

Beyond Snoring: Understanding Obstructive Sleep Apnea

From Nasal Obstruction To Multilevel Upper-airway Surgery

**CENTRAL CME •
DEPARTMENT OF OTOLARYNGOLOGY &
HEAD NECK SURGERY**

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DEFINITION

- An **OSA** is a sleep disorder that involves cessation or significant decrease in airflow in the presence of breathing effort.
- An **Apnea** is defined as any cessation in breathing for 10 seconds or more with an arterial oxygen desaturation of 2% to 4%.
- A **Hypopnea** is defined as a 50% decrease in airflow for 10 seconds or more with a concomitant drop in arterial oxygen saturation.

CLINICAL SIGNIFICANCE

- Highly prevalent condition with major public health impact
- Associated with cardiovascular, metabolic & neuropsychological complications
- ENT specialists play crucial role in diagnosis and management

EPIDEMIOLOGY

- Prevalence: 9–38% adults
- Higher in elderly
- Male > Female



THE GLOBAL BURDEN IS ENORMOUS

Why ENT should care?

936 M

Mild – Severe OSA

425 M

Moderate – Severe OSA

The burden is likely underestimated because many patients remain undiagnosed

Reference:

Benjafield AV, Ayas NT, Eastwood PR, et al. Estimation of the global prevalence and burden of obstructive sleep apnoea: a literature-based analysis. *Lancet Respir Med*. 2019;7(8):687-698. [https://doi.org/10.1016/S2213-2600\(19\)30198-5](https://doi.org/10.1016/S2213-2600(19)30198-5).

CLINICAL FEATURES



CLINICAL FEATURES

- Snoring
- Fatigue
- Gasping & choking
- Nocturia
- Witnessed breath-holds

- Excessive daytime sleepiness
- Mood changes
- Reduced alertness
- Fragmented sleep
- Unrefreshing sleep



OSA IS NOT JUST A SLEEP PROBLEM

Why every medical department should care about obstructive sleep apnea?

CARDIOLOGY

- **Hypertension**
- Atrial Fibrillation
- Heart Failure
- CAD / Nocturnal events

PULMONOLOGY

- Nocturnal hypoxemia,
- **Pulmonary hypertension**
- Overlap with other sleep-related breathing disorders.

OSA IS NOT JUST A SLEEP PROBLEM

Why every medical department should care about obstructive sleep apnea?

ENDOCRINOLOGY

- Dyslipidemia
- T2DM
- Obesity
- Metabolic risk

NEUROLOGY

- Stroke
- Cognition
- Daytime safety

OSA IS NOT JUST A SLEEP PROBLEM

Why every medical department should care about obstructive sleep apnea?

PAEDIATRICS

- Adenotonsillar hypertrophy
- mouth breathing
- behavioral/learning concerns.

DENTISTRY

- Malocclusion
(Misaligned Teeth)
- High-Arched Palate
- Open Bite
- Dry Mouth and Cavities

OSA IS NOT JUST A SLEEP PROBLEM

Why every medical department should care about obstructive sleep apnea?

ANAESTHESIA / ICU

- Airway
- Sedation
- Opioids
- Postoperative risk

PSYCHIATRY

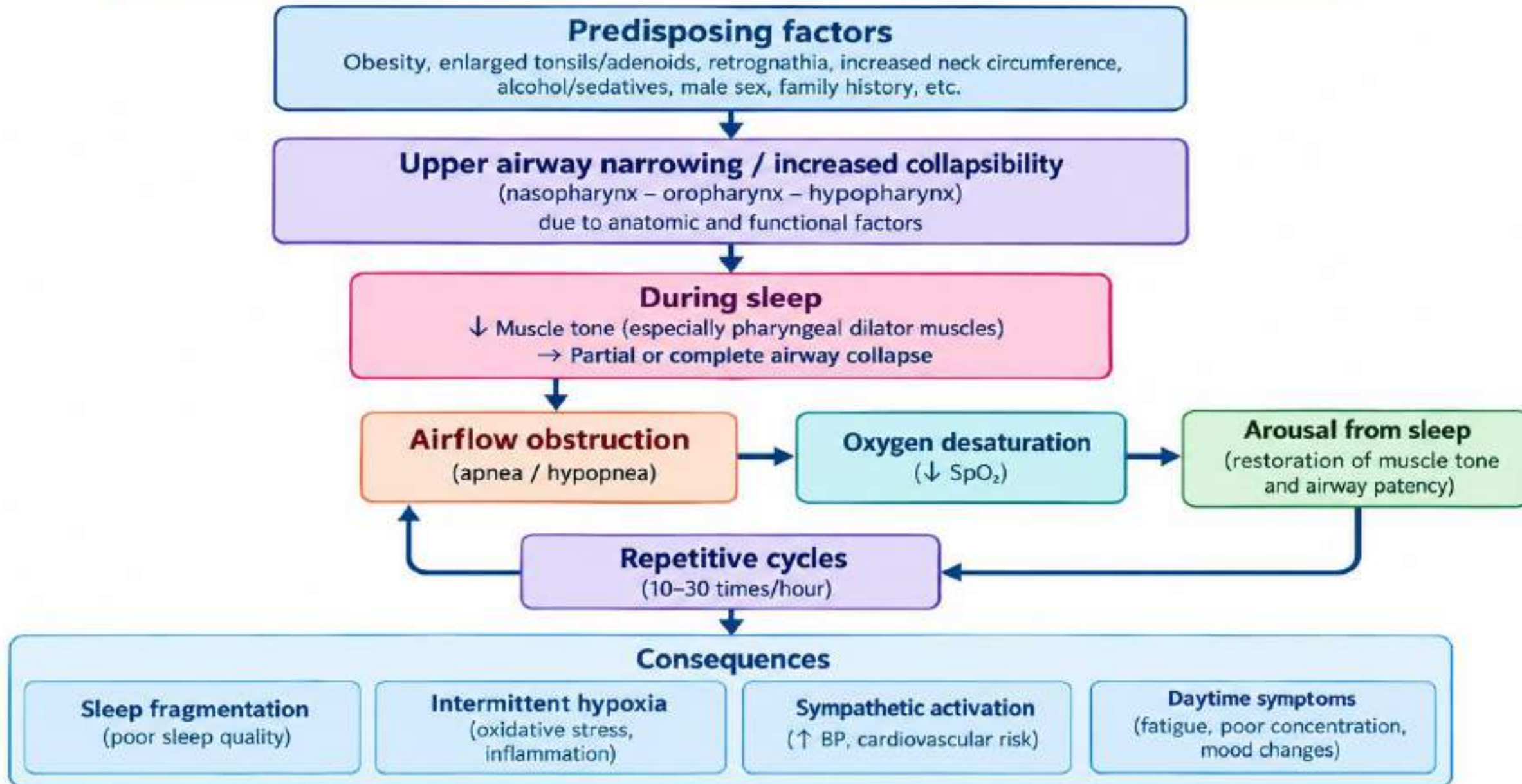
- Depression/anxiety, fatigue, sleep complaints
- Avoid attributing everything to mood.



