Obstructive sleep apnea

Overview

Dr. Kaddaha
Tuesday, November 27th 2018
Disclaimer

Sleep study interpretation and consultant for
Biron
Vitalaire
SAS
Clinique de sommeil de Grand Montréal
Learning objectives

You will understand

• Risk factors
• Screening process
• Underlying pathophysiology
• Diagnosis and work up
• Existing treatment modalities
• Difference between non-surgical and surgical treatment approaches
Profile of Respondents

Gender
- 52% Male
- 48% Female

Age
- 18 - 29 years: 3%
- 30 - 49 years: 15%
- 50 - 69 years: 56%
- 70 - 89 years: 26%

Age Diagnosed with Sleep Apnea
53 years old (Mean)

Age Beginning Treatment for Sleep Apnea
53 years old (Mean)

Household Income
$61,250 per year (Mean)
# Existing Medical Conditions

<table>
<thead>
<tr>
<th>Medical Condition</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension ((n=288))</td>
<td>60%</td>
</tr>
<tr>
<td>Diabetes ((n=111))</td>
<td>24%</td>
</tr>
<tr>
<td>Asthma and Other Breathing Problems ((COPD, Emphysema, etc.) ((n=122))</td>
<td>25%</td>
</tr>
<tr>
<td>Insomnia ((n=134))</td>
<td>29%</td>
</tr>
<tr>
<td>Depression, Anxiety or Other Mental Health Problems ((n=176))</td>
<td>37%</td>
</tr>
<tr>
<td>Heart Disease ((n=54))</td>
<td>13%</td>
</tr>
<tr>
<td>None of the above ((n=70))</td>
<td>14%</td>
</tr>
</tbody>
</table>

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# Barriers to Diagnosis & Treatment

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Public Awareness</td>
<td>Many individuals do not recognize symptoms and severity of the condition.</td>
</tr>
<tr>
<td><strong>Primary Care Physician Education</strong></td>
<td>Front-line caregivers do not routinely ask about duration and quality of sleep or screen patients for OSA.</td>
</tr>
<tr>
<td>Diagnosis and Treatment Costs</td>
<td>While usually covered by payors for qualified patients, costs average $2,105 per year for testing, appointments, treatment devices and surgery if necessary.</td>
</tr>
<tr>
<td>Employer and Payor Investment for Chronic Care Management</td>
<td>Economic stakeholders are still developing cost models that financially reward managing chronic conditions in order to lessen longer-term risk for acute events.</td>
</tr>
</tbody>
</table>

Source: Primary and secondary research

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Sources of Cost for Undiagnosed OSA

Comorbidities & Mental Health
- Hypertension: $5.4 B
- Heart Disease: $6.7 B
- Diabetes: $6.4 B
- Asthma/Breathing Disorders: $2.6 B
- Insomnia: $2.1 B
- Depression/Anxiety/Mental Health: $7.1 B

Total: $30.0 B

Includes cost of healthcare services, medication, and quality of life.

Motor Vehicle Accidents
- Commercial: $19.1 B
- Non-Commercial: $7.1 B

Total: $26.2 B

Includes medical costs, emergency services, property damage, lost productivity, and monetized quality adjusted life years (QALYs) incurred by company, insurer, victims, government and others.

Workplace Accidents
- Fatal: $6.9 B
- Non-Fatal: $3.5 B

Total: $10.4 B

Includes fatal and non-fatal accidents. Includes medical costs and lost productivity.

Lost Productivity
- Productivity: $83.1 B
- Absenteeism: $3.8 B
- Total: $86.9 B

Includes medical costs and lost productivity.

