Obstructive sleep apnea (OSA)

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Definition

- Is characterised by recurrent episodes of partial or complete upper airway collapse during sleep. The collapse is highlighted be reduction in, or complete cessation of, airflow despite ongoing inspiratory efforts

- OSA effects productivity, cognition, coordination, quality of life and cardiovascular health

Epidemiology

- The prevalence of OSA increases from young adulthood through the sixth to seventh decade, then appears to plateau

- The prevalence of an AHI > 5 event/hour in general population has previously been estimated to be 24 % in a male and 9% in female population. When symptoms of sleepiness were also taken into account, the prevalence decreased to 4% in males and 2% in females

- A minimum prevalence of childhood OSAS is estimated to be 2-3% and the prevalence of habitual snoring may be as high as 20%

Pathophysiology

- OSA is characterized by obstructive apneas, hypopneas, and/or respiratory effort-related arousals caused by repetitive collapse of the upper airway during sleep
- The occlusion or narrowing of the upper airway during sleep has been attributed to several factors: abnormal anatomy of upper airway (maxillary or/and mandibular hypoplasia, adenotonsillar hypertrophy,..), pharyngeal muscle factors (impaired strenght and endurance of pharyngeal dilators,..), pharyngeal compliance, sensory function (impaired pharyngeal dilatator reflexes,..), ventilatory control system factors (unsatble ventilatory control,..), sex factors (male influences,..)weight, lung volume dependence of upper airway cross-sectional area.
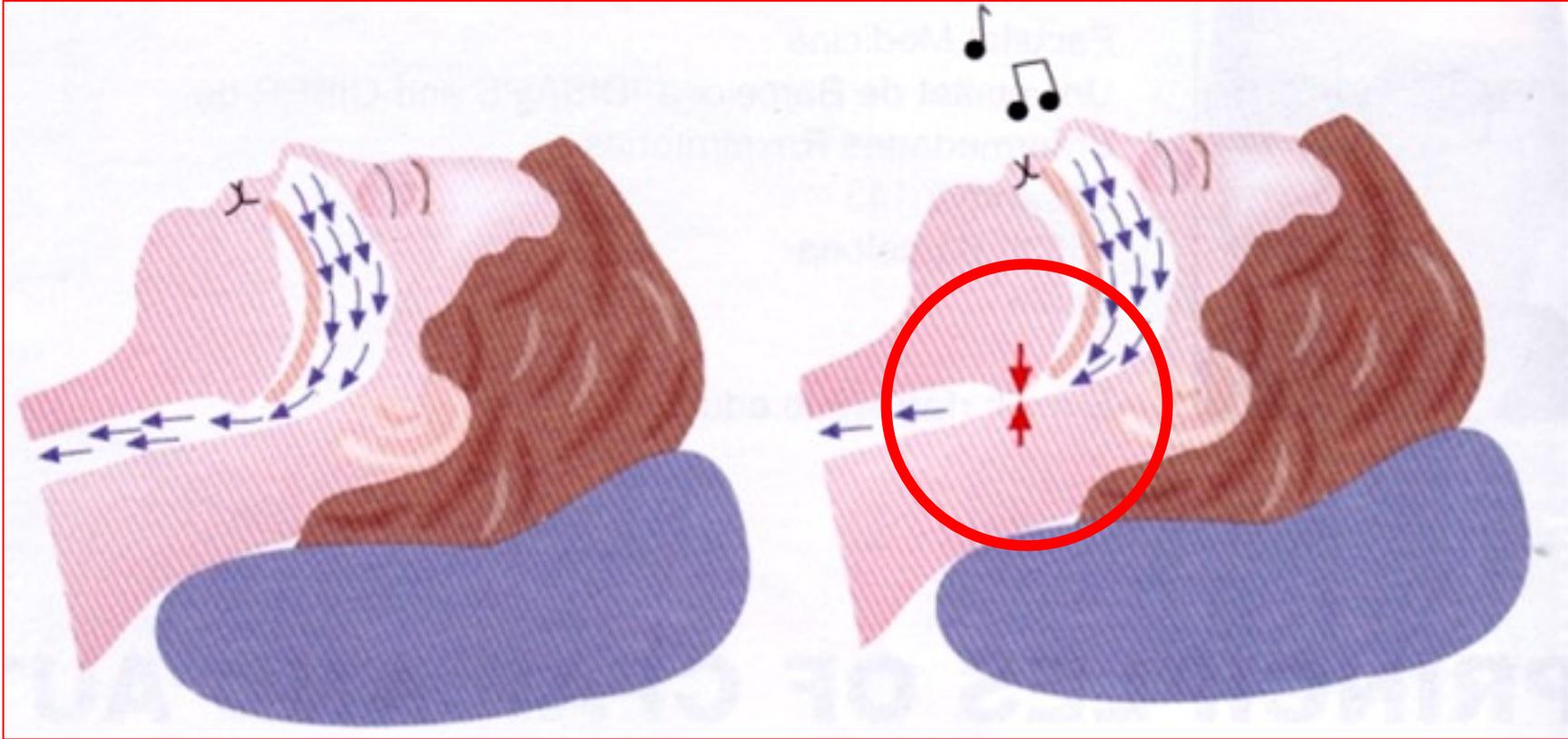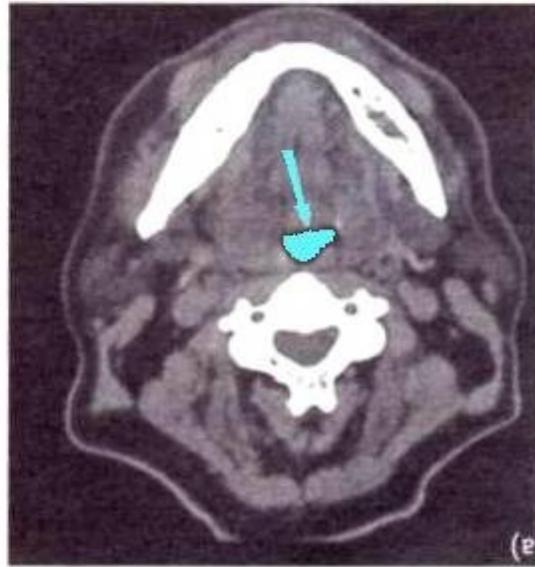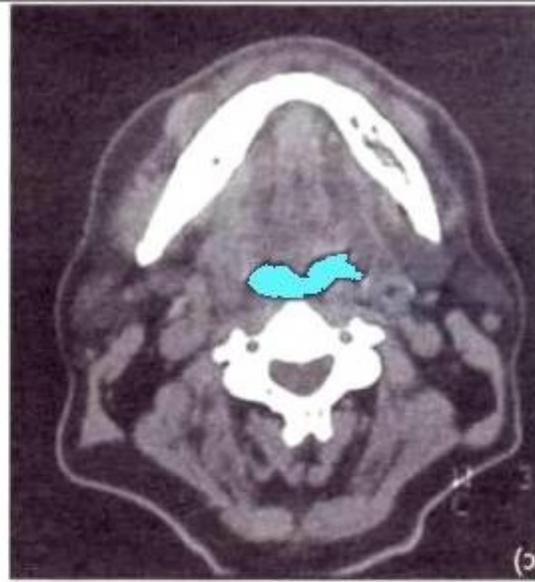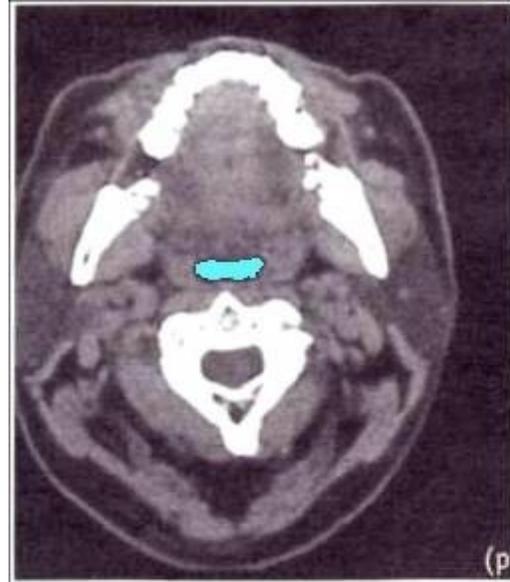
Symptoms