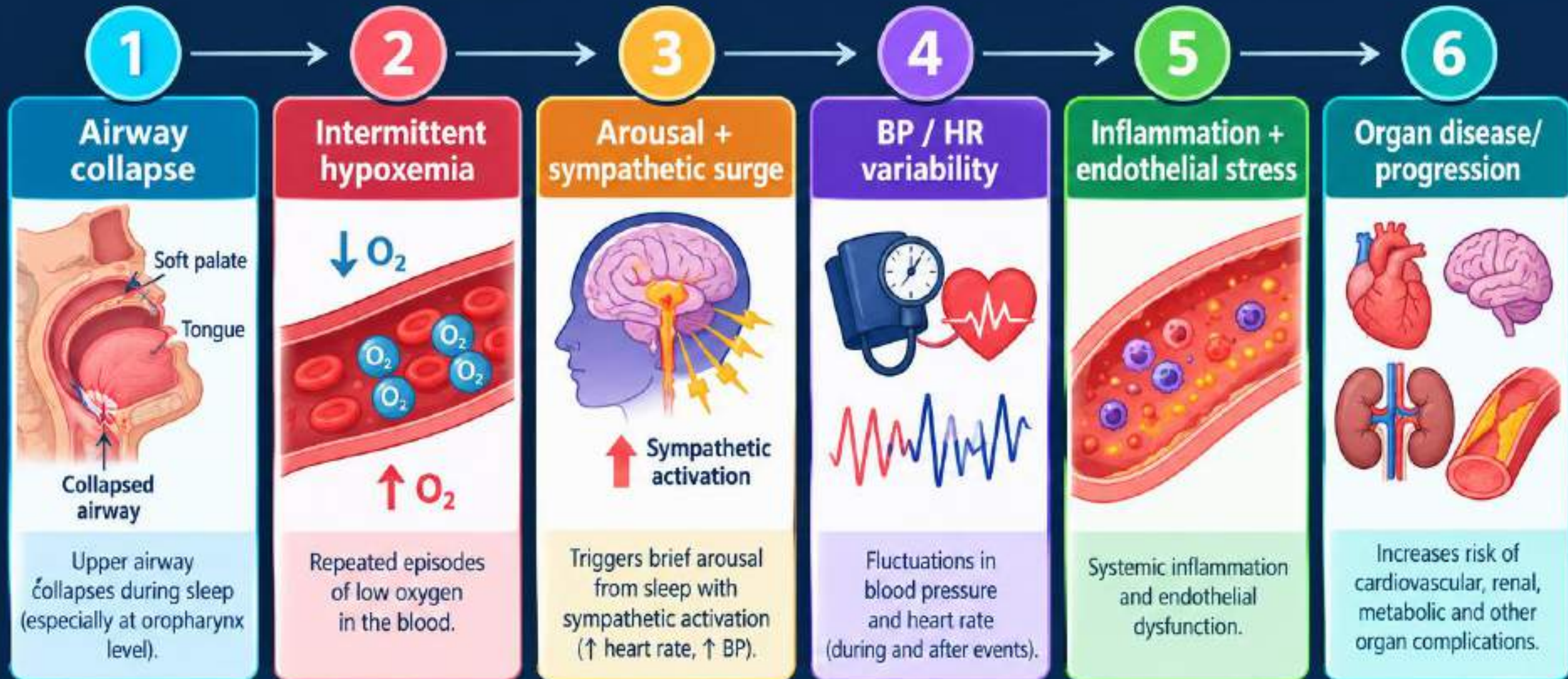
PATHOPHYSIOLOGY



Obstructive Sleep Apnea (OSA) – Pathophysiology



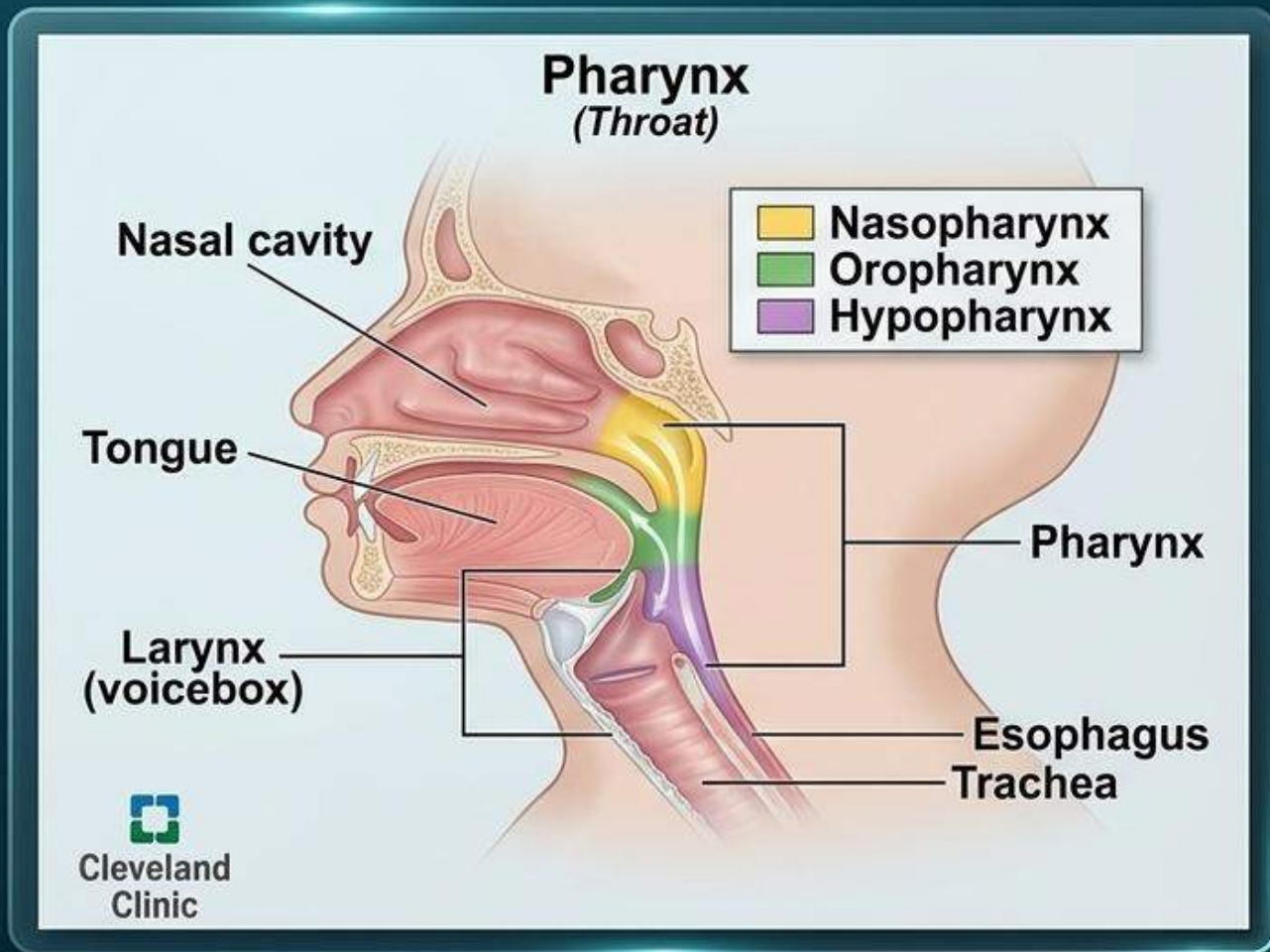
THE OSA "STRESS LOOP"



Where does the airway collapse?