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Cost for Diagnosed / Treated OSA

**Diagnosed OSA**
- $817.9 M
- $6.2 B
- $12.4 B

**Surgical Treatment**
- $5.4 B

**Non-Surgical Treatment**
- $817.9 M
- $6.2 B
- $12.4 B

**Diagnosis**
- In-Lab PSG
- Home Sleep Testing
- CPAP Titration
- Clinic Visits

**Non-Surgical Treatment**
- PAP/ BiPAP Machine
- PAP Consumables
- Oral Appliances

**Surgical Treatment**
- Bariatric Surgery
- Nasal Reconstruction/ Polyp Removal
- Maxillomandibular/ Genioglossus /Hyoid Advancement
- Temperature-controlled RF Tongue Base Reduction
- Tonsillectomy/ Adenoidectomy
- Hypoglossal Nerve Stimulation
- Pillar Procedure
- Sclerotherapy
- Tracheotomy for OSA
- UPPP

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Who do they talk to…and about what?

What type of healthcare provider initially warned you about the risk of sleep apnea? (n=506)

- Sleep Specialist: 30%
- Pulmonologist: 12%
- GP/Internist: 28%
- Cardiologist: 4%
- Endocrinologist: 6%
- Neurologist: 15%
- Ear Nose Throat (ENT): 2%
- Other: 4%

What caused you to raise the issue of your risk of sleep apnea with your healthcare provider? (n=61)

- Excessive Drowsiness: 56%
- Poor Quality of Life: 34%
- Work Performance: 16%
- Friend/relative has sleep apnea: 26%
- Snoring/Disturbing bed partner: 70%
- Encouragement from bed partner: 34%
- Automotive Accident: 2%
- Learned about sleep apnea in reading/watching programs: 20%

(Percentages under 3% not shown for transparency).

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Wisconsin Sleep study Cohort

1. First population study conducted using in-lab studies of sleep and breathing
2. Showed a significant prevalence of sleep apnea or sleep-disordered breathing in a middle-aged, nonclinical population
3. Findings signaled significant and largely undiagnosed effect of sleep-disordered breathing on public health
## Prevalence & Incidence

### TABLE 2

Incidence of OSA from population-based longitudinal studies

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Years of follow-up</th>
<th>Definition</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wisconsin Sleep Cohort [31]</td>
<td>554</td>
<td>4</td>
<td>AHI&lt;5 to AHI≥5</td>
<td>10.6%</td>
</tr>
<tr>
<td>Cleveland Family [30]</td>
<td>286</td>
<td>5</td>
<td>AHI&lt;5 to AHI≥15</td>
<td>15% Men 8.2% Women</td>
</tr>
<tr>
<td>Sleep Heart Health [32]</td>
<td>2968</td>
<td>5</td>
<td>AHI&lt;5 to AHI≥15</td>
<td>11.1% Men 4.9% Women</td>
</tr>
</tbody>
</table>
PREVALENCE OF OSA IN PATIENTS WITH...

- Drug-resistant hypertension: 80% (Logan et al., J. Hypertension 2001)
- Congestive heart failure: 80% (Maisel et al., HFAA 2007)
- Type 2 diabetes: 72% (Somers et al., Circulation 2004)
- Atrial fibrillation: ~50% (Sjoström et al., Thorax 2002)
- All hypertension: 35% (Schäfer et al., Cardiology 1999)
- CAD: 30% (Sarny et al., Clin Cardiology 2001)
- Angina: 30% (Sarny et al., Clin Cardiology 2001)

Diagram showing the overlap of cardiovascular disease, sleep disordered breathing, diabetes, and obesity.
Apneas and Hypopneas

• Specific to the sleeping state
• Accompanied by
  – Completely closed, extra-thoracic upper airway
    • (“Obstructive” event)
  – Reduction or cessation of brain stem respiratory motor output
    • (“Central” event)
  – Combination of central and obstructive events
    • (“Mix” events)
Ventilatory inadequacies

• Accompany intermittent hypoxemia
  – Transient arousals from sleep
  – Sleep state fragmentation throughout the night
  – Over compensatory responses of autonomic nervous system
Pathophysiology of obstructive sleep apnoea

- OBSTRUCTIVE APNOEA – HYPOPNOEAE
  - Increased breathing effort (reduced PO₂ and increased PCO₂)
  - Arousal
    - Upper airway reopens rapidly with increased upper airway dilator muscle activity
    - Hyperventilation
      - Reduction in PCO₂ and rapid increase in PO₂
  - Reduced upper airway muscle reactivity, increased upper airway resistance resulting in reduced lung volume
  - Hypoventilation
  - Reduced upper airway muscle activity
  - Upper airway narrowing/collapse