- Most frequent (>60 %): loud snoring, difficulty staying asleep, restless sleep, unrefreshing sleep, nocturia, neuropsychiatric symptoms, sleep partner noticed repeated apneas or loud snoring

- Common (10 % - 60 %): sudden awakenings to restart breathing, sexual dysfunction, night sweats, morning headaches

- Infrequently (<10 %): enuresis, night cought, sleeplessness, gastroesophageal reflux

Risk factors and associated conditions

- obesity
- large neck circumference
- retrognathia, micrognathia
- nasal congestion
- narrow pharynx, enlarged tonsils
- elongated or enlarged uvula
- elongated soft palate
- older age, male gender
- smoking
- family history of snoring or OSA

The Mallampati Classification

I.   II.   III.   IV.

The Mallampati classification is commonly used to quantify airway narrowing, with classes 3 and 4 considered positive for airway narrowing. The Mallampati classification correlates with OSA severity

Adverse outcomes associated with OSA

- Systemic hypertension
- Congestive heart failure
- Coronary artery disease and myocardial infarction
- Arrhythmias
- Pulmonary hypertension
- Stroke
- Depression
- Sexual dysfunction
- Type 2 diabetes mellitus
- Drowsy driving and motor vehicle crashes

Diagnostic strategy

The diagnosis of OSA is based upon the presence or absence of related symptoms, as well as the frequency of respiratory events during sleep (ie, apneas, hypopneas, and respiratory effort-related arousals [RERAs])

Testing for OSA, Polysomnography

- Is the accepted standard

- The sleep EEG recording is the core part of polysomnography

- Includes the recording of sleep signals, respiratory effort, muscle movement and cardiovascular signals

Testing for OSA, Polygraphy

- staff-monitored in the laboratory

- with recording of at least cardiorespiratory parameters and body posture
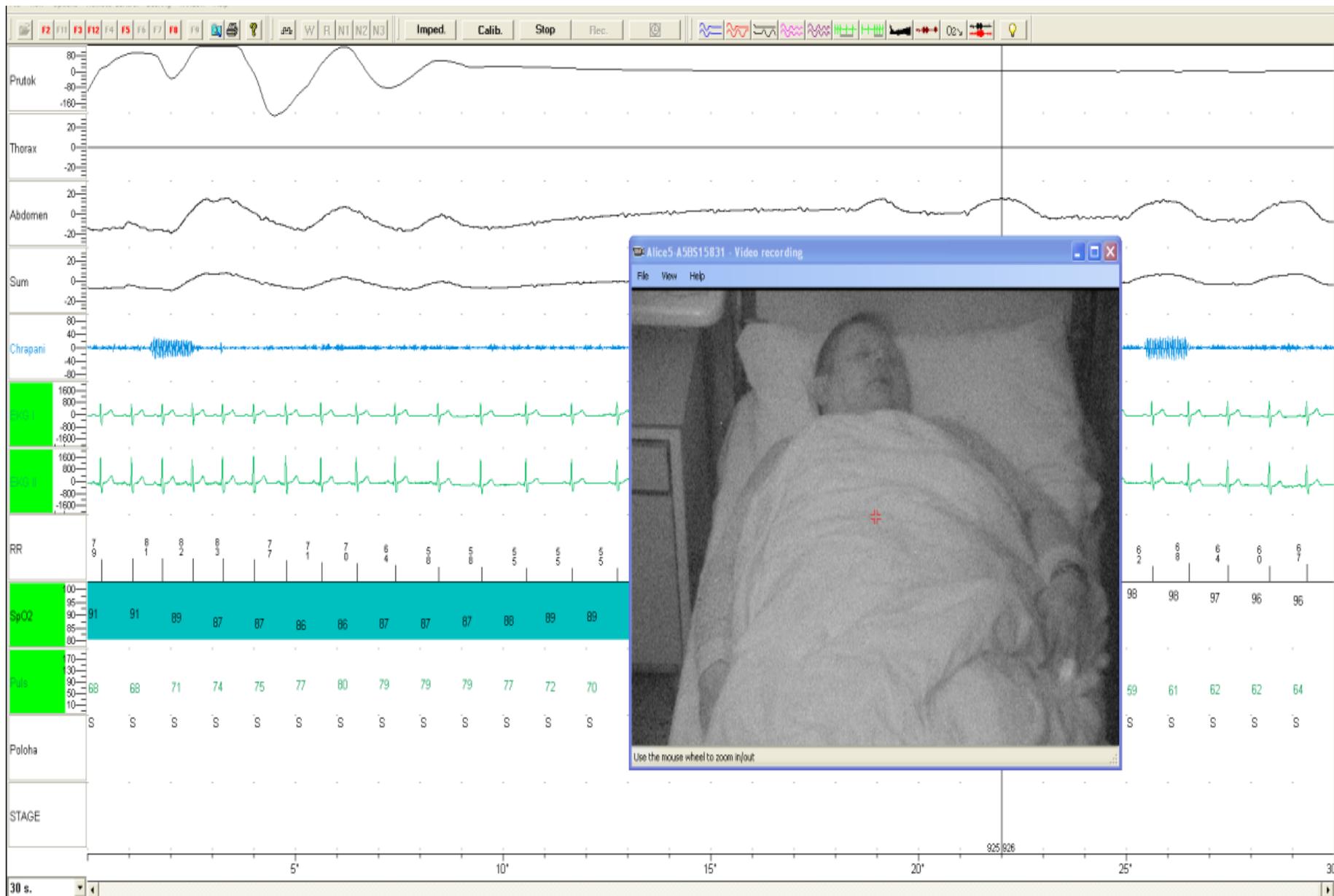
Polygraphy, an example of signals recorded in a sleep lab.