That is where ENT makes the difference.

OSA: ONE SYNDROME, REPEATED AIRWAY COLLAPSE



Nasal Cavity & Septum

Nasopharynx & Adenoid

Soft Palate & Uvula

Tonsils (Palatine)

Tongue Base

Epiglottis & Hypopharynx

Note: Specific sites can involve tissue swelling or muscular collapse.

NOSE → NASOPHARYNX → PALATE → OROPHARYNX → TONGUE BASE → EPIGLOTTIS

CHILD OSA: A DISTINCT PHENOTYPE - ADENOID & TONSIL HYPERTROPHY



Snoring

(Airflow sound in upper airway)



Constant Mouth Breathing

(Due to nasal obstruction)



Restless Sleep

(Tossing, turning, frequent arousals)



Behavioral Concerns

(Irritability, hyperactivity, mood changes)



Bedwetting

(Secondary to disrupted sleep-wake cycles)



Growth Delay

(Poor weight gain or height percentiles)

ADENOID + TONSIL HYPERTROPHY ARE COMMON MAJOR CONTRIBUTORS



Every Doctor Can Be The First Detector



ASK

Snoring? Witnessed apnea? Daytime sleepiness? Morning headache?



LOOK

Obesity, large tonsils, retrognathia, nasal obstruction, resistant hypertension.



ACT

Risk-stratify → arrange objective testing → start an appropriate pathway.

Think OSA in the patient who is “always tired,” snores loudly, or repeatedly desaturates overnight.

POLYSOMNOGRAPHY



Sleep Test (Polysomnography)

(Device used: ResMed- ApneaLink Air)

Patient Name:	Faruk Hossain	Patient ID:	B125
Age:	30 Years 11 months	Sex:	Male
Height:	5.8"	Contact Number:	+88 01618-286023
Weight:	103 KG	Technician:	Syed Islam Akash
BMI:	34.5 kg/m ² (Obese Class II)	Study Time:	Diagnosis 5 Hrs. + Titration 3+ Hrs.
Study Date:	25-Aug-26	Ref. Physician:	Dr. Omar Faruk Sebuji

Parameters Description: Air Flow, SpO2 Sensor, Respiratory Effort Sensor, Chest Belt. The Diagnostic Study was done by ResMed ApneaLink Air. The test device monitors the following information: Respiratory effort, SpO2, Unclassified Apnea, OA, CA, H, MA, Airflow, Flow Lim. Br. with Sn, FI Lim. Br without Sn, Snoring, Pulse rate, CSR.

Sleep Monitoring Summary

Respiratory Events: Respiratory analysis detected the total Apnea-Hypopnea Index (AHI) of 45.1/hr. Apnea Index was 29.6/hrs, where Central Apnea 0.2/hrs. Obstructive Apnea 29.4/hrs and Mixed Apnea 0/hrs. Hypopnea Index was 15.5/hrs. During the Sleep Diagnosis oxygen desaturation index ODI 37.3/hrs., Lowest Oxygen Saturation was 62% and Average oxygen saturation was 90%. **Snoring events: 2798**

Cardiac Events: During the Sleep study the average pulse rate was 77 bpm, the minimum pulse rate was 55 bpm while the maximum pulse rate was 118 bpm.

Cheyne-Stokes Respiration (CSR): 0.0

Diagnosis

Sleep study result: We have found Severe Obstructive Sleep Apnea (AHI 45.1). Oxygen Desaturation (Minimum SpO2 62%)

Titration Summary: In therapeutic study CPAP titration was done with Resmed Aisense 10 Auto CPAP Machine with nasal mask and pressure raised from 4 cmH₂O – 15.6 cmH₂O. Patient used the machine for 3.07 Hours. After the titration we found AHI is normal limit (AHI- 1.2)

(AHI Rating: normal <5, Mild: 5-15, Mod: 15-30, Severe >30)

Conclusion

Severe Obstructive Sleep Apnea (OSA) with significant oxygen desaturation noted during sleep. CPAP titration demonstrated excellent response with marked improvement in respiratory events.

Recommendation

CPAP Showed good response during trial. Patient is advised to consult the treating physician for further management. CPAP Therapy may be considered.

APNEA-HYPOPNEA INDEX (AHI)

- Derived from the total number of apneas and hypopneas divided by the total sleep time
- Most sleep centers use a cutoff of 5-10 episodes per hour as normal
- 5-15 episodes per hour for mild
- 15-30 episodes per hour for moderate, more than 30 episodes per hour for severe.

DISE

**(Drug Induced Sleep
Endoscopy)**



GENERAL MEASUREMENT

- BMI INDEX
- CBC
- S. Creatinine
- S. Fasting Lipid Profile
- S. TSH
- ECG
- ECHO
- Chest X-RAY
- CT/ MRI of the Neck Region

CONSERVATIVE (NONSURGICAL) TREATMENT

- **Lifestyle Modification:**
 - **Weight Reduction** - 10% reduction in weight leads to a 26% reduction in the respiratory disturbance index (RDI)
 - **Sleep position** - Sleeping on one's side rather than on the stomach or back
 - Avoid drinking alcohol and smoking
- **Mandibular Advancement Splints (MAS)**
 - (Dental appliance)

OTHER MODALITIES

- Nasal CPAP Therapy
(Continuous Positive Airway Pressure)
- BiPAP Therapy
(Bi-level Positive Airway Pressure)



CPAP



Same air pressure on
inhale and exhale



BIPAP



Different air pressure levels
for inhale and exhale



When ENT Surgery Becomes The Right Conversation

TONSILS

- Marked tonsillar hypertrophy
- Tonsil-dominant obstruction
- Selected adults / pediatric adenotonsillar disease

NOSE

- Persistent nasal obstruction
- Septal deviation / turbinate disease
- Often improves nasal airflow or PAP tolerance

PALATE

- Adult palatal collapse
- Selected UPPP / palatal procedures
- Best after careful anatomical selection

Think “site of obstruction” → “procedure matched to site” → “objective reassessment.”

