RESONEA

Obstructive Sleep Apnea: Effective Intervention & Care

Provider Training Modules

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RESONEA

Module III: Therapy for OSA

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- Therapeutic goals
- Interventions
  - Patient education and support
  - Lifestyle changes and behavioral modification
  - CPAP
  - Oral appliances
  - Surgery
- Interventions Overview for Mild, Moderate and Severe OSA
- Follow-up

Module III: Therapeutic Goals for OSA

- **Improve the patient's quality of life**
  - Decrease daytime sleepiness
  - Increase wellbeing, daytime performance
  - Decrease other specific symptoms caused or aggravated by OSA

- **Decrease the patient's chances of OSA-associated complications**
  - Reduce the risk of hypertension, type II diabetes, cardiovascular disease, depression, stroke, erectile dysfunction, dementia or cognitive issues
  - Reduce the risk of motor vehicle and other accidents

- **Improve the sleep environment for the bed partner**

Module III: Patient Education & Support

- **Patient education and support are emphasized in chronic disease management**

- **Especially important in OSA to help manage significant barriers**
  - Embarrassment regarding weight and/or snoring
  - Fear regarding the disease (fear is not always a motivator – can trigger denial)
  - Fear and misconceptions pertaining to both PSG testing and CPAP treatment

- **Ten critically important OSA patient messaging points:**
  1) You will feel better if you are treated.
  2) You will feel better if you are treated.
  3) You will feel better if you are treated.
  4) You will live healthier.
  5) You will probably live longer.
  6) Your bed partner will very likely be happier.
  7) Your sex life will benefit from treatment.
  8) Everyone else will be safer, because you will be less likely to cause an accident.
  9) Most OSA treatments involve some effort, but are not painful and those who use them adjust well.
  10) **You will feel better if you are treated.**

Module III: Primary Care Provider

- **Crucial role in patient education and support -- the 'art of medicine'**

- **Support**
  - Empathy
  - Encouragement
  - Empowerment

- **Educate to Motivate**
  - Emphasize the positive outcomes associated with OSA treatment
  - Include a frank but compassionate discussion of the consequences and risks of not treating
    - ✓ Not helpful to gloss over the importance of OSA, especially if non-treatment is being contemplated
    - ✓ It is counterproductive to frighten the patient with a scenario that is grim and places blame… some patients run away and don't come back
  - Provide reassurance that ***people just like them do well with treatment.***

Module III: Patient Education -- Be Specific

- **Emphasize the symptoms of OSA that are likely to improve with treatment:**
  - ✓ Daytime sleepiness and symptoms associated with daytime sleepiness – ***Irritability, difficulty concentrating, memory problems, work performance, energy level, risk of accidents***
  - ✓ Snoring
  - ✓ Other symptoms: ***headaches, GERD, sexual dysfunction, nocturia,***

- **Reduction in risk of adverse health consequences associated with OSA:**
  - Hypertension
  - Type II diabetes
  - Depression
  - Risk of stroke
  - Risk of ASCVD
  - Risk of heart failure
  - Risk of erectile dysfunction
  - Rate of motor vehicle accidents
  - Risk of Alzheimer's disease or dementia

Utilize "Fight or Flight" illustration to help patients understand the pathophysiology of OSA & why the consequences of untreated OSA are so profound.

- **OSA Treatment Options**

Module III: Patient Education & Support Is An Ongoing Process

- **Crucial at time of diagnosis**
- **Patients cannot always hear what is being said when first confronted with a diagnosis**
  - Denial common with all bad news
  - These patients likely to be sleepy & may have a degree of cognitive impairment
- **Utilize Tools**
  - Written materials
  - Graphics and videos
  - English language proficiency may be a factor
  - Literacy skills vary
- **Engage Others**
  - Spouse , friends and family
  - Support groups/online communities
- **Repeat the messaging and provide ongoing support**
- **Multidisciplinary chronic care management teams are an excellent vehicle for providing OSA patient education and support.**

