

# Sleep Disordered Breathing

Sources: Dr. Bahamam's slides and notes

Doctor's notes in blue color

## Introduction

**What is Sleep Disordered Breathing?** Is used to describe a group of disorders characterized by abnormalities of the respiratory pattern or ventilation during sleep.

**Hypopnea:** FYI partial cessation of the airflow

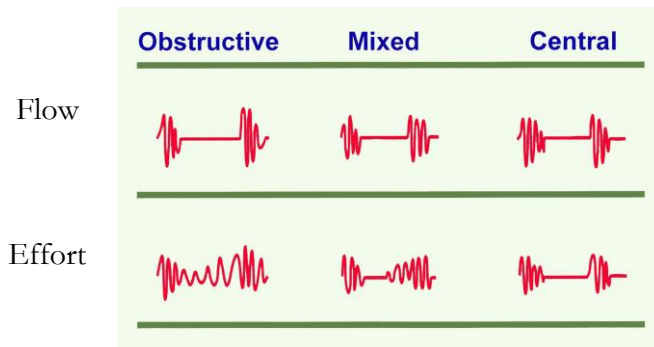
**What is sleep Apnea?** Defined as a cessation of airflow for a minimum of 10 seconds.

**Categories of Sleep Apnea:**

- A. Obstructive Events
- B. Central Events
- C. Mixed Events

**Is it familial?** Genetic plays important role

**Apnea pattern:**



in obstructive there's No flow but there's effort  
In central there's No flow and No effort

## Obstructive sleep apnea (OSA)

**What is OSA?**

- Criteria **A** & **B**
- **Or** Criteria **C**

**A** The presence of one or more of the following: symptoms of sleep apnea

1. The patient complains of sleepiness, nonrestorative sleep, fatigue, or insomnia symptoms.
2. The patient wakes with breath holding, gasping, or choking.
3. The bed partner or other observer reports habitual snoring, breathing interruptions, or both during the patient's sleep.
4. The patient has been diagnosed with hypertension, a mood disorder, cognitive dysfunction, coronary artery disease, stroke, congestive heart failure, atrial fibrillation, or type 2 diabetes mellitus.

**B** Polysomnography (PSG) or OCST1 demonstrates (apnea hypopnea index):

> 5 predominantly obstructive respiratory events (obstructive and mixed apneas, hypopneas, or respiratory effort related arousals [RERAs]) per hour of sleep during a PSG or per hour of monitoring (OCST). عدد مرات انقطاع النفس اثناء النوم ٥ مرات او اكثر خلال الساعة

**C** PSG or OCST demonstrates:

≥ 15 events predominantly obstructive respiratory events (apneas, hypopneas, or RERAs) 3 per hour of sleep during a PSG or per hour of monitoring(OCST). Regardless the presence of symptoms اذا عدد مرات انقطاع النفس خلال الساعة ١٥ مره او اكثر فهنا على طول نخصصها بالابو بستر كف سليب ابنيا

## OSA Severity Criteria:

Severity	AHI (apnea hypopnea index) event/hours
Normal	<5
Mild	5 to ≤ 15
Moderate	15 – 30
Severe	>30

## Clinical Features of OSA:

### 1. Nocturnal Symptoms

- Snoring: **Loud and intermitted**
- 40% of men, 20% of women report habitual snoring
- Associated with considerable social and marital hazard

### 2. Daytime Sleepiness **doesn't happen in all pt**

- *Differential diagnosis includes:* Insufficient Sleep - Medical and psychological disorders - Medications

### 3. Nocturnal Choking /Gaspings

- Bed partners may recognize this more commonly than the patient.