Nasal Obstruction: Important, But Rarely The Whole Story

- Nasal resistance can worsen mouth breathing and sleep-disordered breathing
- DNS (Deviated Nasal Septum) / Turbinate Hypertrophy is the main cause
- Septoplasty / Turbinate surgery can improve nasal airflow

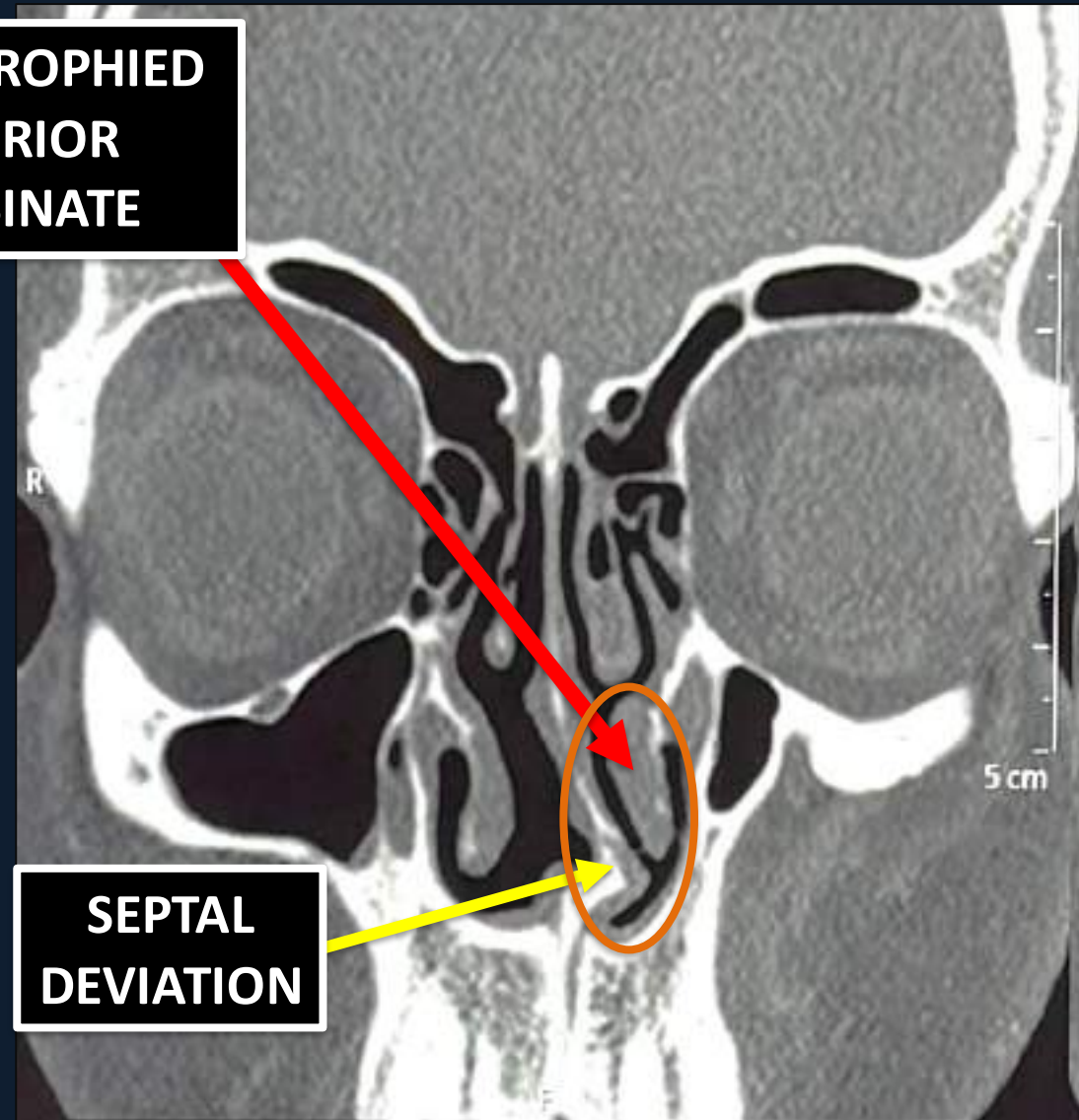


CT SCAN –NOSE & PNS



Normal

**HYPERTROPHIED
INFERIOR
TURBINATE**



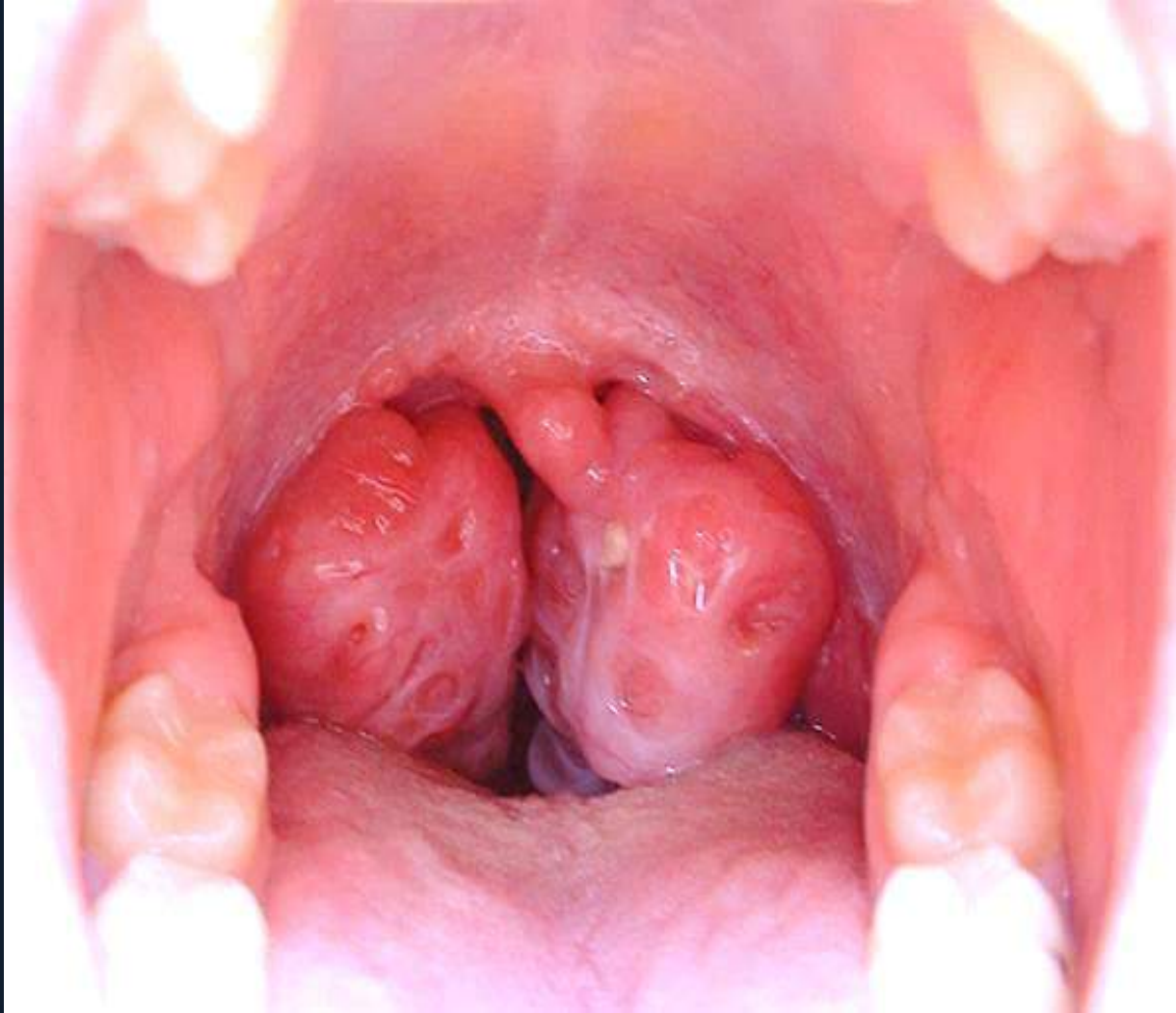
**SEPTAL
DEVIATION**

Septoplasty: What Are We Actually Treating?

Nasal Septoplasty

- **Treat The Nasal Obstruction**
- Septoplasty / Turbinate Reduction
- Improve Nasal Breathing
- Reduce Nasal Resistance
- Facilitate CPAP/PAP Use When Needed

TONSILS CAN BE THE OBSTRUCTION