Module III: Lifestyle Changes & Behavior Modification

Weight Reduction

- It is well known that weight reduction can reduce snoring
- Documented that patients with OSA who receive bariatric surgery have improvement in OSA
- Studies have also documented that obese patients with OSA achieve benefit (decreased AHI and decreased daytime sleepiness) with weight reduction programs [1]
- As with any weight reduction program, maintenance of weight loss can be difficult, but some studies have shown persistence of OSA improvement even if some weight regained [2]

Exercise

- Often a component of weight loss programs
- Benefits of exercise for OSA have been demonstrated independent of weight loss
  - ✓ 2014 meta-analysis that included 5 small randomized controlled trials showed that supervised exercise programs are associated with improved AHI, sleep efficiency, sleepiness, and cardiorespiratory fitness, even with minimal change in weight. [3]

[1] Kryger 2017
[2] Kuna 2013, Johansson 2011, Tuomilehto 2010
[3] Iftikhar 2014

Module III: Lifestyle & Behavior -- Alcohol & Other Sedatives

Alcohol Consumption

- Promotes weight gain
- Depresses central nervous system
- Worsens snoring and exacerbates OSA events (apneas, hypopneas and oxygen desaturation)
- Can promote “rebound” insomnia
  - ✓ ***Should be minimized in patients with OSA and avoided within 3 hours of bedtime.***

Other Sedatives can worsen OSA

- Benzodiazepines
- Barbiturates
- Antihistamines
- Opiates
- Sedating antidepressants
- Sedating anti-epileptics
  - ✓ ***These should be avoided***
  - ✓ ***If absolutely necessary, regimens should be modified to reduce night-time sedative effects.***

Module III: Lifestyle & Behavior -- Sleep Hygiene

- **People with OSA should avoid habits that disrupt their sleep patterns.**

- **General practices of good sleep hygiene:**
  - Regular sleep schedule
  - Use the bed for sleep and romance – do not read, watch TV, etc. in bed
  - Eliminate caffeinated beverages after mid-day
  - No alcohol near bedtime
  - Exercise regularly but not within 4 hours of bedtime
  - Avoid use of computer/phone/tablet light-emitting screens before bedtime
  - If you wake up, don't linger in bed worrying. Get up and read a book or magazine for a short time, before returning to bed.

Module III: Lifestyle & Behavior -- Sleep Position

OSA in some people is associated with sleep position – especially lying on the back.

- Changes in sleep position are not easy to accomplish.
- Various devices are available which restrict lying on back -- pillows, tennis ball contraptions, etc.
  - ✓ ***It is difficult to track effectiveness and adherence to these maneuvers.***
  - ✓ ***Care providers should be skeptical of patient's claims that the problem has been solved with one of these devices.***

Module III: Continuous Positive Airway Pressure (CPAP)

- **Mainstay of OSA treatment**
  - Safety and efficacy are well-documented in a large volume of high-quality clinical trials
  - There is now a considerable body of experience treating OSA successfully with CPAP
  - CPAP is safe and not painful
  - Side effects if they occur (e.g. bloating, irritation from mask) can be managed
  - With proper instruction, patients adjust easily to the therapy

- **"Pneumatic splint"**
  - While the patient sleeps, pressurized air is pumped to a mask fitted to patient's nose and mouth (or nose only)
  - Air passes through the nares into the patient's upper airway
  - Pressure achieved is greater than the compressive pressure on the airway
  - Pressurized air acts like a "splint" to "prop" the airway open

- **Since introduction into practice in the 1980's, CPAP devices have improved:**
  - Now smaller, lighter, and quieter to operate
  - More comfortable with advances in masks and nasal "pillows"
  - Addition of heated humidifiers and heated hoses
  - More form factors available for special uses, like travel

Module III: Benefits of CPAP Are Well-Established

- **Thirty five randomized controlled trials (RCTs) have demonstrated that CPAP [1]**
  - Reduces AHI
  - Lowers blood pressure
  - Decreases day time sleepiness
  - Improves quality of life across a range of disease severities, including cognitive function and depression

- Observational studies in patients with moderate or severe OSA, who received CPAP vs. those who remained untreated, have **demonstrated a decrease in cardiovascular mortality with CPAP treatment.[2]**

- **A reduction in mortality with CPAP has not been demonstrated in RCTs:**
  - However, RCTs comparing CPAP with no treatment (or sham CPAP) have generally been of short duration.

