



Especialização em  
**DIFICULDADES ALIMENTARES NEOPEDIÁTRICAS**

2023/2024

**UC 6 – PERTURBAÇÕES MIOFUNCIONAIS ORAIS E ALIMENTAÇÃO**

**Módulo19: Trabalho interdisciplinar**

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10 de Março de 2024

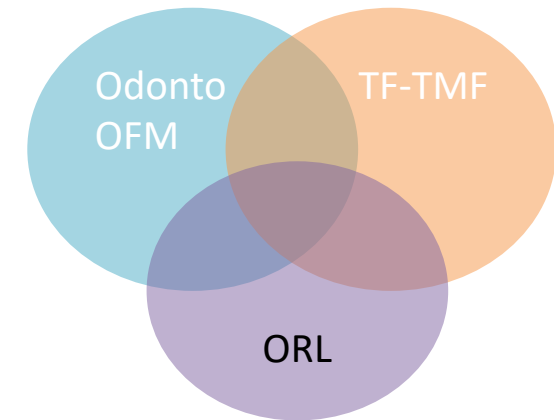
**PAP**





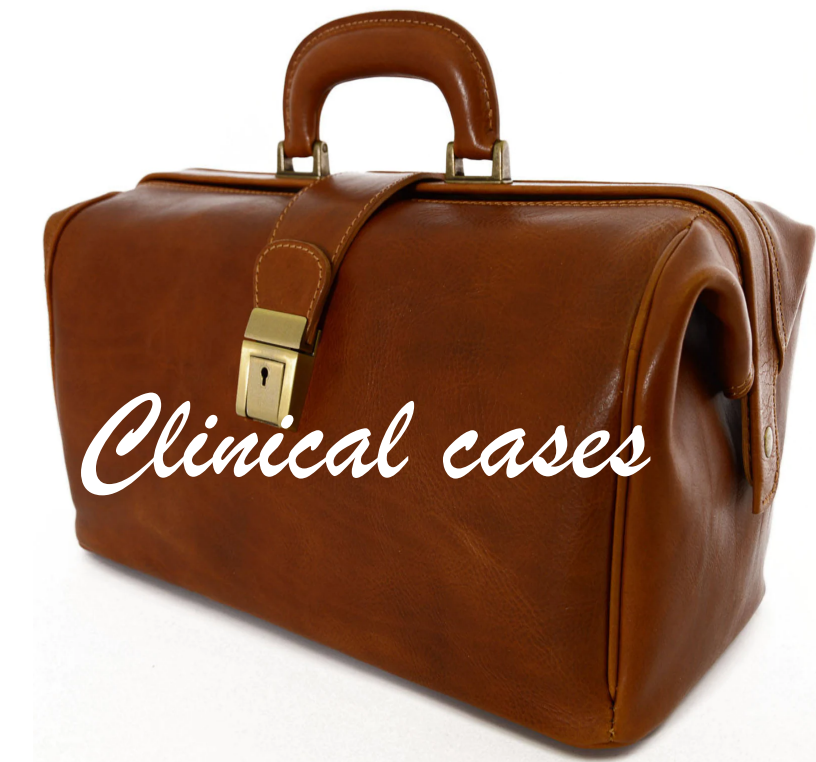
# The dream: A multidisciplinary approach

- *“Coming together is a beginning, staying together is progress, and working together is success.”*  
**Henry Ford**
- *“Alone we can do do so little; together we can do so much.”* **Helen Keller**
- Pediatricians, Family doctors, Internal medicine, ORL, Dentists, Pulmonologists, Speech therapists, Maxillofacial surgeons, Physical therapists, Osteopathy, Allergologists, Nutritionists, Psychologists, Psychiatrists, Endocrinologists, Neurologists, etc...
- Many of us may be the first to approach children, and probably, at one point or other, we shall all share the same patient



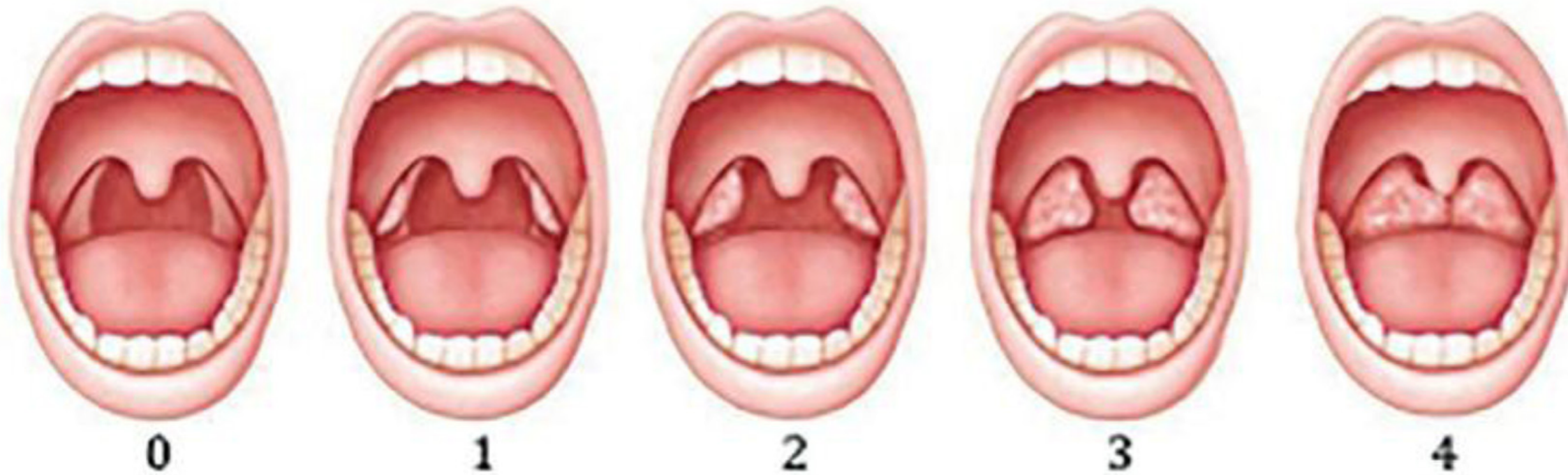
# Classical *versus* practical *versus* clinical approach

- Definitions & classification
  - Symptoms & signs
  - Diagnosis
  - Treatment
  - Controversies
- What we ask?
  - How do ORL search for it?
  - How do ORL treat it?
  - Even we have doubts...





# Tonsillar hypertrophy



## Friedman classification

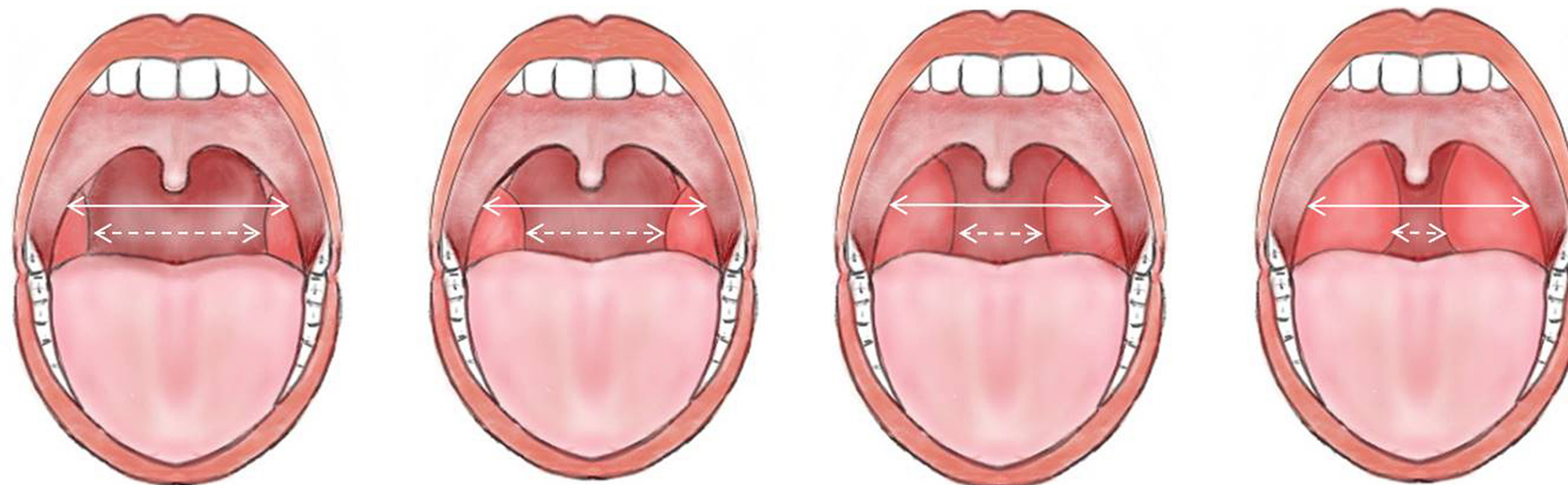
Grade 0: No tonsils /tonsillectomy

Grade 1: In tonsillar fossa

Grade 2: Visible beyond anterior pillars

Grade 3: Extend  $\frac{3}{4}$  to midline

Grade 4: Completely obstructing, "kissing tonsils"



## Brodsky classification

Stage I: <25%

Stage 2: Between 25 – 50%

Stage 3: Between 50 - 75%

Stage 4: >75%

Stage I  
(<25%)