- Large tonsils reduce the **retropalatal** / oropharyngeal lumen
- Grade tonsils and assess the surrounding airway
- In selected adults with hypertrophied tonsils, tonsillectomy can be primary OSA treatment

THE PALATE: NOT SIMPLY A 'LONG UVULA'

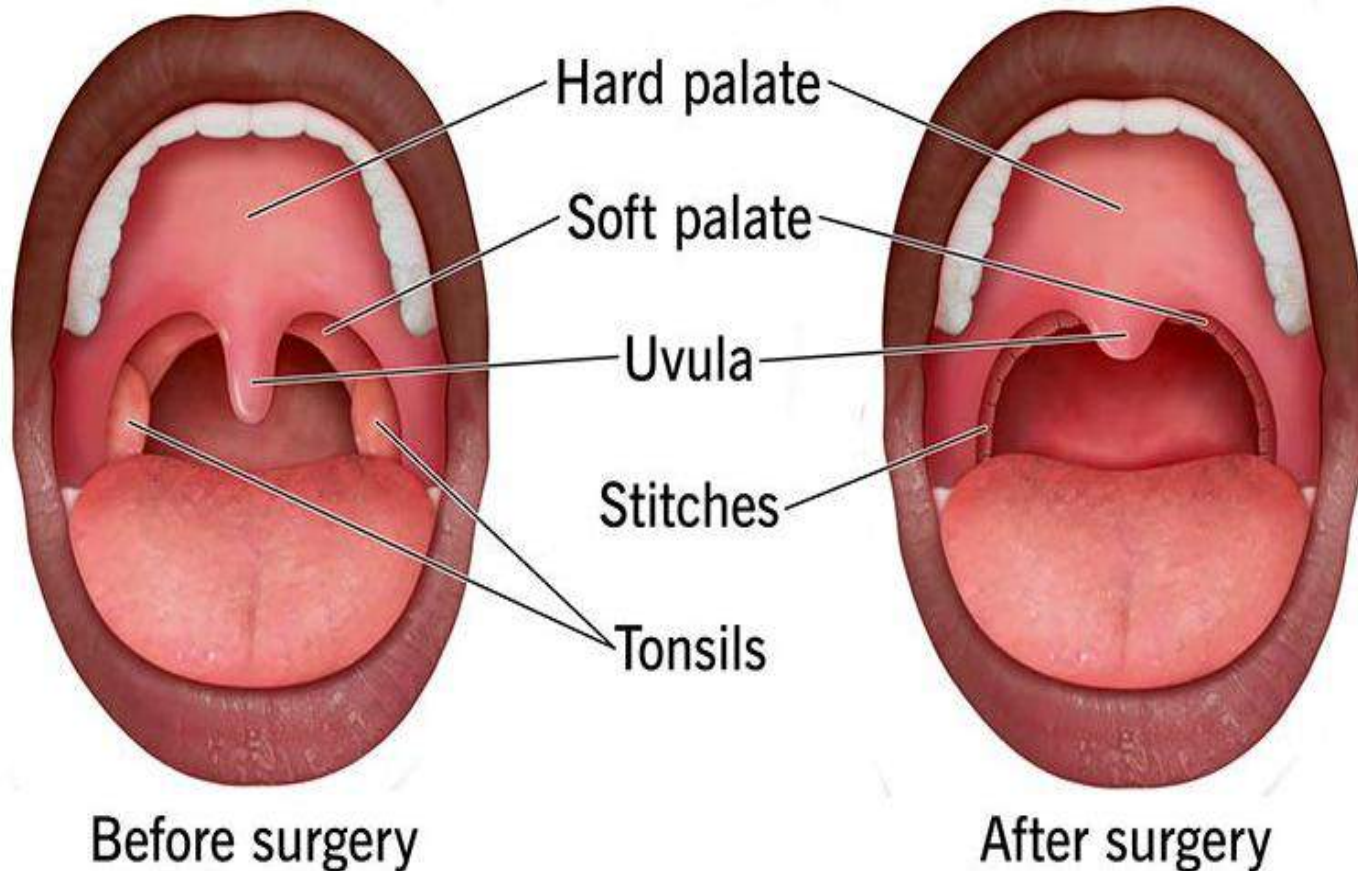


- Soft-palate configuration matters
- Lateral pharyngeal wall collapse matters
- Uvular enlargement may coexist but is not the whole diagnosis
- OSA is dynamic: anatomy changes during sleep

UPPP: UVULOPALATOPHARYNGOPLASTY

THE CLASSIC OPERATION

Uvulopalatopharyngoplasty *UPPP surgery*



- Addresses the soft palate / uvula and tonsillar pillars
- Goal: enlarge and stabilize the retropalatal airway
- Best outcomes occur with favorable anatomy and careful selection