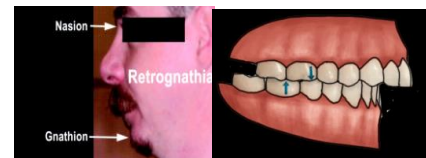
4. Nocturia: **why? In OSA there will be hypoxemia → constriction in the pulmonary artery → increase the load in the right side of the heart → فيفسرها القلب انها فوليوم او فورلود فيفرز → secrete the atrial natriuretic peptide → diuresis**
- Can be missed diagnose in middle age men by prostate hypertrophy and in women by neurogenic bladder

- Nocturnal sweating
- Morning headache
- Dry mouth and throat on awakening
- Nocturnal chest pain
- Nocturnal reflux symptoms
- Unrefreshing sleep
- Interrupted sleep
- Impotence
- ↓Memory and concentration
- Altered mood
- Excessive dreams and Nightmares**

## What are the risk factors?

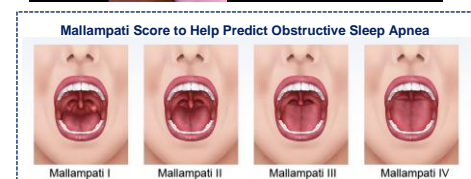
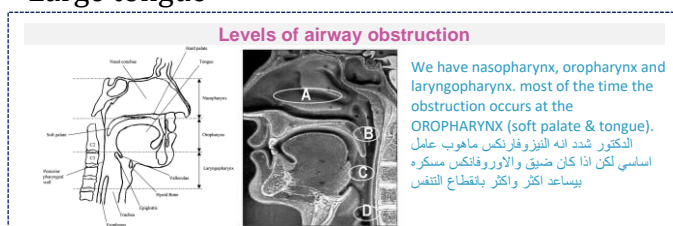
### 1. Structural Abnormalities:

- ✧ Short Fat Neck (Neck circumference >17"/16") **THICK NECK IS THE MOST IMPORTANT RISK FACTOR (imp than obesity)**
- ✧ Small Mandible اللسان بيسكر مجرى الهواء
- ✧ Retrognathia: overbite



### 2. Upper airway narrowing:

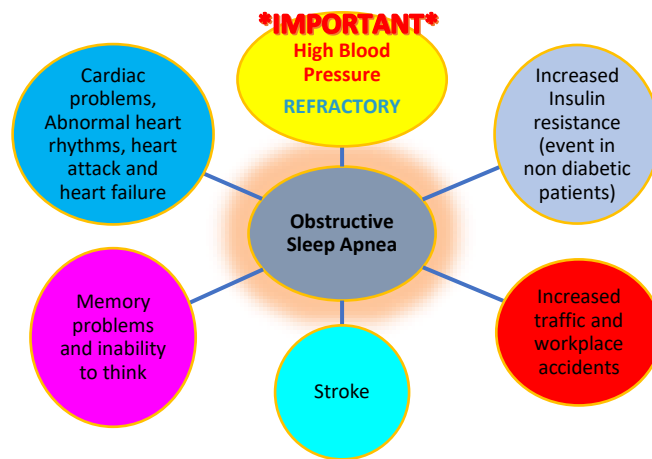
- ✧ Large tonsils / adenoids
- ✧ Long uvula
- ✧ Large tongue



### 3. Obesity

- ✧ Strongest risk factor for OSA.
- ✧ present in >60% of patients referred for a diagnostic sleep evaluation. **Not all OSA are obese**

## OSA and Medical Comorbidity:



### Treatment:

#### 1. General Measures:

These measures should be tried in all patients with OSDB: **usually doesn't work**

- Weight loss: Weight loss is like getting into heaven..... It is SIMPLE but it is not EASY =))
- Avoidance of alcohol & sedatives
- Sleep position: Try sleeping on the side.
- Driving and operation of heavy machinery

#### 2. Specific Measures:

- **Continuous Positive Airway Pressure (CPAP): "Is the gold standard treatment"**

##### - Benefit of CPAP:

- ✘ Improves quality of life even in mild OSA
- ✘ Improves bed partner sleep
- ✘ Improves daytime sleepiness
- ✘ Decreases motor vehicle accident
- ✘ Improves hypertension
- ✘ Increases ejection fraction in systolic CHF
- ✘ Improves insulin resistance
- ✘ Decreases inflammatory markers CRP (C-reactive protein)



- **Intra - Oral Appliances** مايتكلم عنها عشان الوقت
- **Surgical Treatment**
- **Hypoglossal Nerve Stimulation** تخلي اللسان طالع على برى عشان يتفتح مجرى التنفس