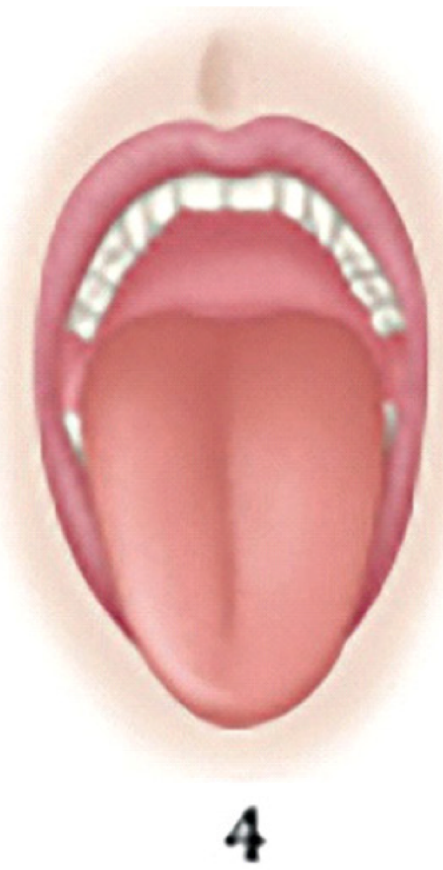
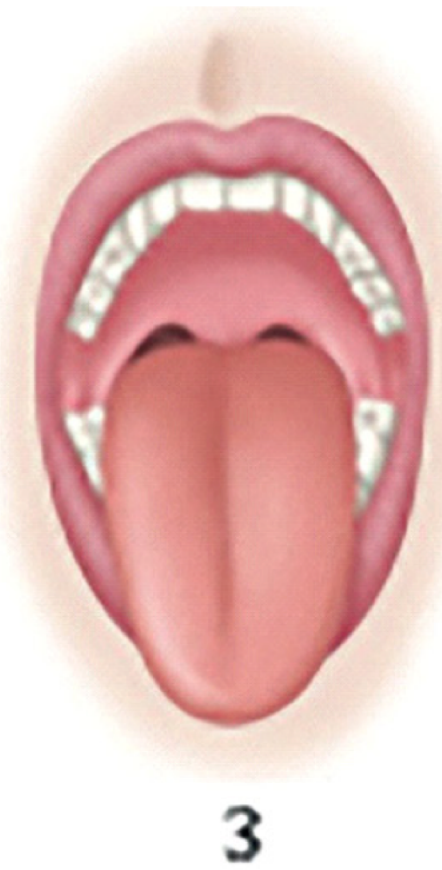
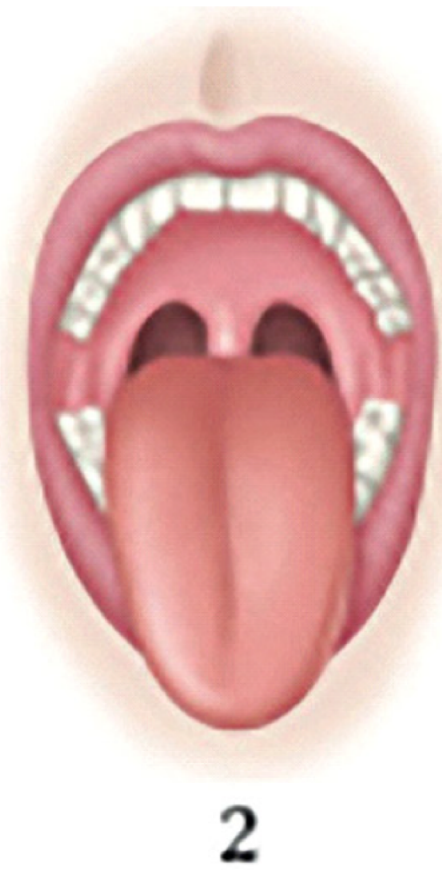
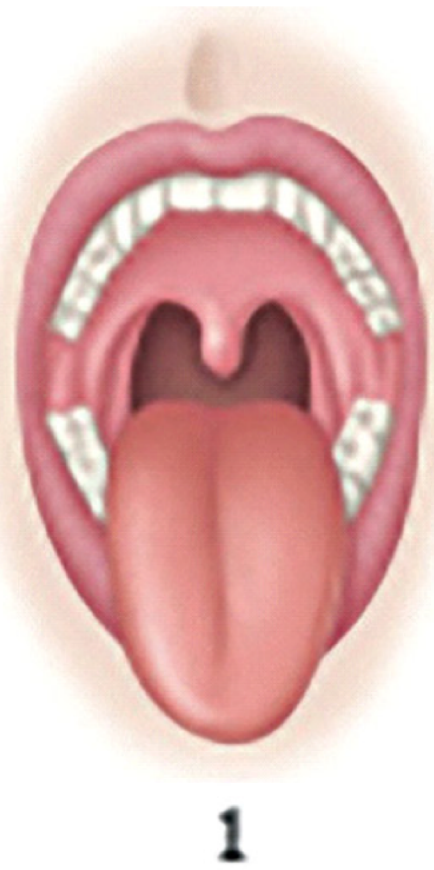
Stage II  
(>25% <50%)

Stage III  
(>50% <75%)

Stage IV  
(>75%)



# Relationship between tongue and oropharynx



Mallampati classification

Class I: Uvula and tonsils fully visible

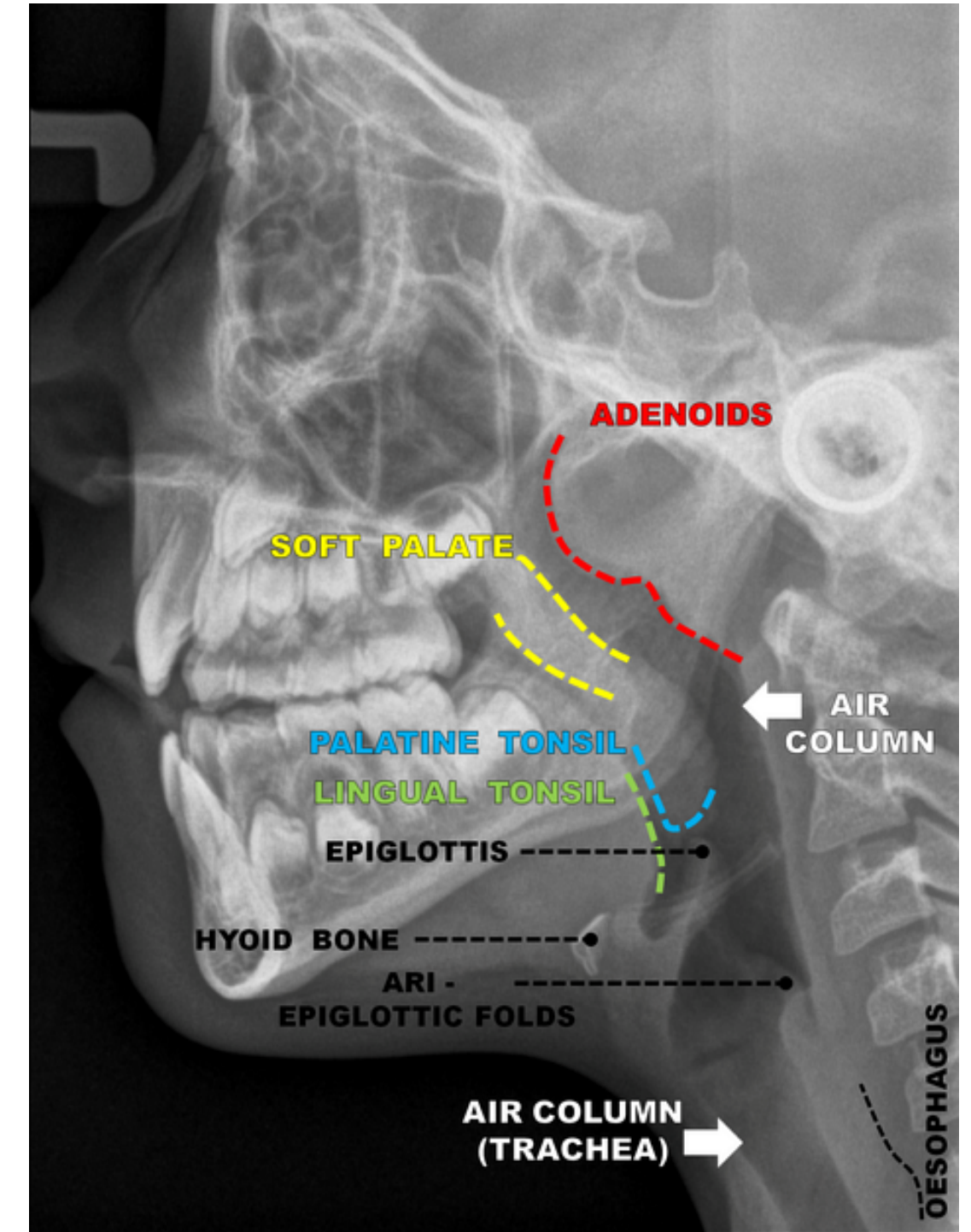
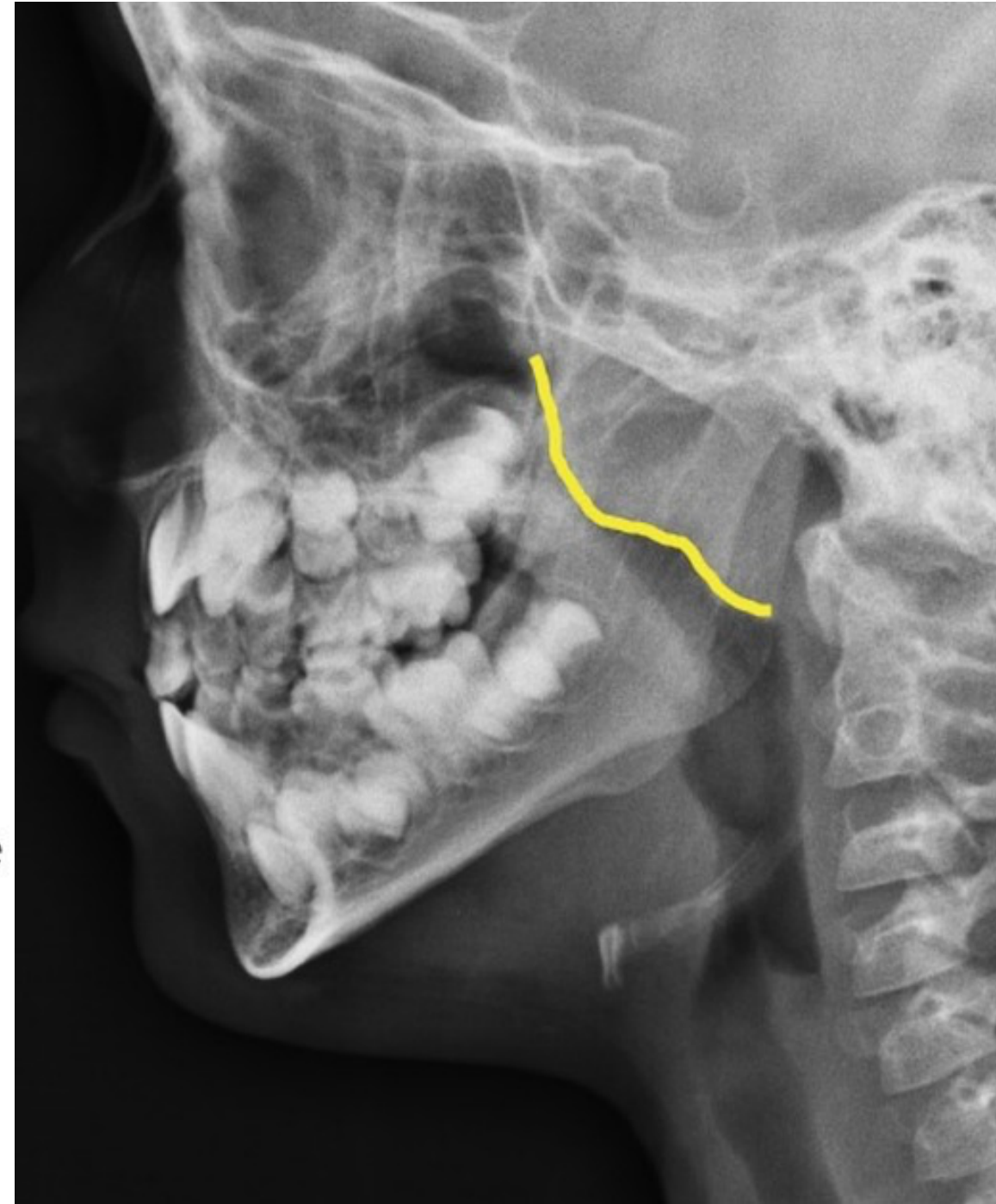
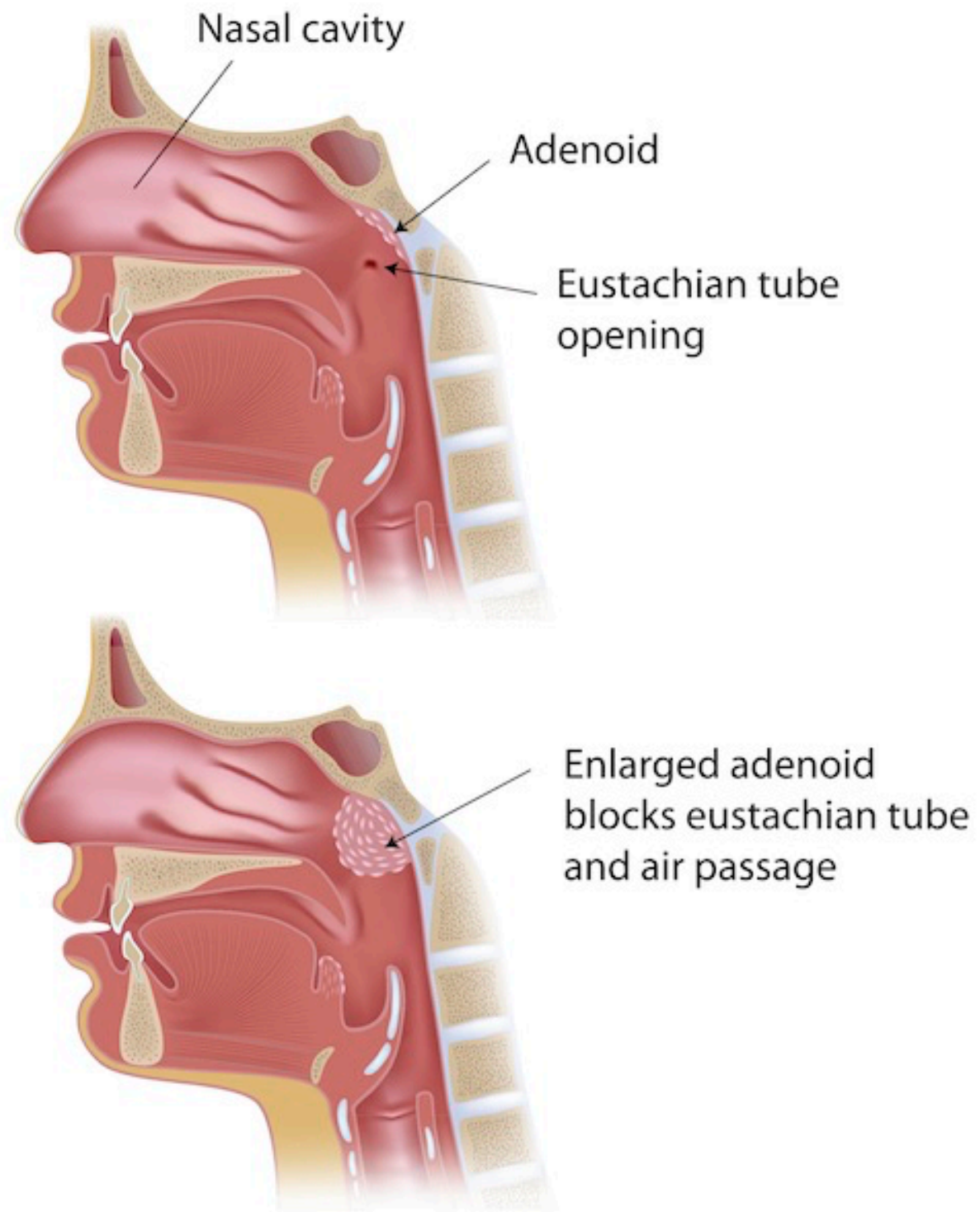
Class II: Uvula partly visible