Testing for OSA, Screening

- recording of oxygen saturation and one further parameter (flow mainly)

- attended or unattended

- not suitable for the exclusion or confirmation of mild OSA

The most important results of diagnostic testing for OSA

AHI (apnoe/hypopnoe index) – defined as the number of apneas and hypopneas per hour of sleep

ODI (oxygen desaturation index) – is the number of times per hour of sleep that the blood's oxygen level drop by a certain degree from baseline

T90 – the rate of sleep-time spent below 90% oxygen saturation

Classification, stages of severity

< Normal

5-15 AHI Mild OSA

15-30 AHI Moderate OSA

> 30 AHI Severe OSA

Epworth Sleepnies Scale

- is valuable tool to define the functional impact of the sleep-related breathing events in patients with OSAS

- was constructed with intention to describe the probability of falling asleep in 8 specific situations

- is applied mostly because of simplicity and practicability in routine

Epworth Sleepnies Scale

THE EPWORTH SLEEPINESS SCALE
(To assess risk of Obstructive Sleep Apnea)

Use the following scale to choose the most appropriate number for each situation:-

0 = would never doze
1 = Slight chance of dozing
2 = Moderate chance of dozing
3 = High chance of dozing

| Situation	Chance of dozing
Sitting and reading	
Watching TV	
Sitting, inactive in a public place (e.g. a theatre or a meeting)	
As a passenger in a car for an hour without a break	
Lying down to rest in the afternoon when circumstances permit	
Sitting and talking to someone	
Sitting quietly after a lunch without alcohol	
In a car, while stopped for a few minutes in the traffic	
Total	

Score:

0-10   Normal range
10-12 Borderline
12-24 Abnormal

Differential diagnosis

- primary snoring
- COPD, asthma
- gastroesophageal reflux
- obesity hypoventilation
- psychiatric illnesses
- a variety of diseases with excessive daytime sleepiness

