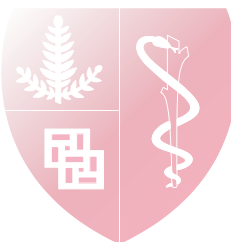


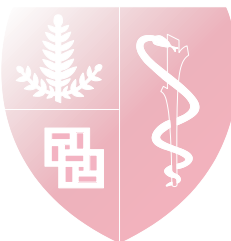
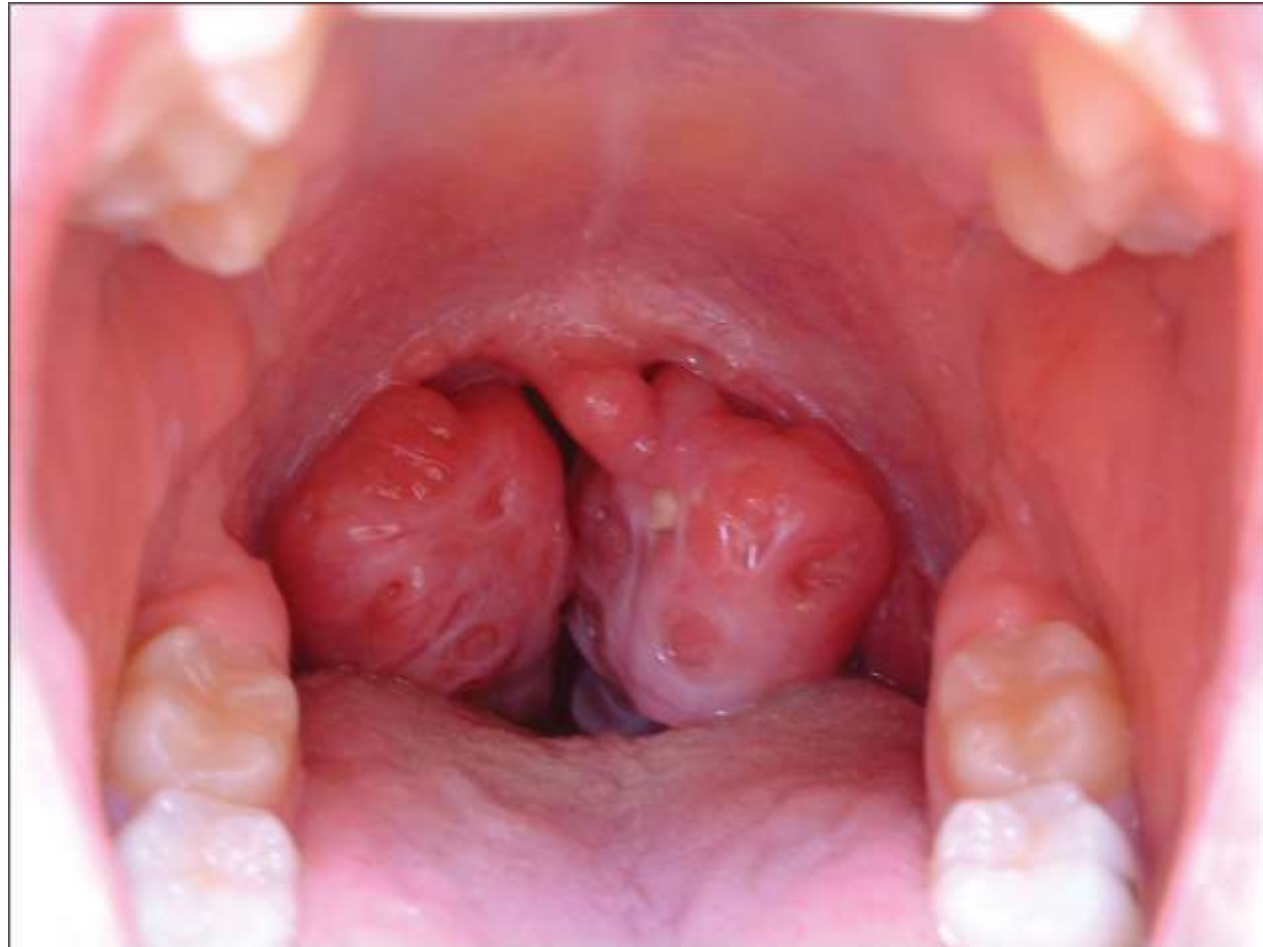
# Case report: Physical Examination