Class III: Soft palate visible, uvula invisible

Class IV: Only hard palate visible

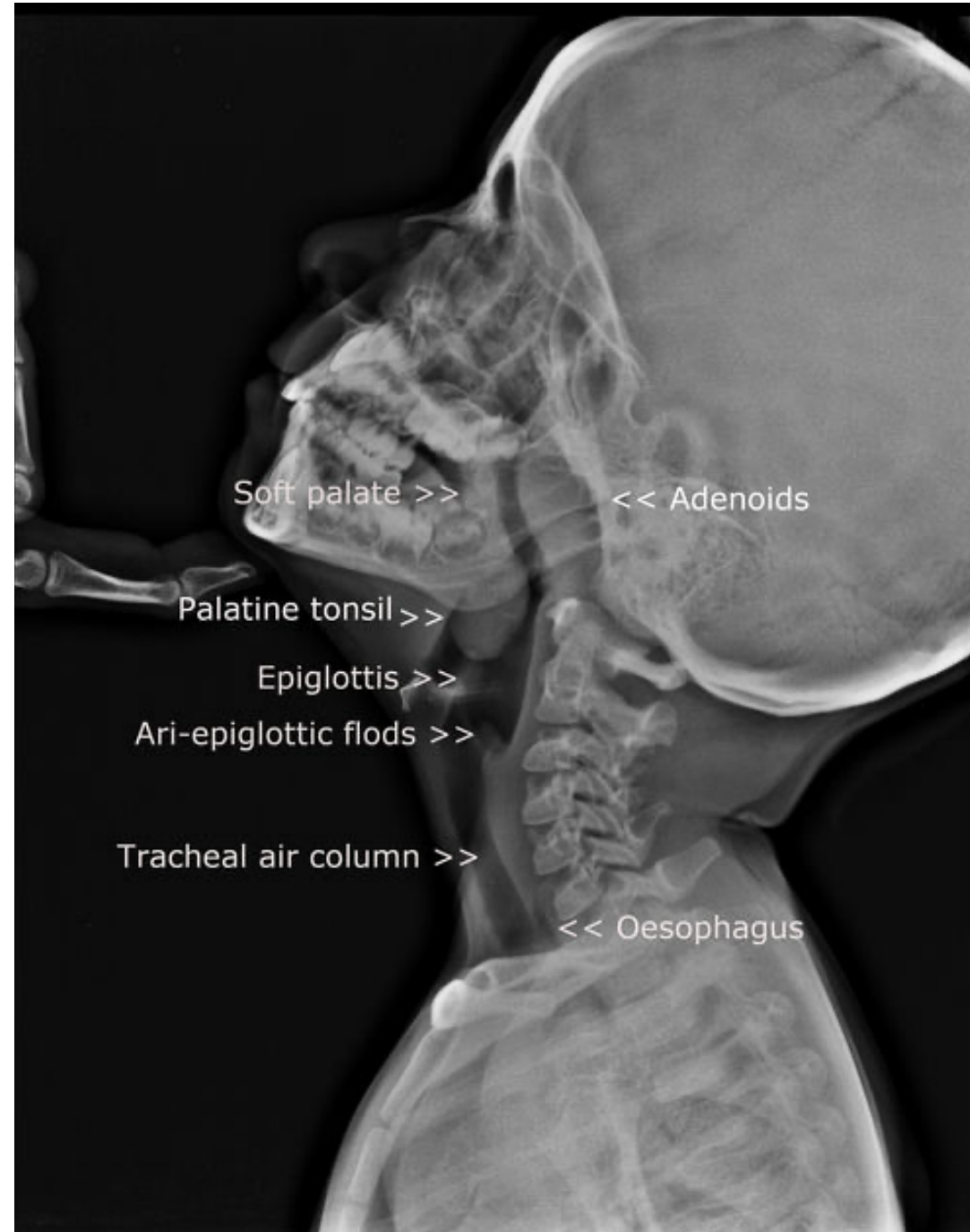
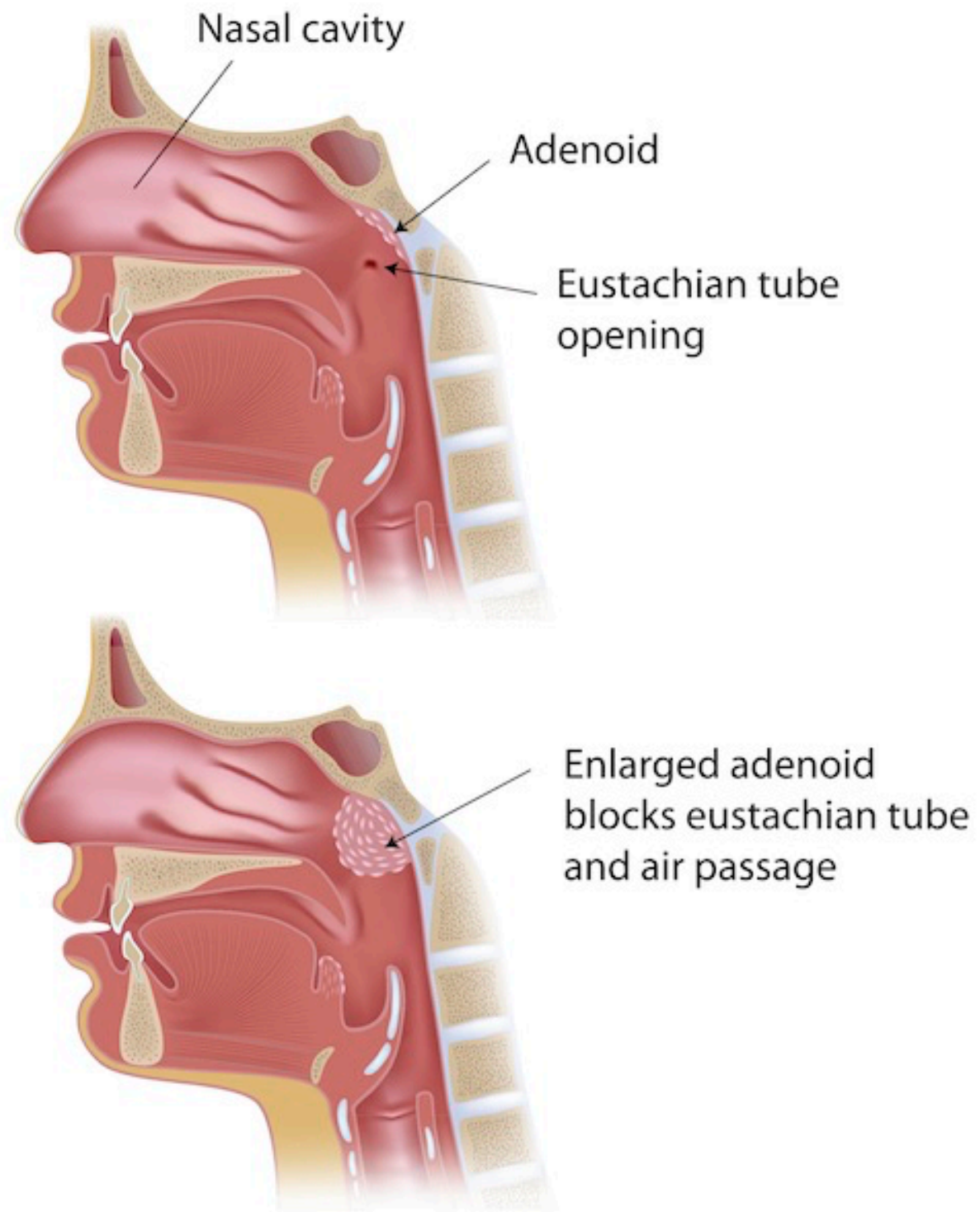