Treatment

- Weight loss and lifestyle changes
- Treatment of comorbidities
- The first-line therapy for treatment of OSA is positive airway pressure (PAP). PAP significantly reduced snoring and daytime sleepiness and improved health-related quality of life and mood. Treatment with PAP is cost-effective, decreases morbidity and mortality due to cardiovascular diseases, and reduces the risk of drowsiness-related traffic accidents
- Alternatives to PAP for the treatment of OSA include a variety of soft tissue and/or maxillary-mandibular surgical interventions
- Mandibular advancing dental devices are a third-line treatment option for some OSA patients intolerant of PAP who are not candidates for surgery
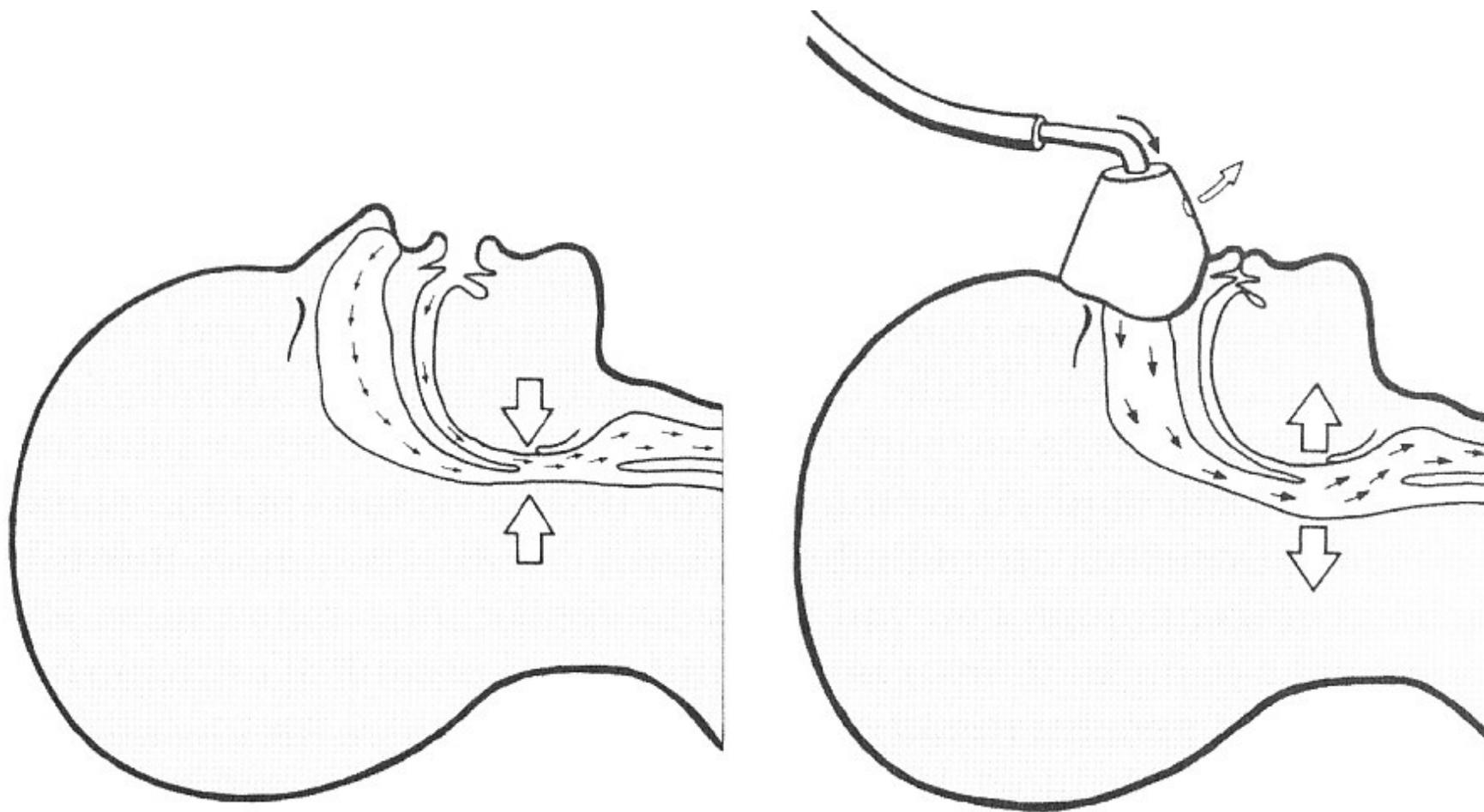
Mechanism of action : CPAP provides „pneumatic stent" for the pharyngeal airway