- Vital signs stable.
- HEENT: normal facies. tonsillar hypertrophy.
- Chest: Clear to auscultation.
- CVS: Normal heart sounds and no murmurs.
- GIT: No hepatosplenomegaly.
- Extremities: no clubbing.
- PFT: Mild reversible airway obstruction.



# Pediatric Obstructive Sleep Apnea

- An Obstructed Airway



# Diagnosis

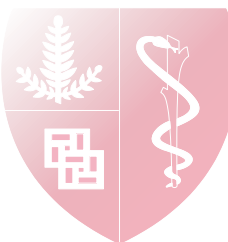
- Utility of History and Physical Examination:
  - Useful to screen patients and determine who needs further investigation.
  - Not helpful for deciding who needs treatment.

*Fernbach SK, et al Pediatr radiol. 1983;13:258-265.*

*Mahboubi S, et al Int J Pediatr Otorhinolaryngol 1985;10:67-73*

*Laurikainen E et al Int J Pediatr Otorhinolaryngol 1987;12:303-310*

*Brooks LJ, et al J Pediatr, 1998;132:682-686.*

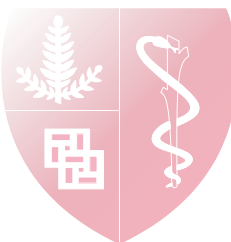


# Diagnosis

- Sleep Questionnaires:
  - Varying sensitivity and specificity (both low).  
Overall, not able to distinguish between primary snoring and OSAS reliably.
  - Cannot be the sole tool used to diagnose OSAS.

*Brouillette RT et al, J pediatr 1984;105:10-14*

*Brouillette RT et al Pediatrics 2000;105:405-412*



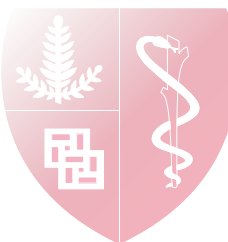
# Diagnosis

- Audiotaping or videotaping
- Appears promising. Several studies have shown a range in sensitivity from 71-94% and specificity from 29-80%.
- Positive predictive values were 50-75% for audiotaping and 83% for videotaping.
- negative predictive values were 73-88%.
- Sounds of struggle on audiotape were more predictive than pauses in breathing.

*Lamm C et al Pediatr Pulmonol 1999;27:267-272*

*Goldstein NA et al Otolaryngol Head Neck Surg 1994;111:611-617*

*Sivan Y et al Eur Res J 1996;9:2127-2131.*

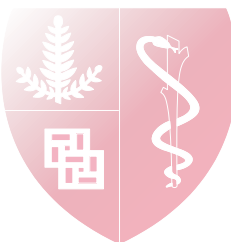


# Abbreviated Polysomnography

Night time pulse oximetry: Useful when positive, with a PPV of 97%.

Patients with negative studies require a full polysomnogram. Affected by co morbid conditions such as obesity and asthma.

*Brouillette RT et al Pediatrics 2000;105:405-412*

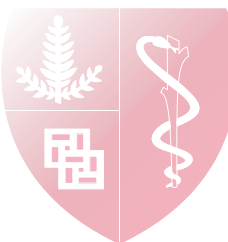


# Nap Polysomnography

- Convenient as they are done during the day.
- PPV of 77-100% and NPV of 17-49%.
- May underestimate the severity of OSAS, due to decreased total sleep time and decreased REM sleep.
- If negative, an overnight PSG should be performed.