Return to sleep

Obstructive Sleep Apnea

Arousal

↓ PaO₂, ↑ PaCO₂

↓ Intrathoracic pressure

↓ Myocardial O₂ delivery

CARDIAC ISCHEMIA CARDIAC HYPERTROPHY CARDIAC FAILURE

↑ LV wall tension

↑ Cardiac O₂ demand

↑ Stroke Volume

↓ Intrathoracic pressure

↑ SNA, ↑ Catecholamines

Acute

↑ HR, ↑ BP

Chronic

HTN
Pathophysiology

• OSA is caused by soft tissue collapse in the pharynx
• Transmural pressure
  – Difference between intraluminal pressure and the surrounding tissue pressure.
  ① If transmural pressure decreases, the cross-sectional area of the pharynx decreases.
  ② If pressure passes a critical point, pharyngeal closing pressure is reached.
  ③ Exceeding pharyngeal critical pressure (Pcrit) causes tissues collapsing inward.
  ④ The airway is then obstructed.
Normal breathing

Snoring - Partial obstruction of the airway

OSA - Complete obstruction of the airway

Tongue
Soft palate
Uvula
Upper airway anatomy

• Composed of numerous muscles and soft tissue
  – Lacks rigid or bony support.
  – Contains a collapsible portion that extends from the hard palate to the larynx.

• Ability of the upper airway to change shape and momentarily close is essential for speech and swallowing during wakefulness
  – Opportunity for collapse at inopportune times such as during sleep
Upper airway anatomy

• Anatomic perspective
  – Narrow upper airway more prone to collapse than a larger one
  – Cross-sectional area of the upper airway during wakefulness is reduced in patients with OSA
    • Compared with subjects without OSA

• Arrangement of the surrounding soft tissues appears to be altered in patients with OSA
  – May place upper airway at risk for collapse
Mid-sagittal magnetic resonance image (MRI) N
Normal subject (left) & patient with severe OSA (right).

Subcutaneous fat

Soft palate
Tongue
Airway
Mandible

Nasopharynx
Retropalatal
Retroglossal
Hypopharynx
Mallampati Classification

Class 1: soft palate, fauces, uvula, pillars
Class 2: soft palate, fauces, portion of uvula
Class 3: soft palate, base of uvula
Class 4: hard palate only
KISSING TONSILS

- It is unusual for tonsils to touch or meet in the midline without protrusion of the tongue. When tonsils meet in the midline or overlap, they are called "kissing tonsils".
Prognathism of lower jaw

Retrognathism of lower jaw
Macroglossia
Screening

- All adults who answer yes to either question:
  - Are they dissatisfied with their sleep?
  - Do they have daytime sleepiness?

- Patients with risk factors
  - Obesity, especially BMI >35 kg/m2
  - Family history of obstructive sleep apnea
  - Retrognathia
  - Treatment-resistant hypertension
  - CHF, atrial fibrillation, stroke
  - Type 2 diabetes

- Patients with high-risk driving occupations or daytime sleepiness + motor vehicle crash
Table 2—Patients at High Risk for OSA Who Should Be Evaluated for OSA Symptoms

<table>
<thead>
<tr>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obesity (BMI &gt; 35)</td>
</tr>
<tr>
<td>Congestive heart failure</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
</tr>
<tr>
<td>Treatment refractory hypertension</td>
</tr>
<tr>
<td>Type 2 diabetes</td>
</tr>
<tr>
<td>Nocturnal dysrhythmias</td>
</tr>
<tr>
<td>Stroke</td>
</tr>
<tr>
<td>Pulmonary hypertension</td>
</tr>
<tr>
<td>High-risk driving populations</td>
</tr>
<tr>
<td>Preoperative for bariatric surgery</td>
</tr>
</tbody>
</table>
Screening tools

