E, Suspension suture is then passed into the looped strand of suture and pulled anteriorly finishing all 3 passes. F, Suture is then tied taking care to avoid cutting the suture on the incisor teeth.
Oral Appliances

- **Mechanism:**
  1. Bring mandible and base of tongue forward
  2. Stabilize mandible to prevent it from falling open during sleep
  3. Alter the mandibular position through downward rotation

- 1. Mandibular repositioning devices
- 2. Tongue-retaining devices
- 3. Soft palate lift
Mandibular repositioning devices

Klearway™:

This is a thermoplastic appliance which must be heated in hot tap water every night (to make flexible) before it is placed in the mouth. It allows for some side-to-side movement of the bottom jaw and limited opening, so that water can be sipped without removal of the appliance. The adjustment hardware is on the roof of the mouth and it takes some time to get used to swallowing with material in that location. The patient is able to adjust the bottom jaw forwarded in very tiny 25 mm increments. The appliance is completely contained within the mouth, and though it makes the lips look a bit puffy, is completely hidden when in use.

**DENTIST AND PHYSICIAN INSTRUCTIONS FOR THE KLEARWAY APPLIANCE FOR THE TREATMENT OF SNORING AND OBSTRUCTIVE SLEEP APNEA**
Tongue-Retaining devices
Oral Appliances

- Oral appliances were effective for mild to moderate OSA but less effective than CPAP for more severe disease.
- Side effects include excessive salivation, dryness of mouth, or transient discomfort which may prevent early acceptance of oral appliances.
- The major long-term problems are TM joint discomfort and movement of teeth.
Nasal Dilators

- Clinical limitation is erosions and pressure necrosis of internal nasal skin and membranes
- Its effect is subjective, not objective

Breathe Fit Nasal Dilator

Drug free relief for nasal congestion

Small re-useable clip inserted into the nostrils opens the nasal passages to promote clearer breathing.

Good for 100 hundred uses $9.99
Neuromuscular Stimulators

- “Pacemaker” system for OSA management.
- A sensor was implanted to detect negative intrathoracic pressure.
- This will trigger the electrical stimuli to genioglossus muscle.
- Electrical and technical challenges, costs have been impediments to its clinical application.
- Sleep > muscle weak > obstructive stimulation > no rest > muscle injury > more weak.
CPAP and BiPAP

The negative pressure associated with inspiratory effort results in collapse at the level of the soft palate and the base of the tongue.
BiPAP

• BiPAP delivers CPAP but also senses when an inspiratory effort is being made and delivers a higher pressure during inspiration. When flow stops, the pressure returns to the CPAP level. This positive pressure wave during inspirations unloads the diaphragm decreasing the work of breathing.
Surgical treatment

- Nasal procedures
- Palatal procedures, tonsillectomy
- Tongue base reduction procedures
- Maxillofacial procedures
- Tracheotomy
It appears that induced nasal obstruction is associated with sleep fragmentation, sleep deprivation, increased respiratory effort, and obstructive hypopneas and apnea in certain patients.
Palatal Surgery

- UPPP: the most common for OSAS

- Uvulopalatopasty: outpatient procedure include LAUP

- Transpalatal advancement pharyngoplasty
LAUP (Laser-Assisted UvuloPalatoplasty)
RAUP (Radiofrequency-Assisted Uvulopalatoplasty)
Uvulopalatopharyngoplasty (UPPP)

**Figure 50.5.** Uvulopalatopharyngoplasty. Resection of the palate is usually distal to the natural dimple or crease that marks where the soft palate approximates the posterior pharyngeal wall. A box-shaped palatal excision, with removal of tissue above the superior pole of the tonsil, results in a greater tendency to enlarge the oropharyngeal airway by anterior displacement of the sutured soft palate.
Tongue-Base Reduction Procedure

- Lingual tonsillectomy
- Laser midline glossectomy
- Lingualplasty
- Radiofrequency tissue ablation of the tongue base
Maxillomandibular Procedures

- Mandibular osteotomy with genioglossus advancement
- Hyoid myotomy and suspension
- Maxillomandibular osteotomy and advancement
Tracheotomy

- A permanent tracheotomy most commonly is performed in a patient with severe OSAS who cannot tolerate nasal CPAP and has failed other surgical procedure.
**Summary**

- **Antidepressants:** Fluoxetine (*Prozac*) 20mg/tab (5-20mg/day for major depression)
- **Progesterone:** for postmenopausal women
- **Sibutramine (*Reductil*):** anorexiant (10mg/day in the morning initially, max 15mg/day)
- **Orlistat (*Xenical*):** a lipase inhibitor (120mg/tab, 1#tid with meal containing fat)
- **Devices for snoring:** 可以有很大的市場
- **O2, CPAP, BiPAP**
- **Surgery**
Thank You