# Adenoid hypertrophy



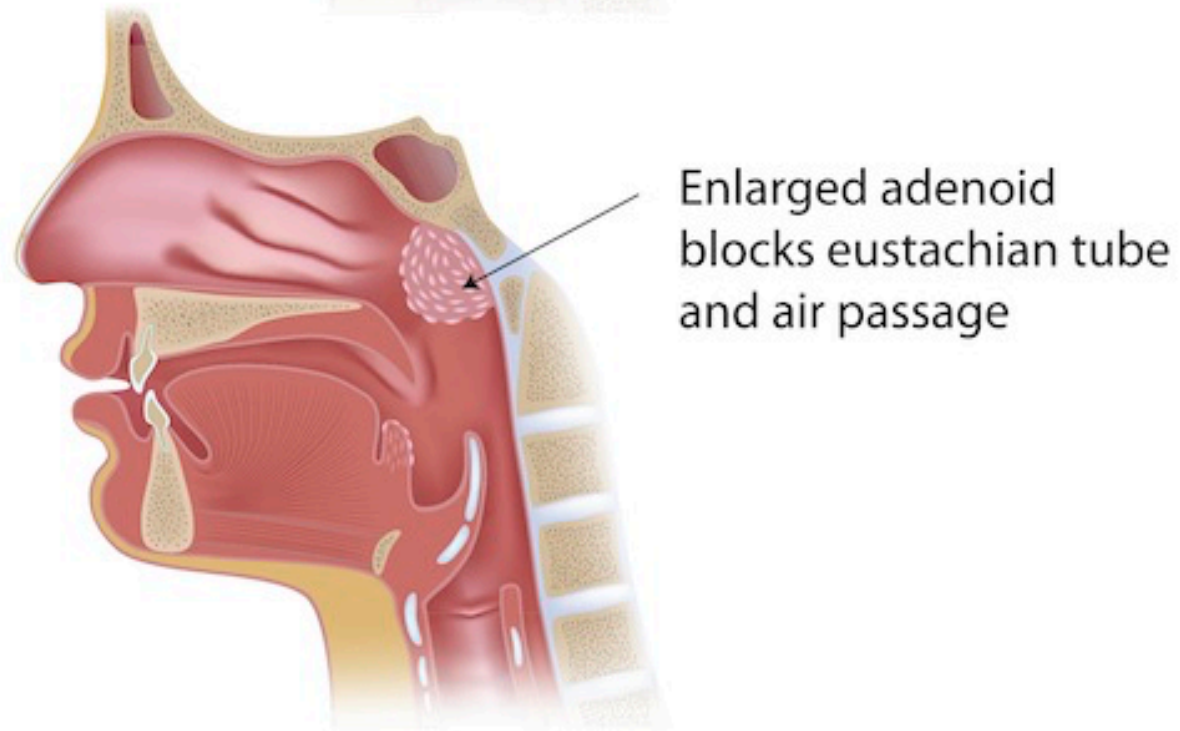
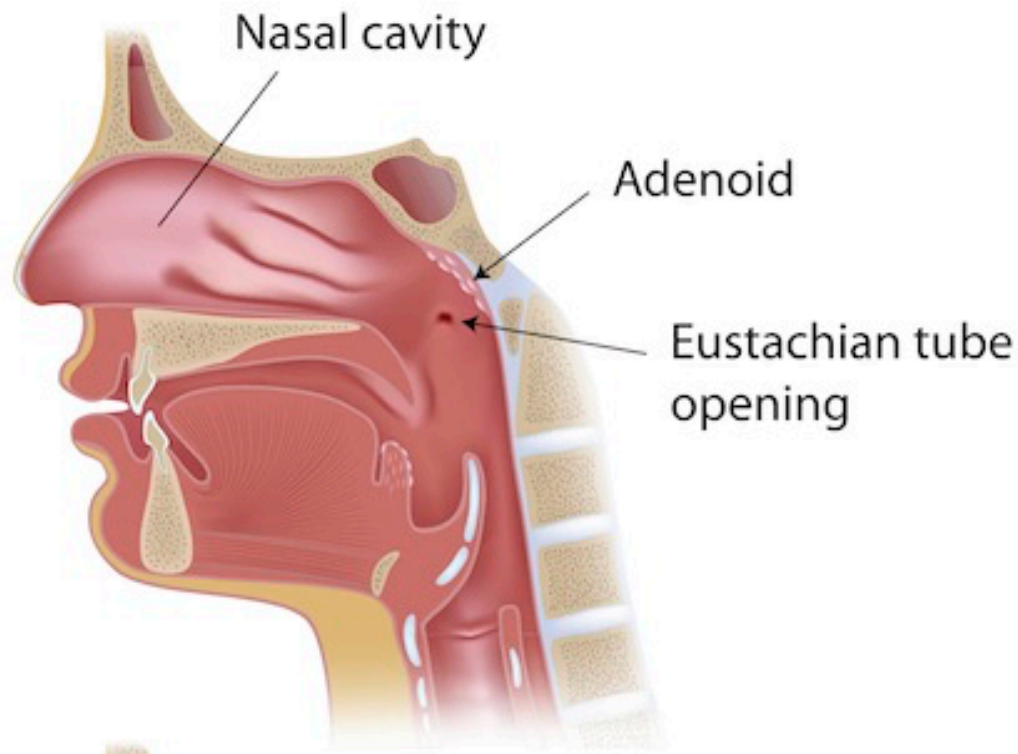
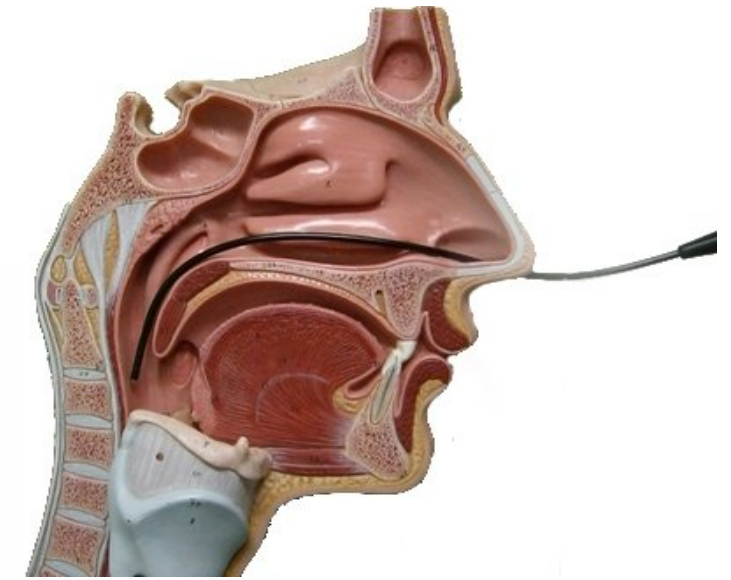


# Adenoid hypertrophy

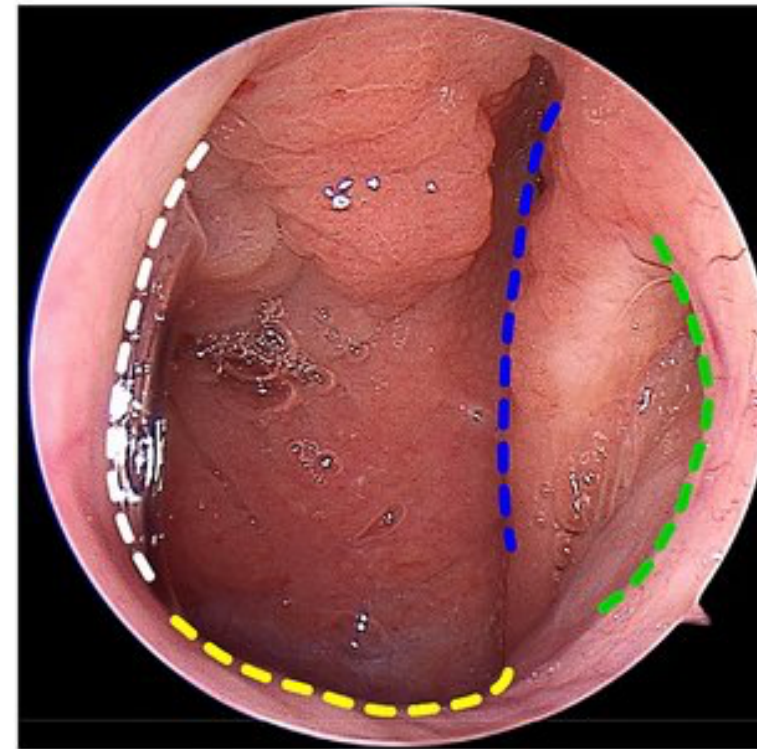




# Adenoid hypertrophy



Grade 0

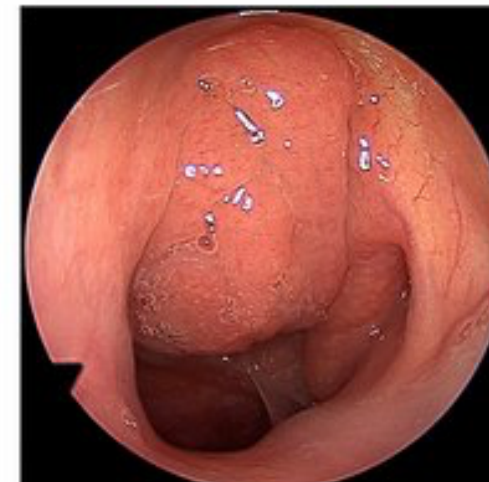


Blue dash line: Salpingo-pharyngeal fold  
 White dash line : Vomer  
 Green dash line : Salpingo-palatine fold  
 Yellow dash line : Soft palate

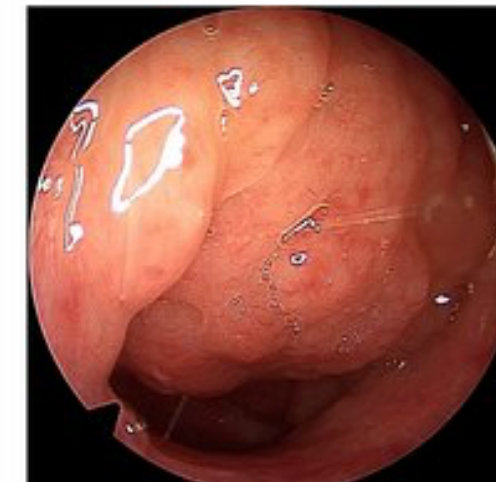
Grade 1



Grade 2



Grade 3



Grade 4



# Adenotonsillar hypertrophy



## SYMPTOMS

What we ask

- Oral breathing
- Snoring
- Agitated sleep
- Strange sleeping positions
- Sleep apnea
- Difficulty eating
- Hearing loss

## SIGNS

What we see

- Bags under eyes
- Open mouth
- Loud breathing
- Middle ear otitis – effusion
- Rhinorrhea
- Grade III-IV tonsils
- Malocclusion



# Adenotonsillar hypertrophy



## CAUSES

What we may think

- Infection / recurrent infection
  - Viral: EBV...
  - Bacterial: Streptococcus...
- Allergies
- Rhinitis
- Reflux
- Neoplasia
  - Lymphoma...