1. **Epworth questionnaire**
   - Probability of falling asleep on a scale of increasing probability from 0 to 3 for eight different situations

2. **Berlin questionnaire** (primary care setting)
   - 10 items
   - Snoring severity, significance of daytime sleepiness, witnessed apnea, obesity, hypertension

3. **STOP-BANG screening test** (preoperative setting)
   - 8 items
   - STOP: Snoring, Tired, Observed apnea, high blood Pressure history
   - BANG: elevated BMI, Age > 50, increased Neck circumference, Gender male
### Table 3—Questions about OSA that Should Be Included in Routine Health Maintenance Evaluations

- Is the patient obese?
- Is the patient retrognathic?
- Does the patient complain of daytime sleepiness?
- Does the patient snore?
- Does the patient have hypertension?

### Table 4—OSA Symptoms that Should Be Evaluated during a Comprehensive Sleep Evaluation

- Witnessed apneas
- Snoring
- Gasping/choking at night
- Excessive sleepiness not explained by other factors
- Nonrefreshing sleep
- Total sleep amount
- Sleep fragmentation/maintenance insomnia
- Nocturia
- Morning headaches
- Decreased concentration
- Memory loss
- Decreased libido
- Irritability
<table>
<thead>
<tr>
<th>Table 5—Components of Patient Education Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Findings of study, severity of disease</td>
</tr>
<tr>
<td>Pathophysiology of OSA</td>
</tr>
<tr>
<td>Explanation of natural course of disease and associated disorders</td>
</tr>
<tr>
<td>Risk factor identification, explanation of exacerbating factors, and risk factor modification,</td>
</tr>
<tr>
<td>Genetic counseling when indicated</td>
</tr>
<tr>
<td>Treatment options</td>
</tr>
<tr>
<td>What to expect from treatment</td>
</tr>
<tr>
<td>Outline the patient’s role in treatment, address their concerns, and set goals</td>
</tr>
<tr>
<td>Consequences of untreated disease</td>
</tr>
<tr>
<td>Drowsy driving/sleepiness counseling</td>
</tr>
<tr>
<td>Patient quality assessment and other feedback regarding evaluation</td>
</tr>
</tbody>
</table>
The Goldstandard

• Overnight in-laboratory polysomnographic evaluation (PSG)
  – Gold standard diagnostic method for OSA at any age

• Polysomnography in the sleep laboratory
  – Standard method for diagnosis and determining severity of Dx
  – Assesses other sleep disorders
PSG report: **Important** variables

- Apnea-hypopnea index (AHI)
  - Episodes of apnea and hypopnea per hour of sleep
    - Mild OSA: AHI ≥5 and <15/h
    - Moderate OSA: AHI ≥15 and <30
    - Severe OSA: AHI ≥30
  - Apnea: airflow reduction by ≥90% from baseline for ≥10 sec
  - Hypopnea: airflow reduction by ≥30% for ≥10 sec plus 3% OxyHb desaturation or arousal from sleep
  - total sleep time
- EEG, EMG chin and limbs, EOG, HR, SpO2, thoracic and abdominal bands, oral thermistor and nasal pressure.
Type 1
High pretest probability of moderate to severe OSA by sleep specialist

No

In-laboratory PSG

Yes

Sleep study by portable monitoring

No

OSA diagnosed?

Yes

Treatment

Other co-morbidities that can affect the study?
Type 3

- Ambulatory home sleep study: portable home study
  - Should be used for patients with high pretest probability of OSA
  - No comorbid sleep conditions
  - No major comorbid diseases such as COPD, CHF
  - Uses oximetry, respiratory monitoring of effort, airflow, snoring, cardiac monitoring, and body position
Type 3
# Sleep Summary