UPPP: UVULOPALATOPHARYNGOPLASTY

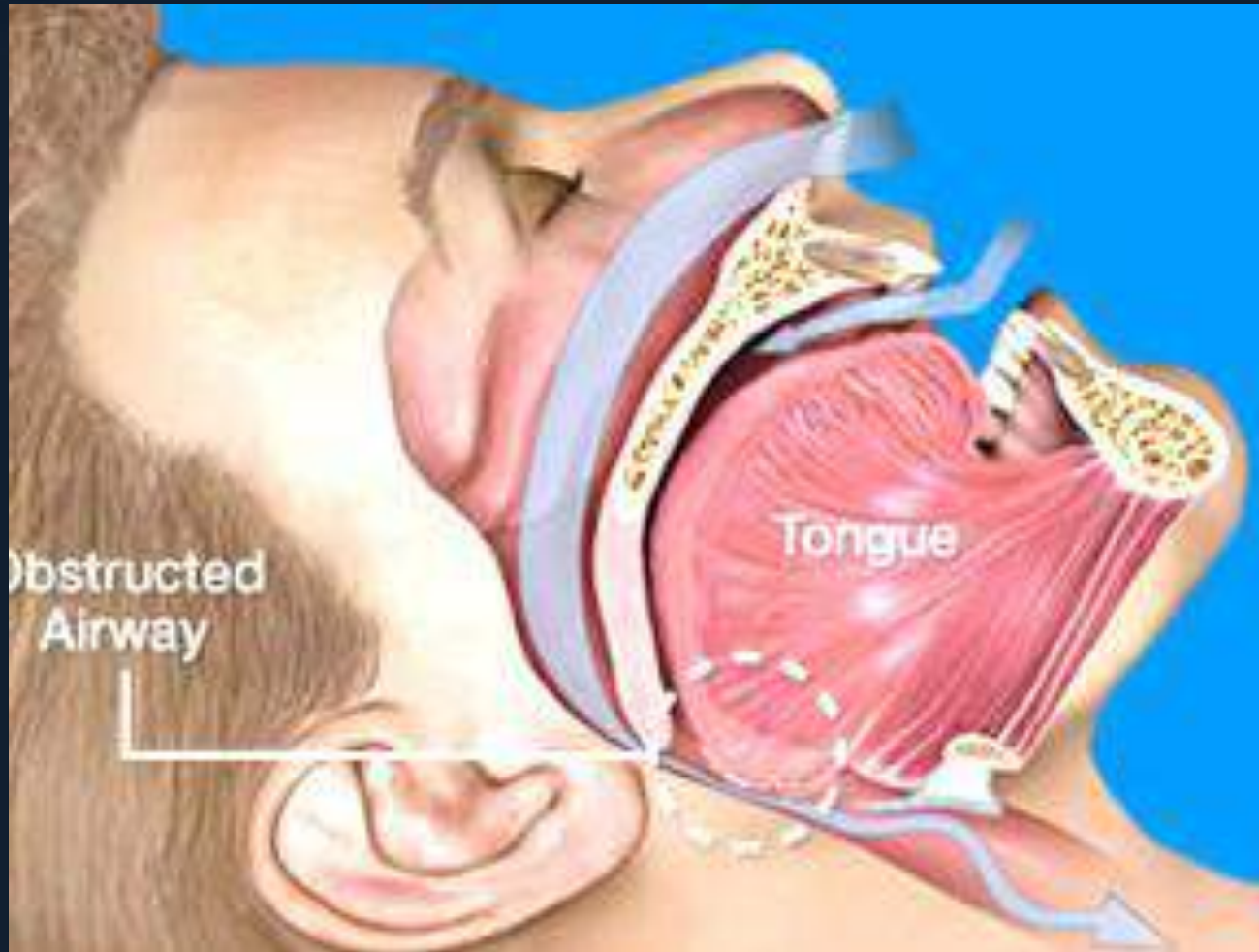


Before



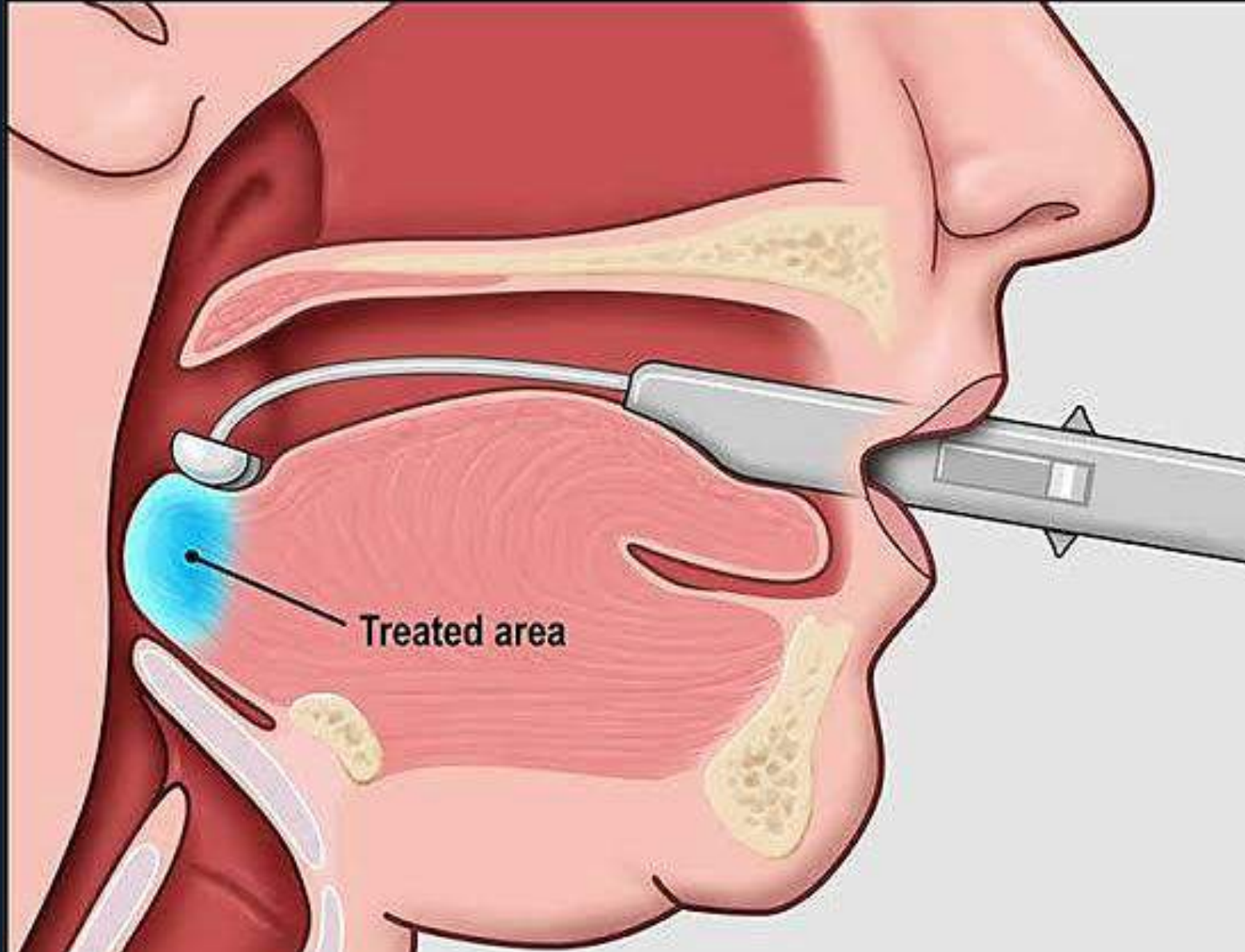
After

TONGUE-BASE OBSTRUCTION

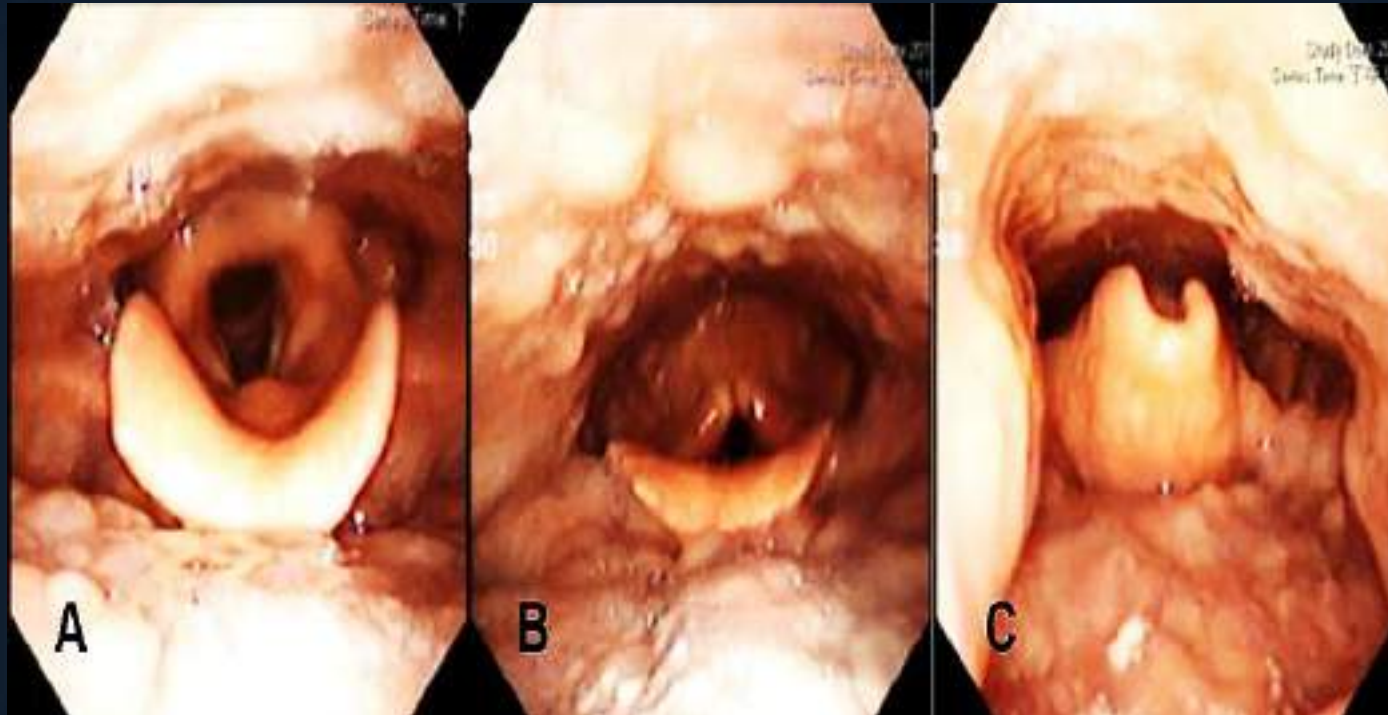


- Tongue-base collapse can persist after palatal surgery
- Lingual tonsil hypertrophy may contribute