### Conclusions:

- Nasal CPAP is the treatment of choice
- Successful treatment in 95% of patients
- Not as costly as surgery
- Long term compliance 60-70%
- Improve long term survival
- Can re-titrate the pressure if the patient's clinical condition changes

# Obesity Hypoventilation Syndrome

## Definition:

- Is defined by extreme obesity and alveolar hypoventilation during wakefulness.
  - Obesity
  - PaCO<sub>2</sub> >45
  - PaO<sub>2</sub> <70
  - Absence of significant pulmonary disease
- ✧ It's not OSA but 90% of these pt have OSA

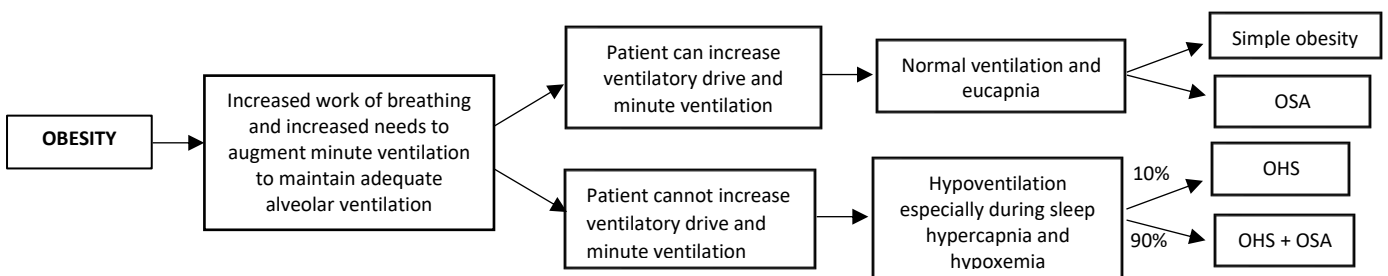
## Criteria A-C must be met:

<b>A</b>	Presence of hypoventilation during wakefulness (PaCO <sub>2</sub> > 45 mm Hg) as measured by arterial PCO <sub>2</sub> , end-tidal PCO <sub>2</sub> , or transcutaneous PCO <sub>2</sub> .
<b>B</b>	Presence of obesity (BMI > 30 kg/m <sup>2</sup> ; > 95th percentile for age and sex for children).
<b>C</b>	Hypoventilation is not primarily due to <ul style="list-style-type: none"> <li>▪ lung diseases,</li> <li>▪ medication use,</li> <li>▪ neurologic disorder,</li> <li>▪ muscle weakness,</li> <li>▪ or a known congenital or idiopathic central alveolar hypoventilation syndrome.</li> </ul>

## Clinical Features:

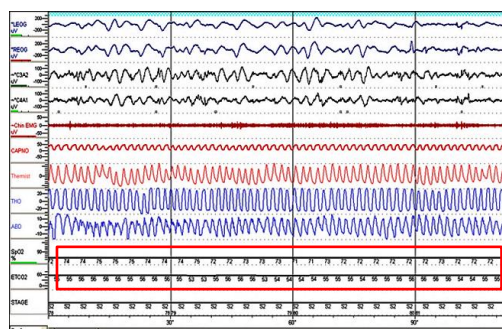
1. Extreme obesity
2. Middle-aged
3. Significant sleep-disordered breathing (fatigue, hypersomnolence, snoring, morning headache)
4. Prone to develop severe pulmonary hypertension and diastolic dysfunction.