- RCTs and single arm studies (before and after CPAP) have **demonstrated improvements in components of the metabolic syndrome, including glucose, lipids, and visceral fat, as well as blood pressure.[3]**

[1] Kryger 2017
[2] Marti 2002 , Campos-Rodriguez 2005, 2012
[3] Drager 2013

Module III: Types of CPAP

- **Fixed-Dose CPAP**
  - Delivers positive airway pressure at a level that remains constant throughout the respiratory cycle
  - The pressure setting is based on a titration study performed in the sleep lab
    - ✓ While the patient sleeps and has OSA apneas and hypopneas, the technician starts CPAP at the lowest level and gradually increases the pressure until OSA events cease
    - ✓ Ramp up pressures at the beginning of the night are sometimes used to improve comfort and tolerance of the device

- **Auto-Titrating CPAP or APAP**
  - Level of positive airway pressure varies in response to a change in air flow…
    - ✓ Throughout the night, as the physiology of sleep changes
    - ✓ Over time - reflecting patient changes (e.g. weight or alcohol/sedative use)
    - ✓ APAP can be used temporarily as a "titration study" to determine the pressure for fixed dose CPAP, or used for ongoing CPAP therapy.
    - ✓ Studies, including RCTs, have documented equivalent outcomes with Fixed-Dose CPAP and APAP.[1]

- **Bi-level Positive Airway Pressure (BiPAP) is similar to CPAP**
  - Main difference is that BiPAP can be set to have a different pressure for inhalation and exhalation.
  - BIPAP may be helpful in a subset of OSA patients who also have obesity/hypoventilation syndrome and central sleep apnea.

[1] Ayas 2004

Module III: Limitations of CPAP

- **Must be used chronically - not a definitive treatment**
  - Use of CPAP for 6 hours or more per night is recommended and use for less than 4 hours per night has been proposed as a cut-off for non-adherence.
  - Reported prevalence of noncompliance (use <4 hours/night) has varied from 29-83% [1]
  - Amongst OSA patients who were prescribed CPAP, compliance is realistically about 50%.
  - Amongst compliant patients, the average duration of CPAP use is approximately five hours per night, across numerous studies.[2]

- **Factors associated with better CPAP compliance include:**
  - Severity of baseline OSA by AHI, and more importantly, degree of daytime sleepiness
  - Patient's initial experience with CPAP - use during the first week of therapy
  - Early experience with CPAP - especially mask fit and absence of mask leaks
  - Psychosocial support, including frequent provider encounters, telehealth contacts and cognitive behavioral interventions

[1] Weaver 2016
[2] Gay 2006

Module III: Oral Appliances/Dental Devices

- **Oral appliances function to reposition the jaw,** bringing the tongue and soft palate forward.
  - Used during sleep
  - Generally provided by a dentist, with medical assessment and follow-up also recommended
  - The dentist providing oral appliances should have sufficient experience treating OSA and sufficient volume of fitting these appliances to be proficient.

- **Oral appliances help to reduce snoring.**

- Many studies, including dozens of RCTs, have **documented that oral appliances are effective for treating OSA.**