Principle of CPAP machine
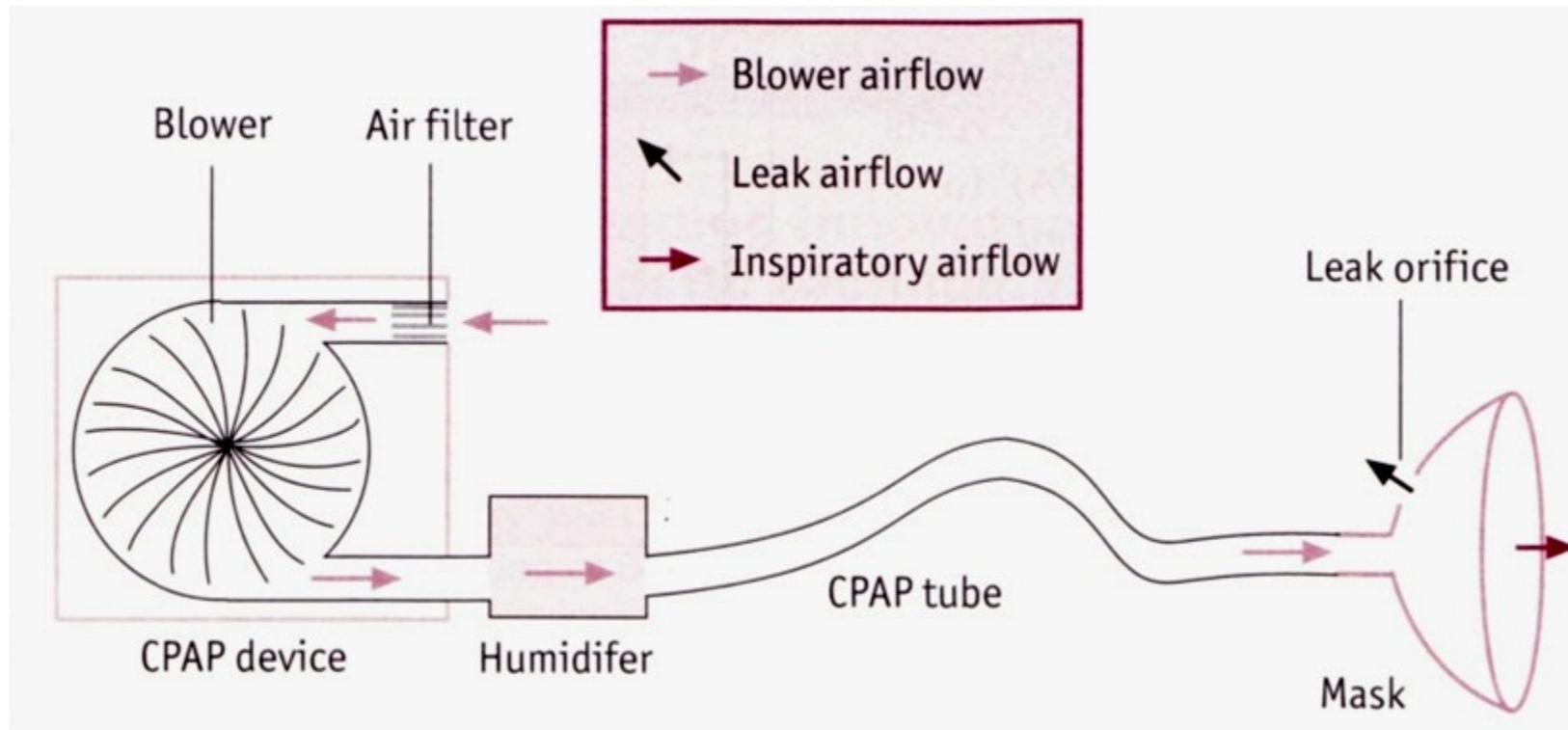
Physicans can use different types of masks and devices

Thank you for your attention