## TREATMENT

How we may treat

- Unspecific immunotherapy
  - Broncho-vaxom, bactek, imunoglukan...
- Specific immunotherapy
  - Anti-mite or anti-graminea vaccines
- Nasal corticosteroids
  - Mometasone, fluticasone, budesonide
- Anti-leucotrienes
  - Montelukaste
- Anti-histamines
  - Desloratadine, levocetirizine...
- Proton pump inhibitors
  - Esomeprazol...
- Surgery

# Adenotonsillectomy indications

Supplement

## Clinical Practice Guideline: Tonsillectomy in Children (Update)

Ron B. Mitchell, MD<sup>1</sup>, Sanford M. Archer, MD<sup>2</sup>, Stacey L. Ishman, MD, MPH<sup>3</sup>, Richard M. Rosenfeld, MD, MPH, MBA<sup>4</sup>, Sarah Coles, MD<sup>5</sup>, Sandra A. Finestone, PsyD<sup>6</sup>, Norman R. Friedman, MD<sup>7</sup>, Terri Giordano, DNP<sup>8</sup>, Douglas M. Hildrew, MD<sup>9</sup>, Tae W. Kim, MD, MEHP<sup>10</sup>, Robin M. Lloyd, MD<sup>11</sup>, Sanjay R. Parikh, MD<sup>12</sup>, Stanford T. Shulman, MD<sup>13</sup>, David L. Walner, MD<sup>14</sup>, Sandra A. Walsh<sup>6</sup>, and Lorraine C. Nnacheta, MPH<sup>15</sup>

AMERICAN ACADEMY OF  
OTOLARYNGOLOGY-  
HEAD AND NECK SURGERY  
FOUNDATION

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Head and Neck Surgery  
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Surgery Foundation 2018  
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DOI: 10.1177/0194599818801757  
http://otojournal.org  
SAGE

- Absolute indications:

- Infection: Paradise criteria

7 infections in 1 year  
5 infections in 2 years  
3 infections in 3 years

- Obstructive: OSA

Mild: AHI 1– 5  
Moderate: AHI 5 – 10  
Severe: AHI >10

Growth retardation, enuresis, hyperactivity,  
asthma

- Relative indications:

- Snoring and oral breathing
- History of peritonsillar abscess
- Infections with antibiotic allergies
- Infections that decrease QoL
- Less common diseases: IgA Nephropathy, PANDAS, PFAPA

- Even more relative indications:

- Halitosis, caseum, malocclusion, adenotonsillar hypertrophy, streptococcus carrier

Mitchell, R.B., Archer, S.M., Ishman, S.L., Rosenfeld, R.M., Coles, S., Finestone, S.A., Friedman, N.R., Giordano, T., Hildrew, D.M., Kim, T.W., Lloyd, R.M., Parikh, S.R., Shulman, S.T., Walner, D.L., Walsh, S.A. and Nnacheta, L.C. (2019), Clinical Practice Guideline: Tonsillectomy in Children (Update). Otolaryngology-Head and Neck Surgery, 160: S1-S42. <https://doi.org/10.1177/0194599818801757>

# Pediatric OSA: Adenotonsillectomy

- Indications: Simple snoring & OSA.
- Success rate: 85-95%
- Tonsillectomy **should not be based solely on PSG** but also on clinical history, examination, and likelihood of improving sleep and symptoms.”<sup>3</sup>
- Tonsillar size alone **does not** correlate with severity of SDB, adenoids + tonsils. AAO Guidelines
- Usually outpatient, but **inpatient** (24h monitoring) if : < 3years, Down’s, underweight, AHI>10, SaO<sub>2</sub> <70%, congenital heart defects, asthma, craniofacial alt, cerebral deficiencies<sup>1,2</sup>
- **Complications:** laryngospasm, nasopharyngeal hemorrhage, desaturation, airway obstruction<sup>1,2</sup>
- **Risk factors** for persistent or recurrent disease: < 3years, Down’s, obesity, asthma craniofacial or neuromuscular disorder<sup>1,2</sup>

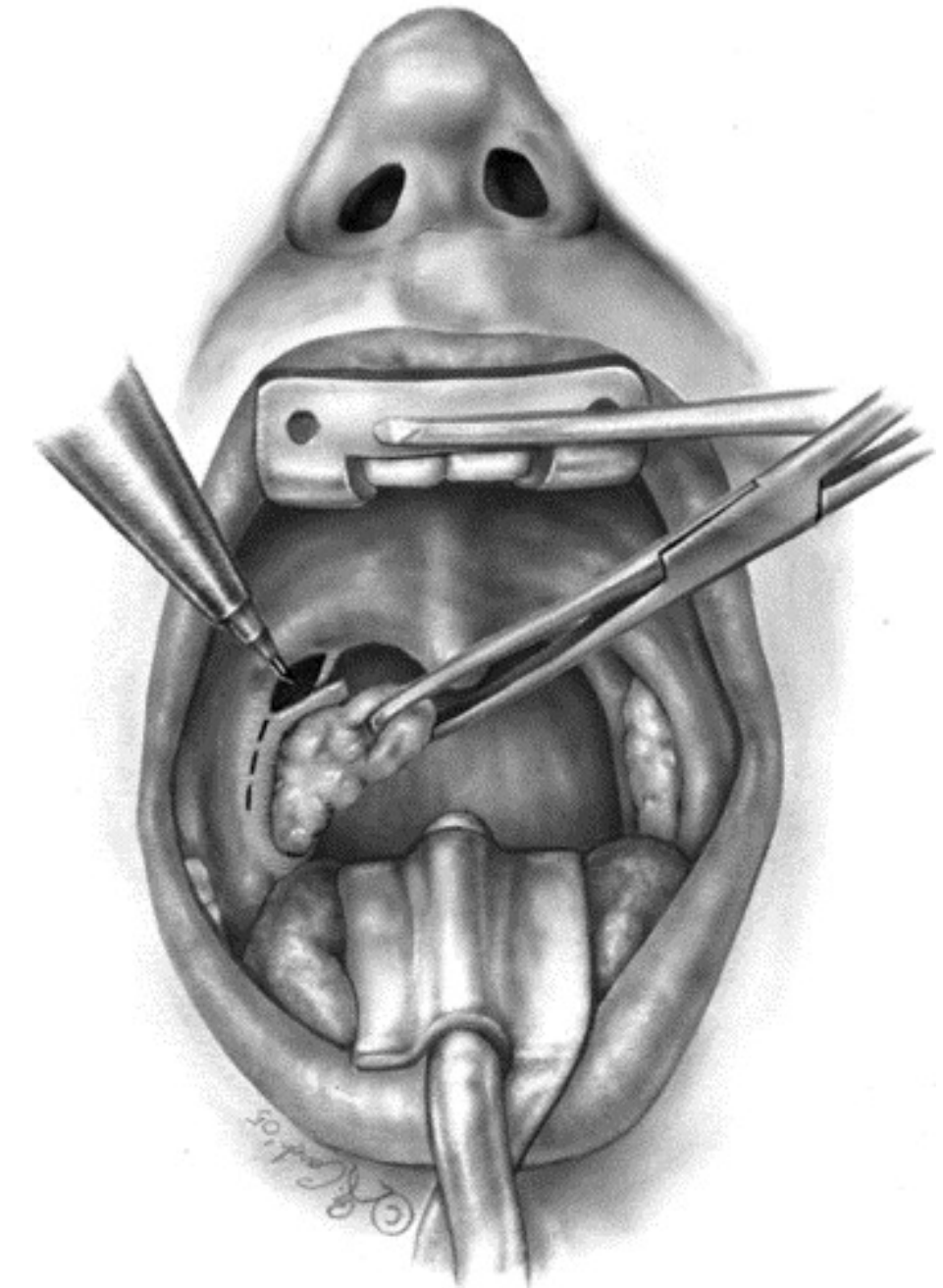
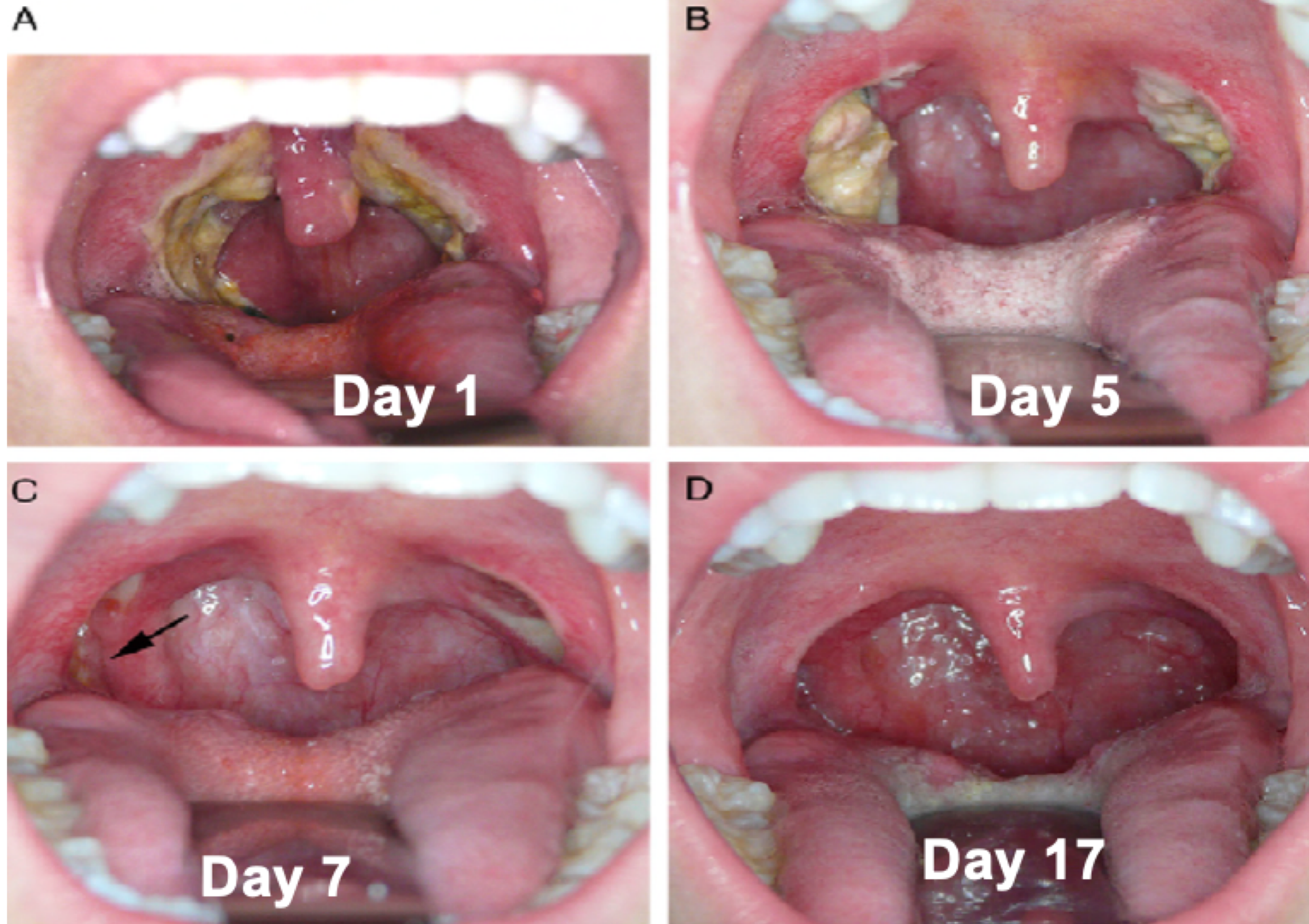
1- K. Hörmann, T. Verse, *Surgery for Sleep Disordered Breathing*, 87 DOI: 10.1007/978-3-540-77786-1\_6.4K.

2 - De Benedetto M, Arigliani M, Ballacchino A, Cassano P, Toraldo DM, Ralli M, Passali FM, Passali D. Obstructive sleep apnea syndrome in the pediatric age: the role of the otorhinolaryngologist. *Eur Rev Med Pharmacol Sci*. 2019 Mar;23(1 Suppl):3-8. doi: 10.26355/eurrev\_201903\_17340. PMID: 30920635.