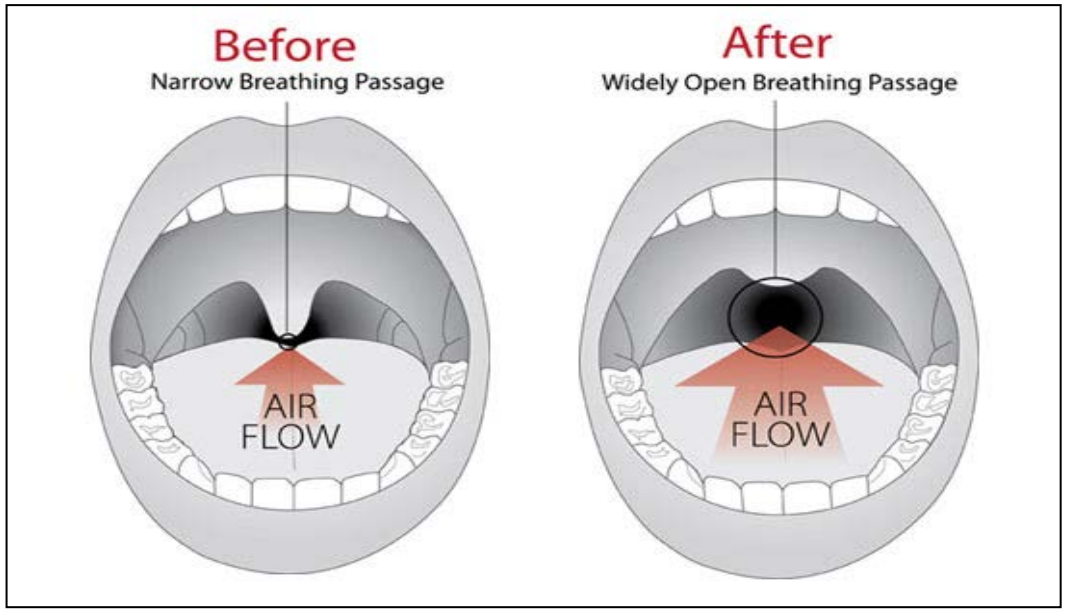
- However, **most studies that have compared oral appliances to CPAP** have concluded that:
  - CPAP is superior at improving AHI and oxyhemoglobin saturation (but not symptoms of daytime sleepiness).[1]
  - Patients generally prefer oral appliances and demonstrate better adherence with these.[1]

- **Side effects are usually minor** and may include jaw pain and changes to the bite with prolonged use.
  - Oral appliances contraindicated in those with temperomandibular joint syndrome (TMJ).

[1] Cistulli 2017

Module III: Surgery on Upper Airway

- **Surgery is generally a second line option** in patients who have a surgically-correctable, upper airway obstructing lesion.
- Usually reserved for **patients who have failed CPAP and oral appliance therapy.**
- Sometimes employed in an **adjunctive role** to help patients who are **struggling with CPAP or an oral appliance** (e.g. relief of nasal obstruction).
- Surgery can play a primary role in OSA management in patients with a **surgically-correctable lesion that is causing apnea, such as severe tonsillar hypertrophy.**
- **Surgical procedures utilized for OSA include:**
  - Nasal turbinate reduction
  - Tonsillectomy/adenoidectomy
  - Uvulopalatopharyngoplasty (UPPP)
  - Maxillomandibular advancement (MMA)



Module III: Newer Approaches

- **Surgical implant of hypoglossal nerve stimulation device- one FDA approved product**
  - STAR trial[1] – single arm (n=154); baseline AHI of 32 reduced to 15; baseline ESS of 11.6 reduced to 7.0; then responders were randomized to groups with stimulation turned on or group with sham treatment (stimulation off).
  - In sham group, the AHI worsened, increasing toward baseline.
  - Indicated for CPAP failures -- in moderate-to-severe OSA .
  - Not in AASM guidelines and generally not covered by insurance.
  - AAO-HNS (Head and Neck Surgeons) have issued a position statement on the therapy:

    American Academy of Otolaryngology-Head and Neck Surgery considers upper airway stimulation (UAS) via the hypoglossal nerve for the treatment of adult obstructive sleep apnea syndrome to be an effective, second-line treatment of moderate-to-severe obstructive sleep apnea in patients who are intolerant or unable to achieve benefit with positive pressure therapy (PAP). Not all adult patients are candidates for UAS therapy and appropriate polysomnographic, age, BMI and objective upper airway evaluation measures are required for proper patient selection.