- Selected options: lingual tonsil surgery, tongue-base reduction, transoral robotic approaches

RADIO-FREQUENCY ABLATION OF TONGUE-BASE



EPIGLOTTIC COLLAPSE



Endoscopic classification for collapsibility of epiglottis

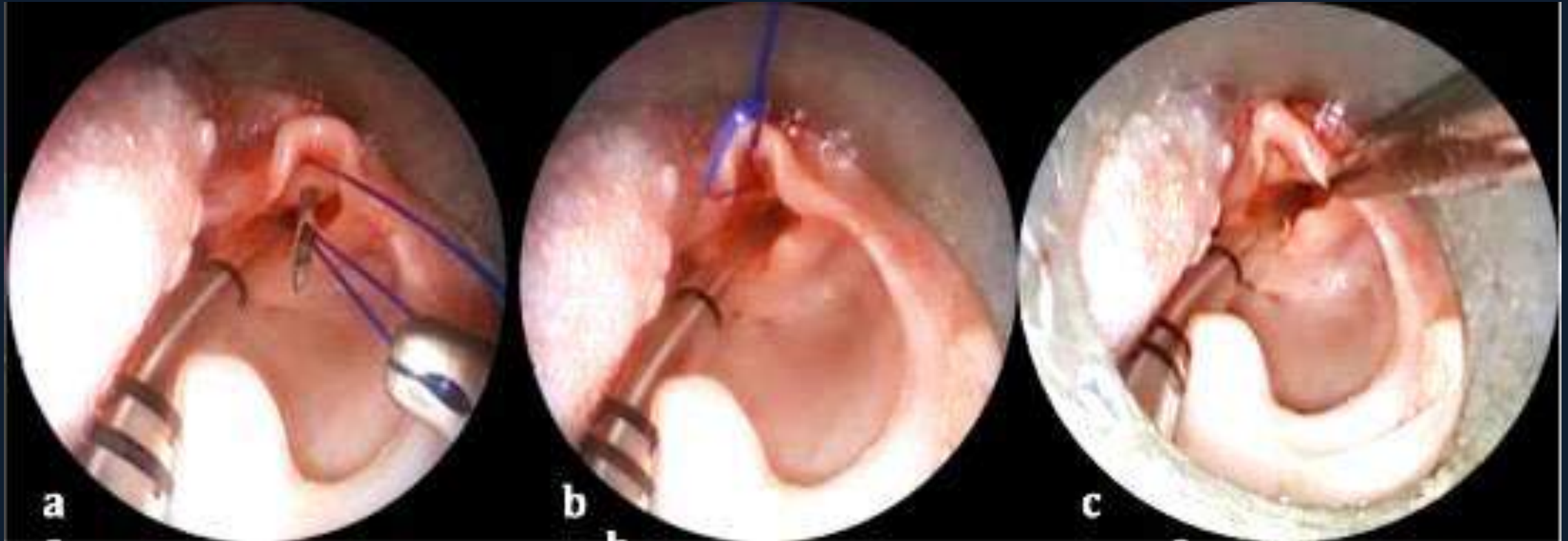
(A) Type I, the whole glottis is visible