## Apnea/Hypopnea

<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyzed Time</td>
<td>585.2 minutes</td>
<td></td>
</tr>
<tr>
<td>Apnea (A) + Hypopnea w/ 3% desat (H3) + Hypopnea w/ Arousal (HA):</td>
<td>383</td>
<td>48.9 / h</td>
</tr>
<tr>
<td>Supine A+H3+HA:</td>
<td>232</td>
<td>65.5 / h</td>
</tr>
<tr>
<td>Non-Supine A+H3+HA:</td>
<td>151</td>
<td>35.2 / h</td>
</tr>
<tr>
<td>Apnea + Hypopnea w/ 4% desat (A+H4):</td>
<td>282</td>
<td>36.0 / h</td>
</tr>
<tr>
<td>Supine A+H4:</td>
<td>205</td>
<td>57.9 / h</td>
</tr>
<tr>
<td>Non-Supine A+H4:</td>
<td>77</td>
<td>17.9 / h</td>
</tr>
</tbody>
</table>

## Position

<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supine Time:</td>
<td>212.4 minutes</td>
<td>36.3 %</td>
</tr>
<tr>
<td>Non-Supine Time:</td>
<td>257.6 minutes</td>
<td>44.0 %</td>
</tr>
<tr>
<td>Upright Time:</td>
<td>115.2 minutes</td>
<td>19.7 %</td>
</tr>
<tr>
<td>Movement Time:</td>
<td>- minutes</td>
<td>- %</td>
</tr>
</tbody>
</table>

## Oxygen Saturation

<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Oxygen Saturation:</td>
<td>95.9 %</td>
<td></td>
</tr>
<tr>
<td>Oxygen Desaturation Events:</td>
<td>235</td>
<td>30.2 / h</td>
</tr>
<tr>
<td>OD &gt;= 3%:</td>
<td>235</td>
<td>30.2 / h</td>
</tr>
<tr>
<td>OD &gt;= 4%:</td>
<td>87</td>
<td>11.2 / h</td>
</tr>
</tbody>
</table>

## Snoring

<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snore Time:</td>
<td>10.5 minutes</td>
<td>2.3 %</td>
</tr>
<tr>
<td>Number of Snoring Episodes:</td>
<td>234</td>
<td></td>
</tr>
</tbody>
</table>
SpO2 Report --- OxyMetry Report

User Information
Name: [Redacted]
Sex: Female
Recording Date (mm/dd/yy): 05/28/15
Time: 10:00:00
Height / cm: [Redacted]
Duration: 09:08:27
Weight / kg: [Redacted]
Analysed: 09:08:27

Comments

<table>
<thead>
<tr>
<th>Event Data</th>
<th>SpO2</th>
<th>Pulse</th>
<th>%SpO2 Level Events</th>
<th>Below(%)</th>
<th>Time(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Events</td>
<td>5</td>
<td>147</td>
<td></td>
<td>100</td>
<td>100.0</td>
</tr>
<tr>
<td>Time In Events(min)</td>
<td>4.5</td>
<td>90.1</td>
<td>94 - 95</td>
<td>95</td>
<td>8.8</td>
</tr>
<tr>
<td>Avg. Event Dur.(sec)</td>
<td>54.6</td>
<td>36.8</td>
<td>89 - 90</td>
<td>90</td>
<td>0.0</td>
</tr>
<tr>
<td>Index (1/hr)</td>
<td>0.5</td>
<td>0.1</td>
<td>84 - 85</td>
<td>85</td>
<td>0.0</td>
</tr>
<tr>
<td>% Artifact</td>
<td>0.1</td>
<td>0.1</td>
<td>79 - 75</td>
<td>80</td>
<td>0.0</td>
</tr>
<tr>
<td>Adjusted Index (1/hr)</td>
<td>0.5</td>
<td>16.1</td>
<td>74 - 70</td>
<td>75</td>
<td>0.0</td>
</tr>
<tr>
<td>% SpO2 Data</td>
<td></td>
<td></td>
<td>69 - 65</td>
<td>70</td>
<td>0.0</td>
</tr>
<tr>
<td>Basal SpO2(%)</td>
<td>96.2</td>
<td></td>
<td>64 - 62</td>
<td>65</td>
<td>0.0</td>
</tr>
<tr>
<td>Time(min) &lt; 88%</td>
<td>0.0</td>
<td></td>
<td>59 - 55</td>
<td>60</td>
<td>0.0</td>
</tr>
<tr>
<td>Events &lt; 88%</td>
<td>0</td>
<td></td>
<td>54 - 50</td>
<td>55</td>
<td>0.0</td>
</tr>
<tr>
<td>Minimum SpO2(%)</td>
<td>92</td>
<td></td>
<td>49 - 45</td>
<td>50</td>
<td>0.0</td>
</tr>
<tr>
<td>Avg. Low SpO2(%)</td>
<td>93.4</td>
<td></td>
<td>44 - 40</td>
<td>45</td>
<td>0.0</td>
</tr>
<tr>
<td>Avg. Low SpO2 &lt; 88%</td>
<td></td>
<td></td>
<td>39 - 35</td>
<td>40</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Pulse Data
Avg Pulse Rate (bpm): 58.9
Low Pulse Rate (bpm): 45