## Pathophysiology:



**Prevalence:** disease of postmenopausal women

**Treatment:** we can treat them by CPAP or PiPAP

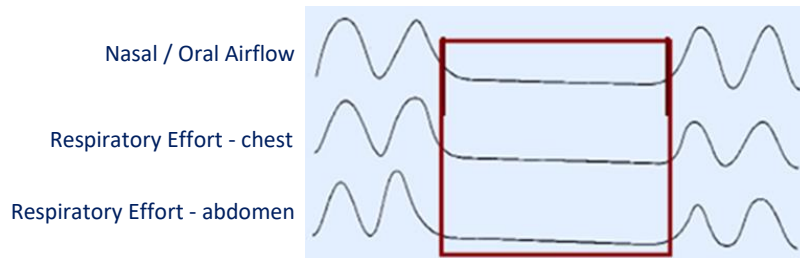


SUSTAINED HYPOXEMIA

# Central Sleep Apnea

## Definition:

- Is a disorder of decreased breathing rate or depth, particularly during sleep due to a transient reduction or withdrawal of central output to the respiratory muscles (the diaphragm and intercostal muscles). Usually seen in children due to congenital diseases, but can be seen in adult with heart failure (Cheyne stoke respiration)
  - Other cause of central sleep apnea is: Treatment-emergent central sleep apnea characterized by the development of central sleep apnea during the initiation of CPAP in patients with obstructive sleep apnea.



Absent inspiratory effort throughout the entire period of absent airflow.

## Cheyne Stokes Respiration:

- breathing pattern characterized by regular “crescendo-decrescendo” fluctuations in respiratory rate and tidal volume.
- More common among patients with heart failure and low ejection fraction. More common in men, thin, old, low CO<sub>2</sub> when they are awake, AFib
- Associated with poor prognosis in patients with heart failure.

### Diagnostic Criteria:

(A or B) + C + D satisfy the criteria

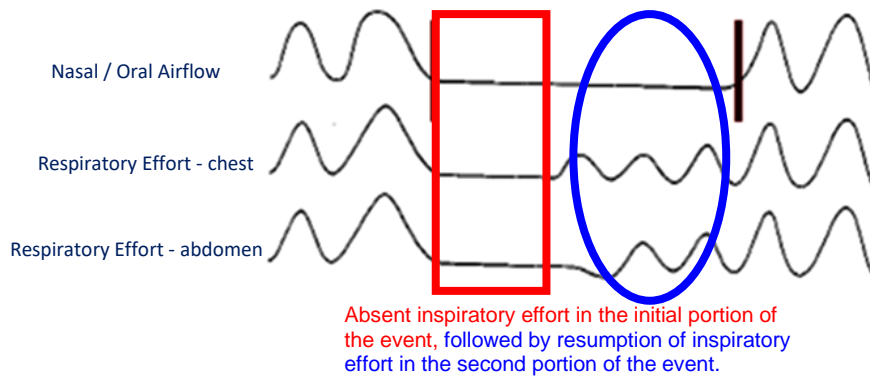
<b>A</b>	The presence of one or more of symptoms
<b>B</b>	The presence of: <ul style="list-style-type: none"> <li>atrial fibrillation/flutter,</li> <li>congestive heart failure,</li> <li>or a neurological disorder.</li> </ul>
<b>C</b>	PSG shows all of the following: <ol style="list-style-type: none"> <li>≥ 5 central apneas and/or central hypopneas per hour of sleep.</li> <li>The total number of central apneas and/or central hypopneas is &gt; 50% of the total number of apneas and hypopneas.</li> <li>The pattern of ventilation meets criteria for Cheyne-Stokes breathing (CSB).</li> </ol>

D مالقيتها بسلايد الدكتور ولا اي مكان ثاني

**Treatment:** treat the underlying cause if you optimize the cardia function most of them will not need machine

## Mixed Apnea

- Begins as central apnea followed by obstructive apnea
- Seen in patients with OSA
- Often found in Down's Syndrome



## Key points

- ✧ Sleep Disordered Breathing is an important medical disorder that warrants active investigation by means of a clinical evaluation and polysomnographic sleep studies.
- ✧ Treatment is essential, not only to improve the symptoms that include sleepiness, but also to prevent the development of cardiovascular complications.
- ✧ Effective treatments exist that include behavioral, medical and surgical means; dramatic improvements in patient's wellbeing can be achieved.

## Question

**A breathing pattern characterized by regular “crescendo-decrescendo” fluctuations in respiratory rate and tidal volume.**

- A. Obstructive Apnea
- B. Hypopnea
- C. Cheyne Stokes Respiration
- D. OHS (Obesity Hypoventilation Syndrome)

ANS:C