3 - Otolaryngology–Head and Neck Surgery144(1S) S1–S30 2011



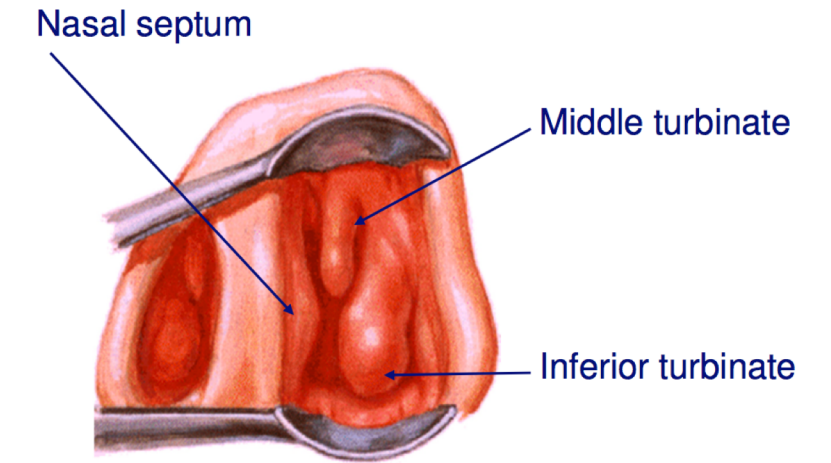
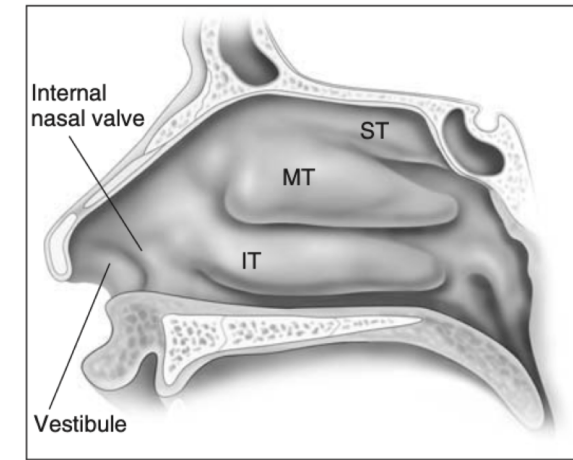
# Adenotonsillectomy vs adenotonsillotomy (partial)



Isaacson G. et al. Pediatrics Vol. 130 No. 2 August 1, 2012 pp. 324-334



# Rhinitis



## SYMPTOMS

What we ask

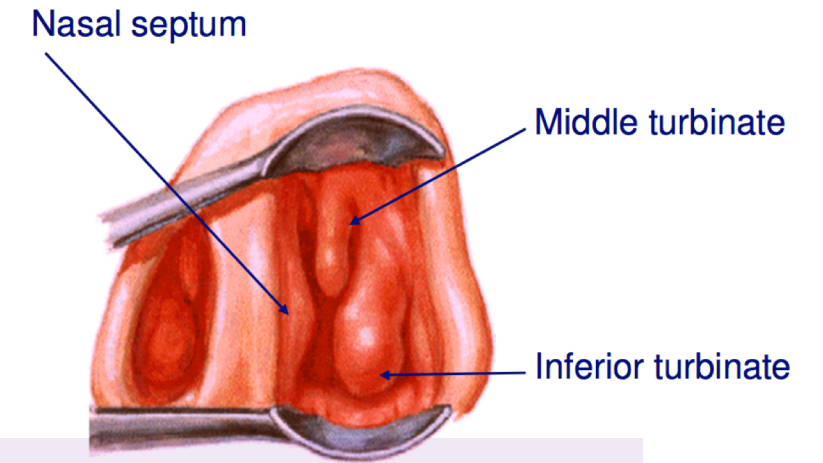
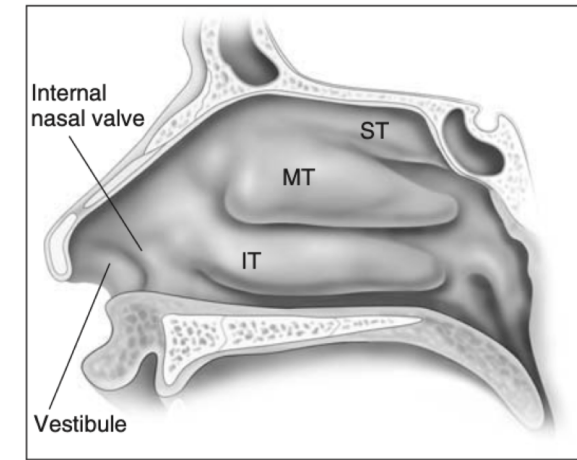
- Nasal obstruction
- Rhinorrhea
- Dry cough
- Sneezing
- Pruritis – nasal or conjunctival
- Snoring
- Mouth breathing

## SIGNS

What we see

- Bags under eyes
- Open mouth
- Loud breathing
- Middle ear otitis – effusion
- Rhinorrhea
- Inferior turbinate hypertrophy
- Pale or hyperemia nasal mucosa

# Rhinitis



## CAUSES

- Infection / recurrent infection
- Allergies
- Irritants / Pollution

## DD

- Choanal atresia
- Foreign object

## TREATMENT

- Unspecific immunotherapy
  - Broncho-vaxom, bactek, imunoglukan...
- Specific immunotherapy
  - Anti-mite or anti-graminea vaccines
- Nasal corticosteroids
  - Mometasone, fluticasone, budesonide
- Anti-leucotrienes
  - Montelukaste
- Anti-histamines
  - Desloratadine, levocetirizine...
- Surgery



# Inferior turbinate reduction

- Indications:

- Inferior turbinate hypertrophy

Associated with adenotonsillectomy

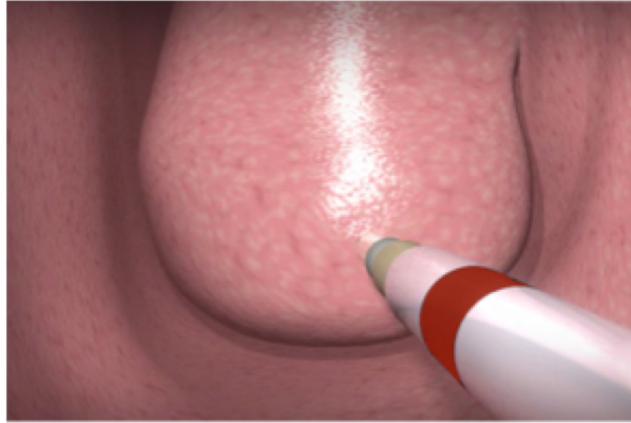
Stand alone if no adenotonsillar hypertrophy

Not enough response after medical treatment

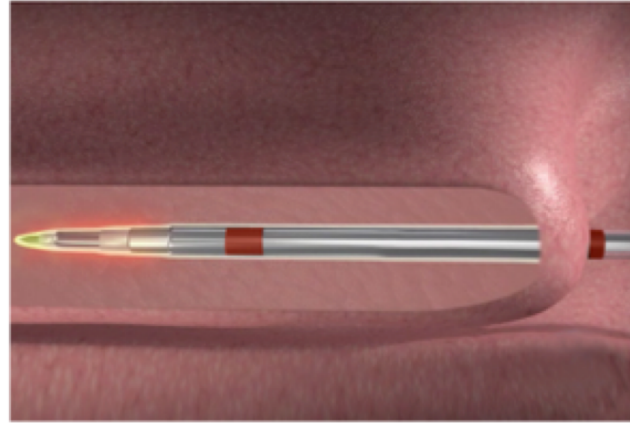
- Controversy

- From what age?
  - Technique?
  - Regrowth?
  - Associated allergies should be controlled

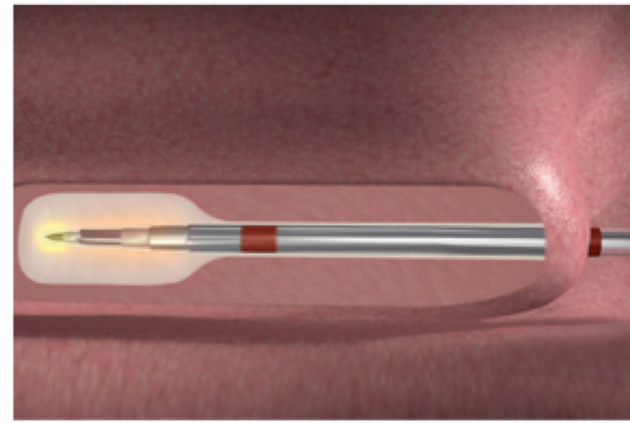
## Surgical Procedure



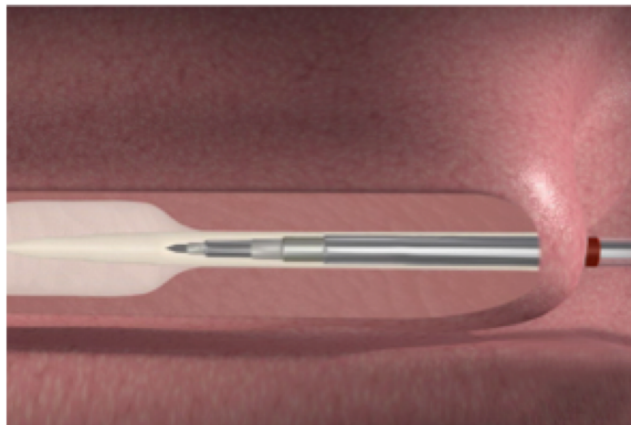
**Step 1**  
Press the COBLATION® (yellow ablate) foot pedal while advancing the Wand tip submucosally into the inferior turbinate. Once inserted, remove your foot from the COBLATION foot pedal.



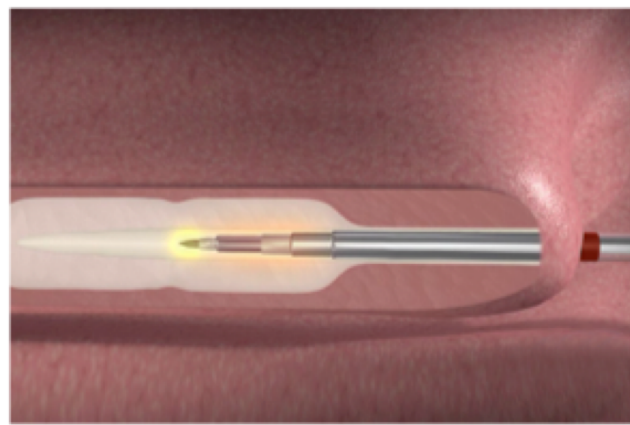
**Step 2**  
Advance the inactivated wand submucosally to the most proximal (closest to the handle) marker or desired depth. Warning: Take care not to perforate the posterior aspect of the turbinate.



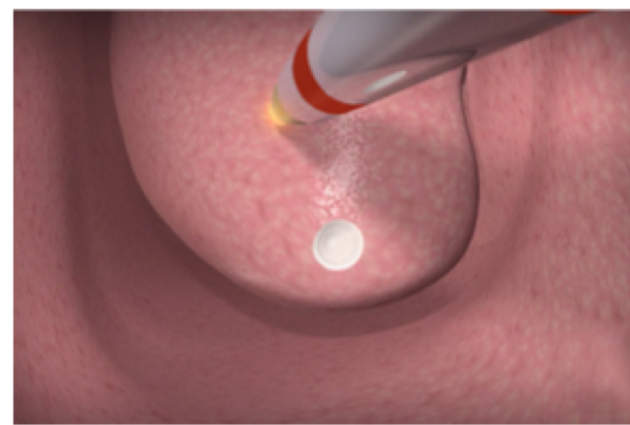
**Step 3**  
Press the COBLATION foot pedal while holding the Wand in place and keep the wand activated for 10 seconds to create the first lesion. The wand may also be gently moved in a circular motion to increase the size of the lesion.<sup>4</sup>



**Step 4**  
Withdraw the inactivated wand to the distal (closest to the Wand tip) visualization marker or desired depth. Warning: Take care not to perforate the posterior aspect of the turbinate.