Analysis Parameters
Desaturation Event: drop in SpO2 by at least 4% for a minimum duration of 10 seconds.
Pulse Event: Change in rate by at least 6 bpm for a minimum duration of 8 seconds.

Graphic Summary
SpO2 (10% per division)

Pulse Rate (10 bpm per division)

SpO2 at (100)
(% Time)

SpO2 Events at 10
Events
Specialist or Sleep study
Which one first?

- Sleep specialist evaluation recommended
  - Complex sleep-disordered breathing processes suspected
  - Other sleep disorder suspected
  - To ensure proper diagnostic tests ordered

- Prior evaluation not needed in other cases
  - But clinician should discuss options with patient first
  - Explain OSA therapy and why it may be initiated
Lifestyle changes

- For milder cases of obstructive sleep apnea, your doctor may recommend lifestyle changes:
  - Lose weight if you're overweight.
  - Exercise regularly.
  - Drink alcohol moderately, if at all, and don't drink several hours before bedtime.
  - Quit smoking.
  - Use a nasal decongestant or allergy medications.
  - Don't sleep on your back.
Positive Airway Pressure Therapy (PAP)
Splinting of airway
Traction on airway
Positive intrathoracic pressure
Positive airway pressure
Decreased venous return
Decreased afterload
Increased cardiac output
Increased lung volume
Alternative treatments
# Recommendations

<table>
<thead>
<tr>
<th>Recommendation Statement</th>
<th>Strength of Recommendation</th>
<th>Quality of Evidence</th>
<th>Benefits versus Harms/Burdens Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Use of Oral Appliances for Treatment of Primary Snoring in Adults</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We recommend that sleep physicians prescribe oral appliances, rather than no therapy, for adult patients who request treatment of primary snoring (without obstructive sleep apnea).</td>
<td>STANDARD</td>
<td>High</td>
<td>Benefits clearly outweigh harms</td>
</tr>
<tr>
<td><strong>The Use of Oral Appliances for Treatment of Obstructive Sleep Apnea in Adults</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When oral appliance therapy is prescribed by a sleep physician for an adult patient with obstructive sleep apnea, we suggest that a qualified dentist use a custom, titratable appliance over non-custom oral devices.</td>
<td>GUIDELINE</td>
<td>Low</td>
<td>Benefits clearly outweigh harms</td>
</tr>
<tr>
<td>We recommend that sleep physicians consider prescription of oral appliances, rather than no treatment, for adult patients with obstructive sleep apnea who are intolerant of CPAP therapy or prefer alternate therapy.</td>
<td>STANDARD</td>
<td>Moderate</td>
<td>Benefits clearly outweigh harms</td>
</tr>
<tr>
<td>We suggest that qualified dentists provide oversight—rather than no follow-up—of oral appliance therapy in adult patients with obstructive sleep apnea, to survey for dental-related side effects or occlusal changes and reduce their incidence.</td>
<td>GUIDELINE</td>
<td>Low</td>
<td>Benefits clearly outweigh harms</td>
</tr>
<tr>
<td>We suggest that sleep physicians conduct follow-up sleep testing to improve or confirm treatment efficacy, rather than conduct follow-up without sleep testing, for patients fitted with oral appliances.</td>
<td>GUIDELINE</td>
<td>Low</td>
<td>Benefits clearly outweigh harms</td>
</tr>
<tr>
<td>We suggest that sleep physicians and qualified dentists instruct adult patients treated with oral appliances for obstructive sleep apnea to return for periodic office visits—as opposed to no follow-up—with a qualified dentist and a sleep physician.</td>
<td>GUIDELINE</td>
<td>Low</td>
<td>Benefits clearly outweigh harms</td>
</tr>
</tbody>
</table>
Meta-analysis of randomised controlled trials of oral mandibular advancement devices and continuous positive airway pressure for obstructive sleep apnoea-hypopnoea