*Saeed MM, et al Chest 2000,;118:360-365.*

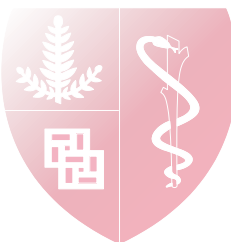
*Marcus CL et al Pediatr Pulmonol 1992;13:16-21.*



# Home Polysomnography

- Currently not approved for children in diagnosis of OSA
- Results comparable to laboratory study.
- Methods and equipment different from standard

*Hui-Leng Tan SV et al Chest 2015;148:1382-1395.*





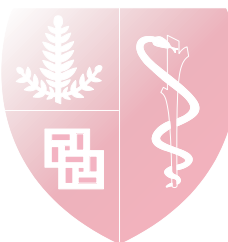
# Nocturnal Polysomnography

- “Gold Standard”: currently the only technique shown to quantitate the ventilatory and sleep abnormalities of OSA.
- Can be done at any age.
- Age appropriate criteria exist.
- Can distinguish primary snoring from OSA.
- Help determine the risk of post operative complications ( how severe was AHI, how significant were saO2 drops).
- ETCO2/TCOM necessary

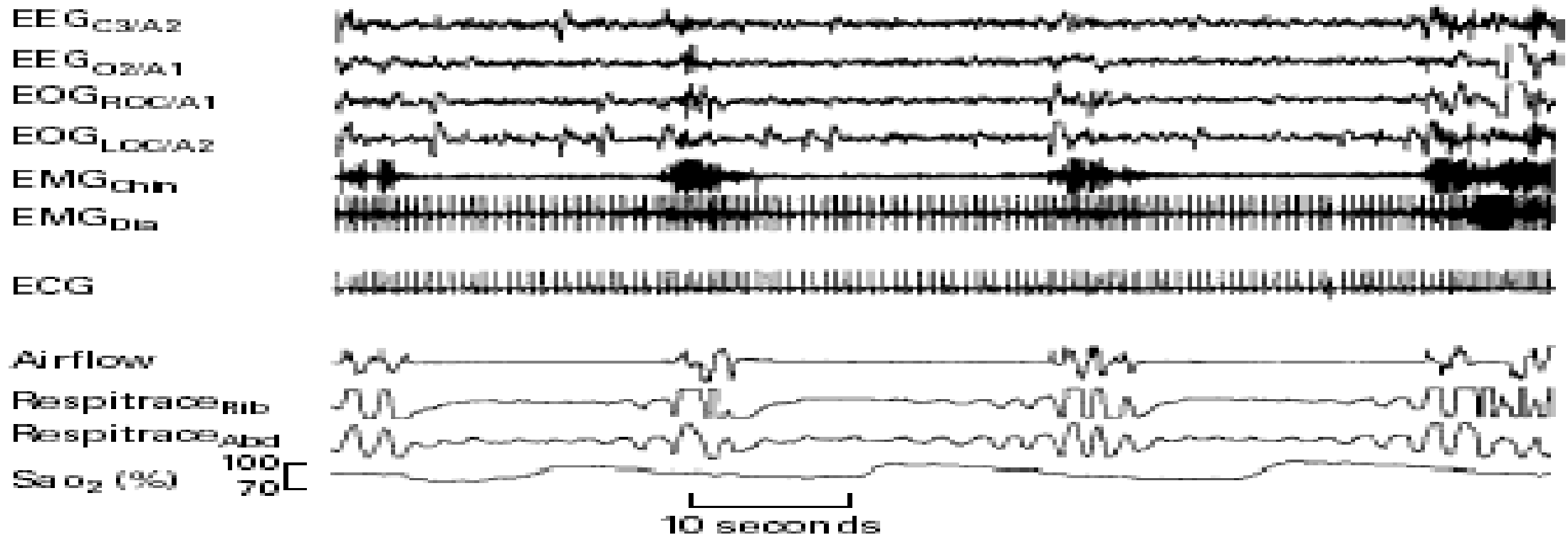
*ATS Am J Respir Crit Care Med 1996;153:866-878.*