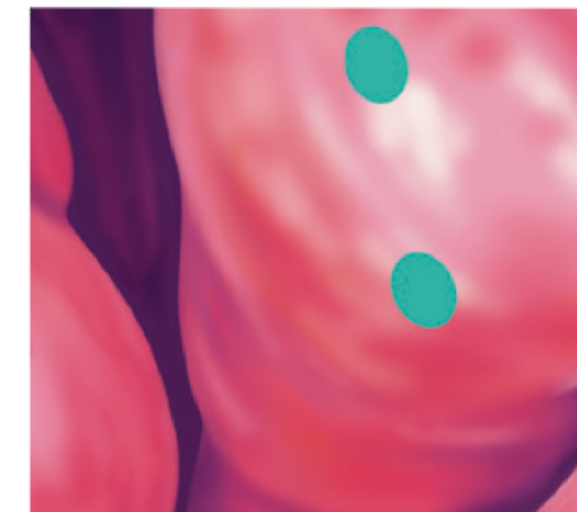
**Step 5**  
Press the COBLATION foot pedal and activate the wand for 10 seconds to create a second lesion. The wand may also be gently moved in a circular motion to increase the size of the lesion.<sup>4</sup>



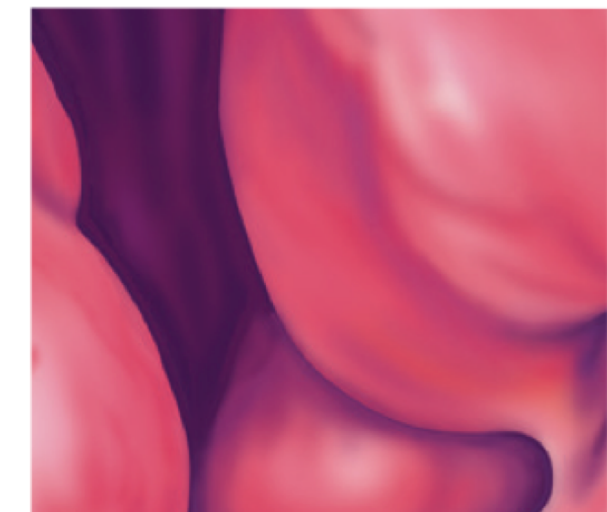
**Step 6**  
Carefully remove the inactivated wand. This process may be repeated to create multiple channels to decrease the size of the turbinate.

**OLYMPUS**  
**CELON**

**smith&nephew**  
**COBLATION®**  
**REFLEX ULTRA® PTR**  
**AND ULTRA 45**  
Turbinate Reduction Wands



Green dots indicate wand entry points



Tissue removal leads to immediate opening of the nasal airway



# Pediatric obstructive sleep apnea (OSA)

## International Classification of Sleep Disorders ICSD-3

- Criteria A and B must be met
- A. The presence of one or more of the following:
  - Snoring.
  - Labored, paradoxical, or obstructed breathing during the child's sleep.
  - Sleepiness, hyperactivity, behavioral problems, or learning problems.
- B. PSG demonstrates one or both of the following:
  - One or more obstructive apneas, mixed apneas, or hypopneas, per hour of sleep.

OR

- A pattern of obstructive hypoventilation, defined as at least 25% of total sleep time with hypercapnia ( $\text{PaCO}_2 > 50 \text{ mm Hg}$ ) in association with one or more of the following:
  - Snoring.
  - Flattening of the inspiratory nasal pressure waveform.
  - Paradoxical thoracoabdominal motion.

# Pediatric OSA

## SYMPTOMS

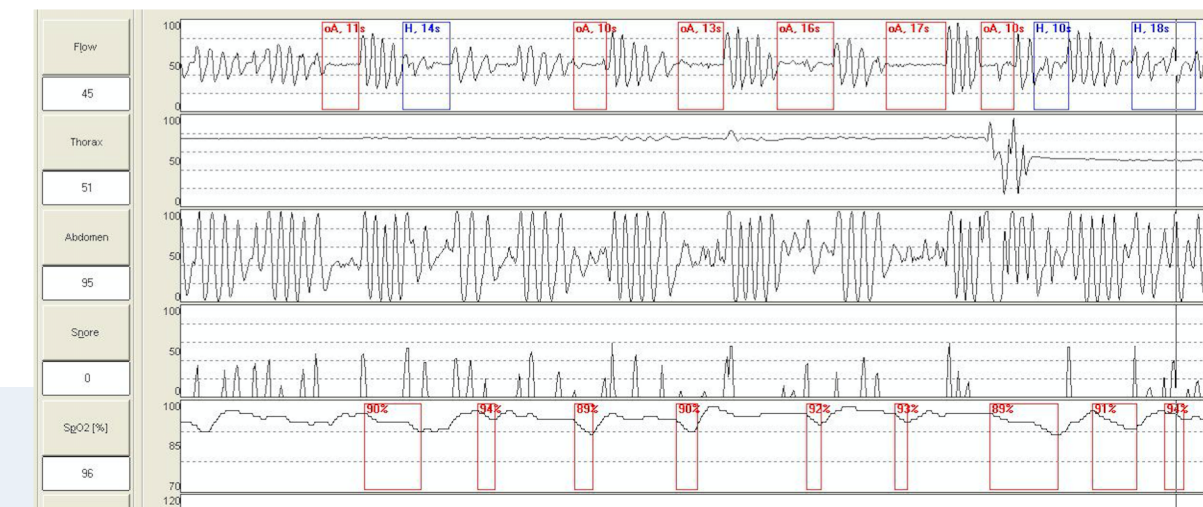
- Snoring
- Apnea
- Nasal obstruction/mouth breathing
- Irritability/moodiness
- Hyperactivity/daytime sleepiness
- Secondary enuresis
- Pectus excavatum
- Sleeping in unusual positions

What we ask

## SIGNS

- Bags under eyes
- Obesity/low percentile progression
- Open mouth
- Loud breathing
- Middle ear otitis – effusion
- Rhinorrhea &/or inferior turbinate hypertrophy
- Tonsils 3+ or 4+
- High arched & narrow hard palate
- Malocclusion

What we see





# Pediatric OSA

## CAUSES

What we may think

- Adenotonsillar hypertrophy
- Obesity
- Lingual tonsil hypertrophy
- Macroglossia
- Laryngomalacia
- Decreased muscular tone
- Craniofacial features

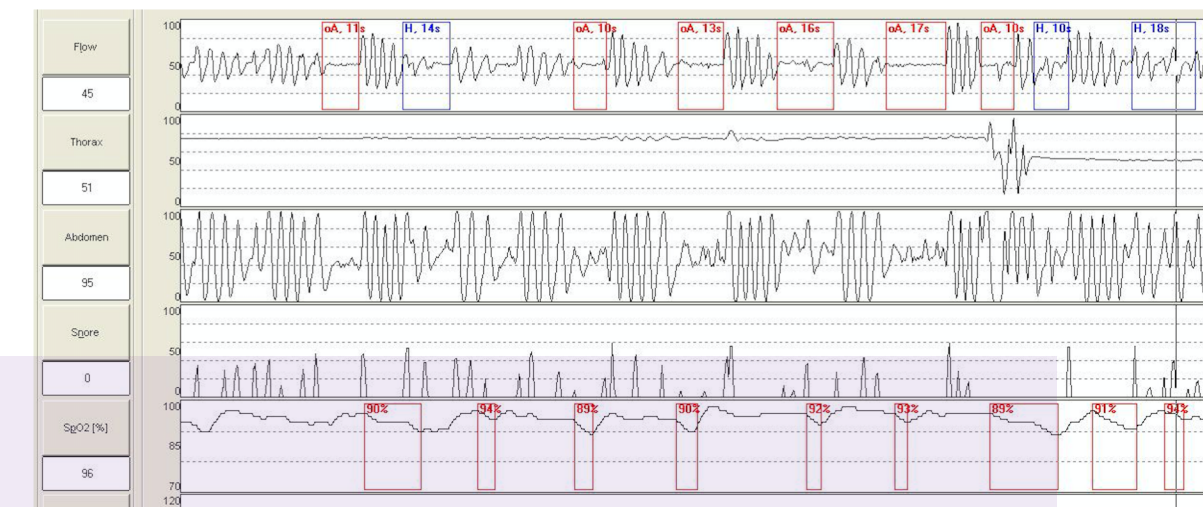
## DD

- Insufficient sleep, Narcolepsy, Idiopathic hypersomnia, sleep related epilepsy, central sleep apnea, isolated snoring, nonobstructive alveolar hypoventilation

## TREATMENT

How we may treat

- Nasal corticosteroids
  - Mometasone, fluticasone, budesonide
- Anti-leucotrienes
  - Montelukaste
- Mandibular advancement devices
- Positive airway pressure (PAP)
- Positional therapy
- Myofunctional therapy
- Surgery



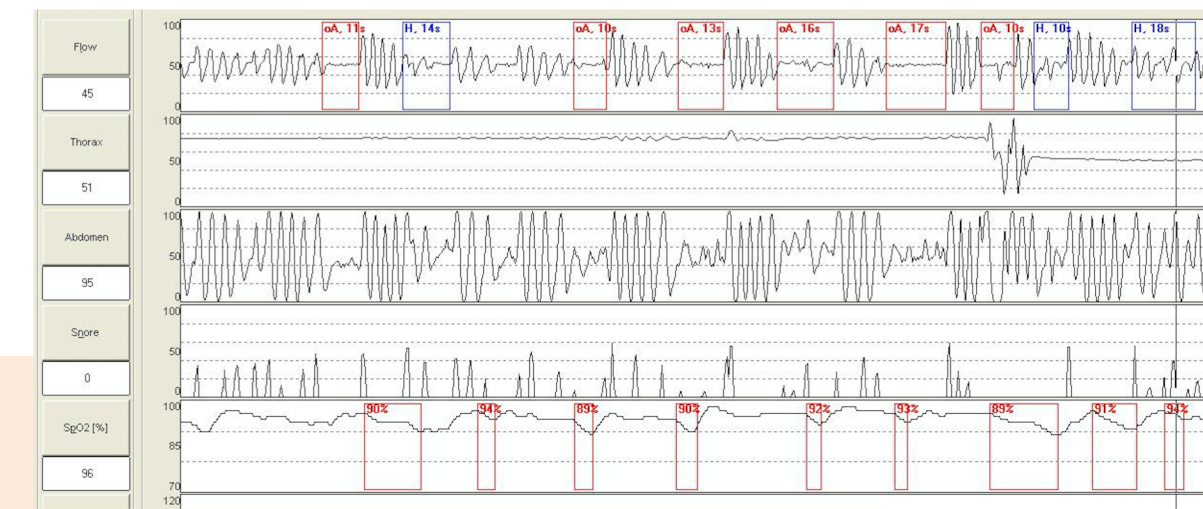
# Surgery for Pediatric OSA

- Indications:

- Adenotonsillectomy
- Inferior turbinate reduction
- Lingual frenulum surgery?
- Palatopharyngoplasty
- Lingual tonsillectomy
- Partial arytenoidectomy
- Epiglottopexy/partial epiglottectomy