(B) Type II, only the posterior glottis is visible

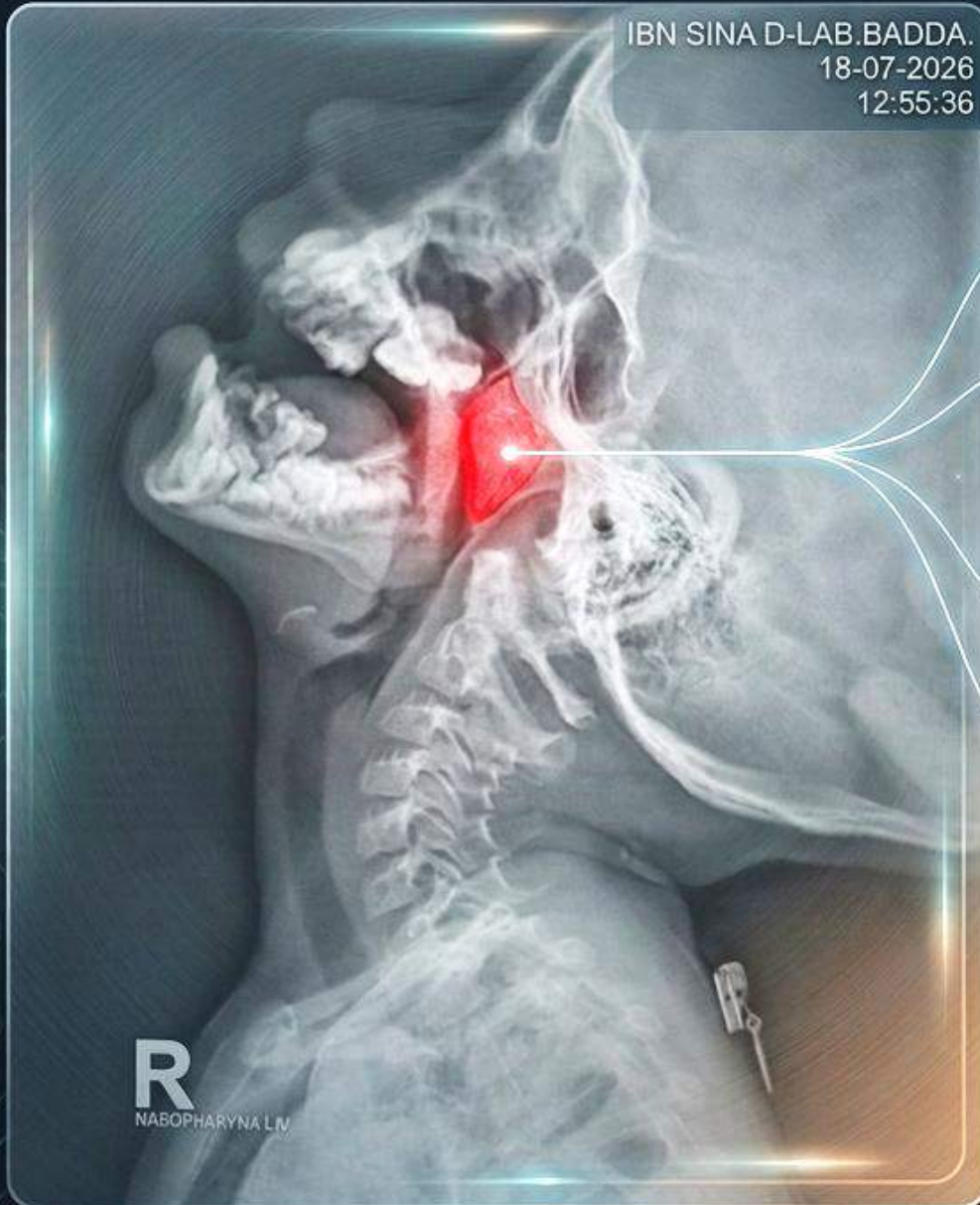
(C) Type III, the glottis is obscured by the epiglottis.

- Floppy / retroflexing epiglottis may cause sleep-related obstruction
- Often better identified dynamically with DISE
- Selected patients may benefit from targeted supraglottic surgery

EPIGLOTTOPEXY



ADENOID HYPERTROPHY: THE NASOPHARYNGEAL CULPRIT



• Nasal obstruction → mouth breathing

• Eustachian tube dysfunction / otitis media association



• Sleep-disordered breathing / OSA

• Adenoidectomy ± tonsillectomy when indicated



OSA + ANESTHESIA = A PERIOPERATIVE RISK ISSUE

AIRWAY RISK

- Sedation + opioids + sleep-state collapse → airway risk
- Postoperative edema and pain can worsen obstruction

PRACTICAL RESPONSE

- Higher-risk patients may need monitored postoperative care and PAP planning

THE MALLAMPATI SCORE



CLASS I
Complete
visualization of
the soft palate



CLASS II
Complete
visualization
of the uvula



CLASS III
Visualization
of only the
base of the uvula



CLASS IV
Soft palate
is not
visible at all

FIVE MESSAGES TO LEAVE THE ROOM WITH

- 01** OSA is a clinical disease — not an AHI number.
- 02** Look for the cause: obesity, nose, tonsils, palate, tongue base and craniofacial factors.
- 03** PAP is the foundation for most adults with moderate–severe OSA; optimize before declaring failure.
- 04** Surgery is individualized and anatomy-directed; ENT is central when obstruction is surgically actionable.
- 05** Always reassess — symptoms, adherence, residual disease and safety.



Bappi Lahiri (1952–2022): The legendary Indian singer, composer, and pioneer of Bollywood disco music. Dr. Deepak Namjoshi, director of the hospital, told PTI, "Lahiri had been admitted to the hospital for a month and was discharged on Monday. But his health deteriorated on Tuesday and his family called for a doctor to visit their home. He was brought to the hospital. He had multiple health issues. He died due to OSA (Obstructive Sleep Apnea) shortly before midnight."

<https://www.hindustantimes.com/lifestyle/health/bappi-lahiri-dies-at-69-due-to-obstructive-sleep-apnea-what-is-osa-its-signs-and-symptoms-101644991681185.html>

Recent evidence & selected references-

- Benjafield AV et al. Lancet Respir Med. 2019;7:687–698.
- AAO-HNS. Position Statement: Treatment of OSA. 2021.
- AAO-HNSF. Tonsillectomy in Children: Update. 2019.
- Qi Y et al. Eur Arch Otorhinolaryngol. 2024;281:3333–3343.
- DISE and surgical outcomes systematic review. Sleep Breath. 2024.
- Pediatric DISE-directed tongue surgery meta-analysis. Clin Otolaryngol. 2025.



Thank you
for your attention