*ATS Am J Respir Crit Care Med 1999 ;160:1381-1387.*

*Marcus CL et al Am Rev Respir Dis 1992;146:1235-1239.*

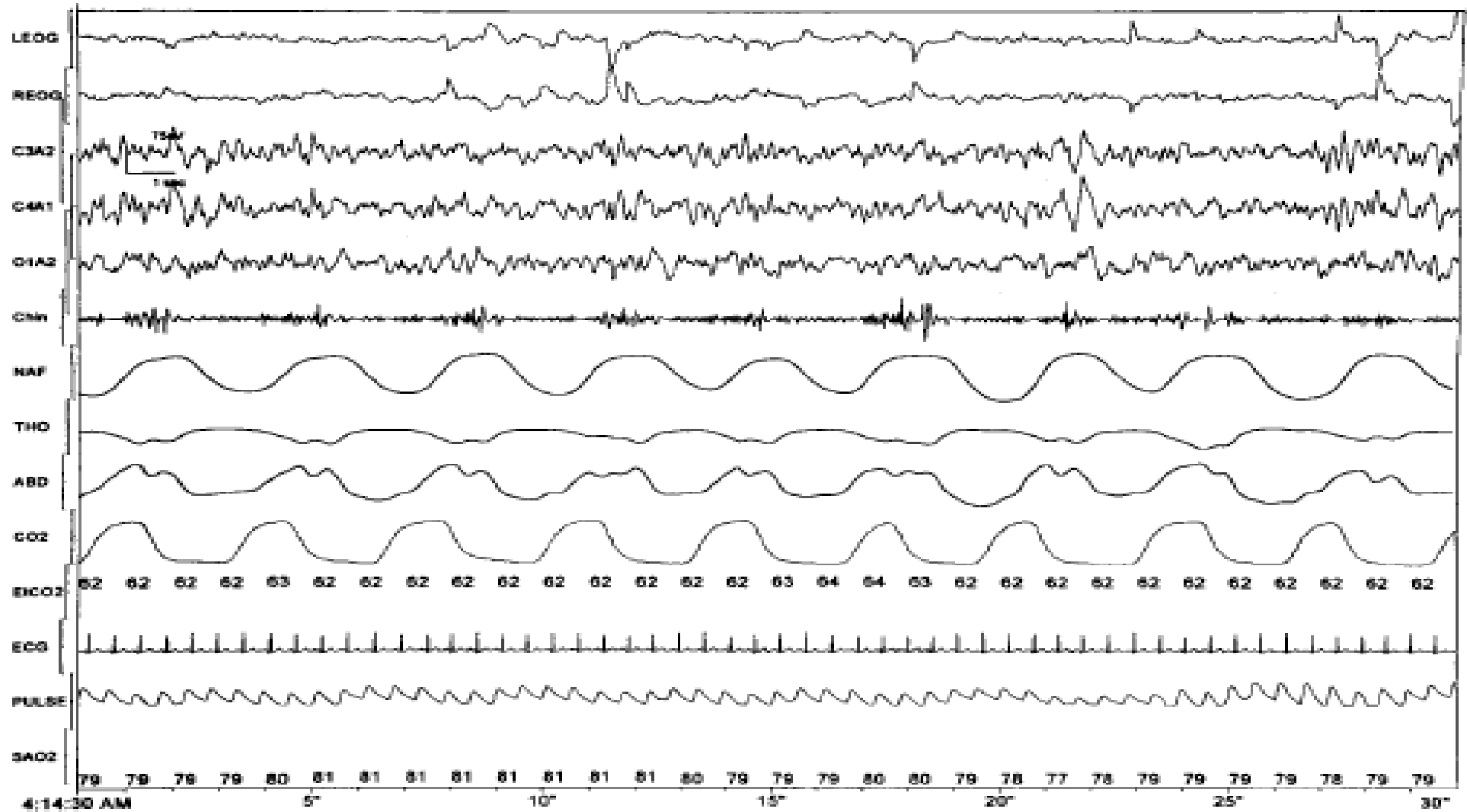


## Repetitive obstructive apnea



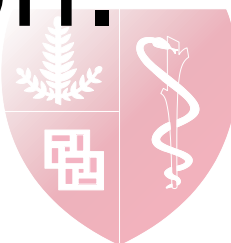
*Figure 1 Polygraphic example of repetitive obstructive apnoea. EEG<sub>CS/A2</sub> and EEG<sub>O2/A1</sub> = central and occipital electroencephalograms, respectively; EOG<sub>ROC/A1</sub> and EOG<sub>LOC/A2</sub> = right and left oculogram, respectively; EMG<sub>chin</sub> = submental electromyogram; EMG<sub>Di</sub> = diaphragm electromyogram; EMG<sub>Abd</sub> = abdominal electromyogram; ECG = electrocardiogram; Airflow = airway pressure measured from nasal prongs; Respirace<sub>Rib</sub> and Respirace<sub>Abd</sub> = thoracic and abdominal movements, respectively; SaO<sub>2</sub> = arterial oxygen saturation (%). Inspiration is an upward deflection on the airflow and Respirace signals. Note that there is a cessation of airflow accompanied by continued deflections from the Respirace channels. The apnoeas are associated with decreases in SaO<sub>2</sub> to approximately 75% and are terminated by brief arousals.*

# Obstructive Hypoventilation



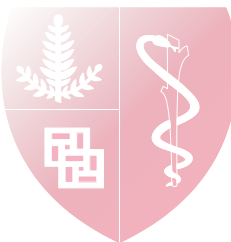
# Diagnosis: Summary

- History and physical examination are poor at predicting OSA. Helpful in leading to a further plan and testing