Linda D. Sharples a,b,*; Abigail L. Clutterbuck-James c; Matthew J. Glover d; Maxine S. Bennett b; Rebecca Chadwick e; Marcus A. Pittman c; Timothy G. Quinnell c

Summary of studies (n = 71 studies with 77 comparisons)

- CPAP vs. Control n = 52
- MAD vs. Control n = 12
- CPAP vs. MAD n = 13
Study ID | ES (95% CI) | % Weight
--- | --- | ---
Mild
Duran 2002 | -14.00 (-24.66, -3.34) | 5.72
Quinnell 2014 | -4.70 (-6.25, -3.15) | 19.83
Subtotal (I-squared = 65.1%, p = 0.091) | -7.79 (-16.38, 0.79) | 25.55

Moderate
Aarab 2011 | -9.10 (-15.51, -2.69) | 10.67
Barnes 2004 | -6.30 (-9.36, -3.24) | 17.18
Gotsopoulos 2002 | -15.00 (-22.27, -7.73) | 9.36
Hans 1997 | -25.70 (-54.86, 3.46) | 1.00
Lam 2007 | -9.90 (-15.82, -3.98) | 11.50
Mehta 2001 | -16.00 (-23.37, -8.63) | 9.22
Subtotal (I-squared = 52.0%, p = 0.064) | -10.72 (-14.59, -6.85) | 58.93

Severe
Blanco 2005 | -2.10 (-12.33, 8.13) | 6.07
Johnston 2002 | -14.82 (-25.35, -4.29) | 5.83
Petri 2008 | -6.70 (-20.97, 7.57) | 3.63
Subtotal (I-squared = 31.6%, p = 0.232) | -7.95 (-15.94, 0.05) | 15.52
Overall (I-squared = 60.4%, p = 0.005) | -9.29 (-12.28, -6.30) | 100.00

NOTE: Weights are from random effects analysis
Événements associés à position
Surgical treatment

- Tracheostomy
- UPPP +/- tonsillectomy
- MMA
- LAUP
- RAUP
<table>
<thead>
<tr>
<th>Table 6—General OSA Outcomes Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution of sleepiness</td>
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<tr>
<td>OSA specific quality of life measures</td>
</tr>
<tr>
<td>Patient and spousal satisfaction</td>
</tr>
<tr>
<td>Adherence to therapy</td>
</tr>
<tr>
<td>Avoidance of factors worsening disease</td>
</tr>
<tr>
<td>Obtaining an adequate amount of sleep</td>
</tr>
<tr>
<td>Practicing proper sleep hygiene</td>
</tr>
<tr>
<td>Weight loss for overweight/obese patients</td>
</tr>
</tbody>
</table>
Take Home Messages
Who to suspect

• Fat boy Joe or Jane
• Ask the partner
• Look into habits
• Co-morbidities
• Family
• Remember high-risk occupations
How to diagnose them

• Different levels
• At home or in lab
• Specialist or sleep study
What treatment to choose

- Behavioral
- Positive pressure
- Oral appliances
- Oral Surgery
- Bariatric surgery
- Positional
- Pharmacological
- ...
When you hesitate...

Get in touch with us!

• Complicated case
• Type 1 or Type 3 inconclusive
• Choosing between best types of investigation
• Suggestion for treatment
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  – Phone: 514-994-1271

• Work
  – Charles Moyne Hospital
  – Phone: 450-466-5000
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