- **Oral Pressure Therapy**
  - Mouthpiece attached to a suction unit
  - One FDA approved device and generally not covered by insurance
  - 63 patient single arm study; [2] baseline AHI of 27.5 was reduced to 14.8 after 28 days of treatment
  - Baseline ESS of 12.1 was reduced o 8.6 with treatment
  - Also had single-night cross-over comparisons – AHI was lower on treated nights.

[1] Strollo 2014
[2] Colrain 2013

Module III: Interventions Overview -- Patients With Mild OSA

1. **Patient education and support:**
   - OSA pathophysiology, consequences and benefits of treatment

2. **Behavioral modification:**
   - Weight loss and exercise
   - Sedative medication avoidance
   - Minimize alcohol.
   - Sleep hygiene
   - Sleeping in a non-supine position

3. **Continuous Positive Airway Pressure (CPAP) therapy:**
   - Recommended for patients with mild OSA who have one or more clinical symptoms or physiologic sequelae attributable to OSA – in particular, excessive daytime sleepiness.
   - Medicare provides coverage for CPAP in patients with mild OSA (AHI 5-14), if associated with excessive daytime sleepiness, impaired neurocognitive function, mood disorders, insomnia, cardiovascular disease (eg, hypertension, ischemic heart disease), or a history of stroke.
   - CPAP is recommended for patients with mild OSA even in the absence of symptoms, if they perform mission critical work (e.g. airline pilot, bus or truck drivers).

4. **Oral appliances** – a viable alternative for those with mild OSA who decline or fail to adhere to CPAP.

Module III: Interventions Overview -- Patients With Moderate OSA

1. **Patient education and support**

2. **Behavioral modification**

3. **Continuous Positive Airway Pressure (CPAP) therapy:**
   - Recommended as initial therapy for moderate OSA

4. **Oral appliances** are considered a reasonable alternative in patients with moderate OSA who decline or fail to adhere to CPAP.

5. **Surgery** can be considered an adjunct therapy for patients who are initially intolerant to CPAP, or if there is incomplete treatment of OSA with CPAP or oral appliances.

Module III: Interventions Overview -- Patients With Severe OSA

1. **Patient education and support**

2. **Behavioral modification**

3. **Continuous Positive Airway Pressure (CPAP) therapy:**
   - Recommended as initial therapy for severe OSA

4. **Oral appliances** may be used with caution in patients with severe OSA, since variable efficacy of oral appliances has been reported in this patient population.

5. **Surgery** can be considered an adjunct therapy for patients who are initially intolerant to CPAP, or there is incomplete treatment of OSA with CPAP.

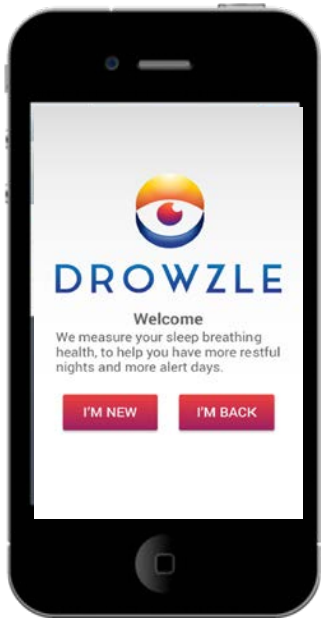
Module III: Interventions -- Follow-up

All OSA patients require ongoing follow-up, for the purposes of:

- Further validation of the clinical diagnosis,
- Continued education and support,
- Determining adherence to lifestyle recommendations,
- Assessing adherence to therapy and response to CPAP or oral appliances,
- Considering the need for additional evaluations and interventions.

DROWZLE App is a useful tool for patient follow-up:

- Allows frequent, systematic & objective monitoring of symptoms & personal risk factors
- Tracks change in daytime sleepiness scores with Epworth scale
- Overnight sound analysis can capture changes in sleep breathing, including apneas
- Can provide measurement of post-treatment improvement
- App provides links to educational information on OSA, plus patient resources available online
- Allows push-messaging to check patient progress or need for provider intervention



Multi-disciplinary chronic care management teams are an excellent vehicle for providing ongoing follow-up care for patients with OSA.

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