- Abbreviated/screening techniques are helpful if results are positive.
- Children with negative results should undergo a comprehensive evaluation.



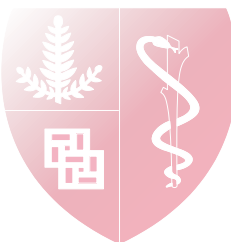
# Case Report: Assessment

- Mild persistent asthma.
- Gastro esophageal reflux disease.
- Rule out obstructive sleep apnea.



# Case Report: Plan

- Flovent 44 2 Puffs BID, albutoerl 2 puffs every 4 hours PRN.
- Tab Ranitidine 150 mg, 2 daily.
- Scheduled for an overnight PSG.



# Case Report: Sleep Study Report

- Sleep Efficiency: 71%
- Respiratory arousal index: 67/hour
- Snore score: 4/4.
- **Apnea index: 21/hr. Children AHI: 0-1= normal, 1-5 mild, 5-10 moderate, anything over 10= severe**
- **Apnea Hypopnea Index: 59/hour.**
- saO<sub>2</sub> (average): 92% nadir :84%
- NO REM at all.

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CPAP started on room air: pressures 4-12 trialed

Sleep efficiency 92%

Respiratory arousal index: 2/hour

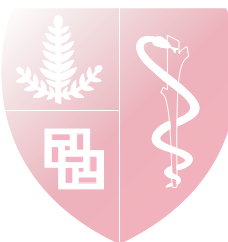
Snore score: 0/4

**Apnea index: 3/hour.**

**Apnea/hypopnea index: 3/hour, however on a pressure 10 AHI= 1.2**

SaO<sub>2</sub> average :96% nadir: 96%

REM Onset 140 minutes.



# Case report : Follow up

- Not sleepy or tired any more.
- Has started going to the gym.
- Will be going back to school.
- No more night awakenings with “shortness of breath”.
- Gave up vaping!