- Topics to discuss

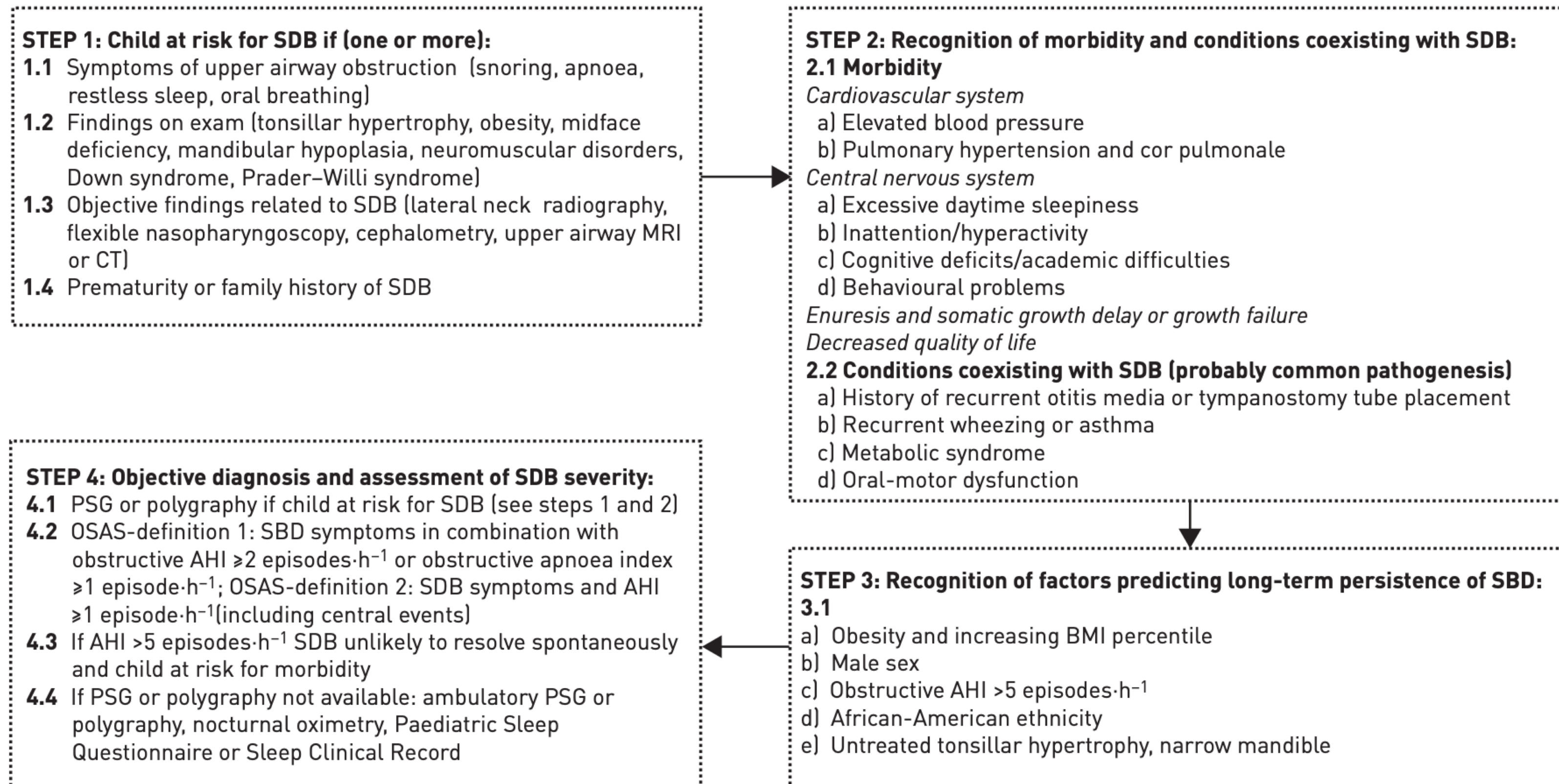
- From what age?
- Technique?
- Regrowth?
- Small tonsils
- Obesity
- Syndromes
- Laryngomalacia





# Obstructive sleep disordered breathing in 2- to 18-year-old children: diagnosis and management

Athanasios G. Kaditis<sup>1</sup>, Maria Luz Alonso Alvarez<sup>2</sup>, An Boudewyns<sup>3</sup>, Emmanouel I. Alexopoulos<sup>4</sup>, Refika Ersu<sup>5</sup>, Koen Joosten<sup>6</sup>, Helena Larramona<sup>7</sup>, Silvia Miano<sup>8</sup>, Indra Narang<sup>9</sup>, Ha Trang<sup>10</sup>, Marina Tsaoussoglou<sup>1</sup>, Nele Vandebussche<sup>11</sup>, Maria Pia Villa<sup>12</sup>, Dick Van Waardenburg<sup>13</sup>, Silke Weber<sup>14</sup> and Stijn Verhulst<sup>15</sup>



▼

**STEP 5: Indications for treatment of SDB:**

**5.1**

- a) AHI >5 episodes·h<sup>-1</sup> irrespective of the presence of morbidity
- b) Treatment may be beneficial if AHI 1–5 episodes·h<sup>-1</sup> especially in the presence of: morbidity from the cardiovascular system (see 2.1); morbidity from the central nervous system (see 2.1); enuresis; somatic growth delay or growth failure; decreased quality of life; risk factors for SDB persistence (see 3)
- c) If at risk for SDB and PSG or polygraphy not available, treatment is considered when positive oximetry or SDB questionnaires (see 4.4) or morbidity present

**5.2** Unclear whether should treat primary snoring (evaluation annually)

**5.3** OSAS treatment is a priority in the presence of: major craniofacial abnormalities; neuromuscular disorders; achondroplasia; Chiari malformation; Down syndrome; mucopolysaccharidoses; Prader–Willi syndrome



**STEP 6: Stepwise treatment approach to SDB#:**

**6.1** A stepwise treatment approach (from 6.2 to 6.9) is usually implemented until complete resolution of SDB

**6.2** Weight loss if the child is overweight or obese

**6.3** Nasal corticosteroids and/or montelukast *p.o.*

**6.4** Adenotonsillectomy

**6.5** Unclear whether adenoidectomy or tonsillectomy alone are adequate

**6.6** Rapid maxillary expansion or orthodontic appliances

**6.7** CPAP or NPPV (for nocturnal hypoventilation)

**6.8** Craniofacial surgery

**6.9** Tracheostomy



**STEP 7: Recognition and management of persistent SDB:**

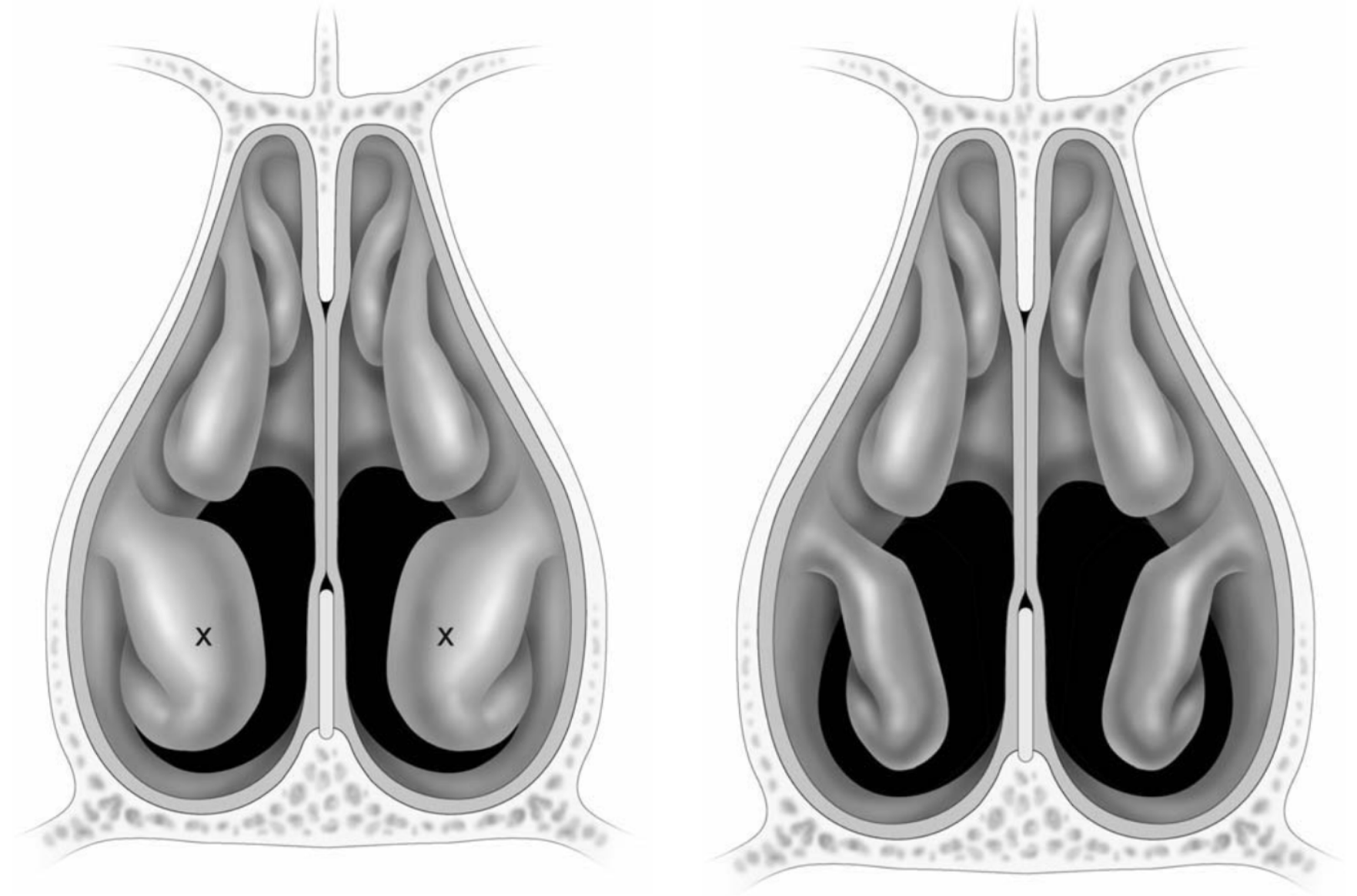
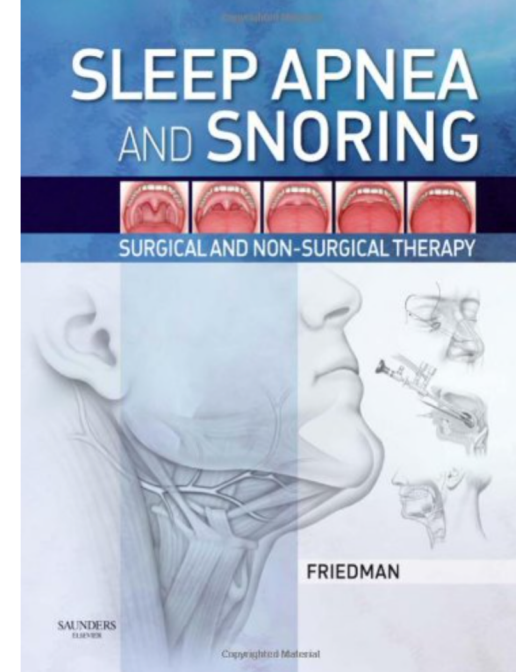
**7.1**

- a) Outcomes monitored after intervention (6 weeks–12 months): symptoms, PSG, quality of life, cardiovascular or central nervous system morbidity, enuresis, growth rate
- b) If PSG not available: polygraphy, oximetry/capnography
- c) PSG ≥6 weeks after adenotonsillectomy (persistent SDB symptoms or at risk of persistent OSAS preoperatively); after 12 weeks of montelukast/nasal steroid
- d) PSG after 12 months of rapid maxillary expansion (earlier if symptoms persist) and after 6 months with an oral appliance
- e) PSG for titration of CPAP, NPPV and then annually; PSG as predictor of successful decannulation with tracheostomy
- f) Airway re-evaluation by nasopharyngoscopy, drug-induced sleep endoscopy, MRI



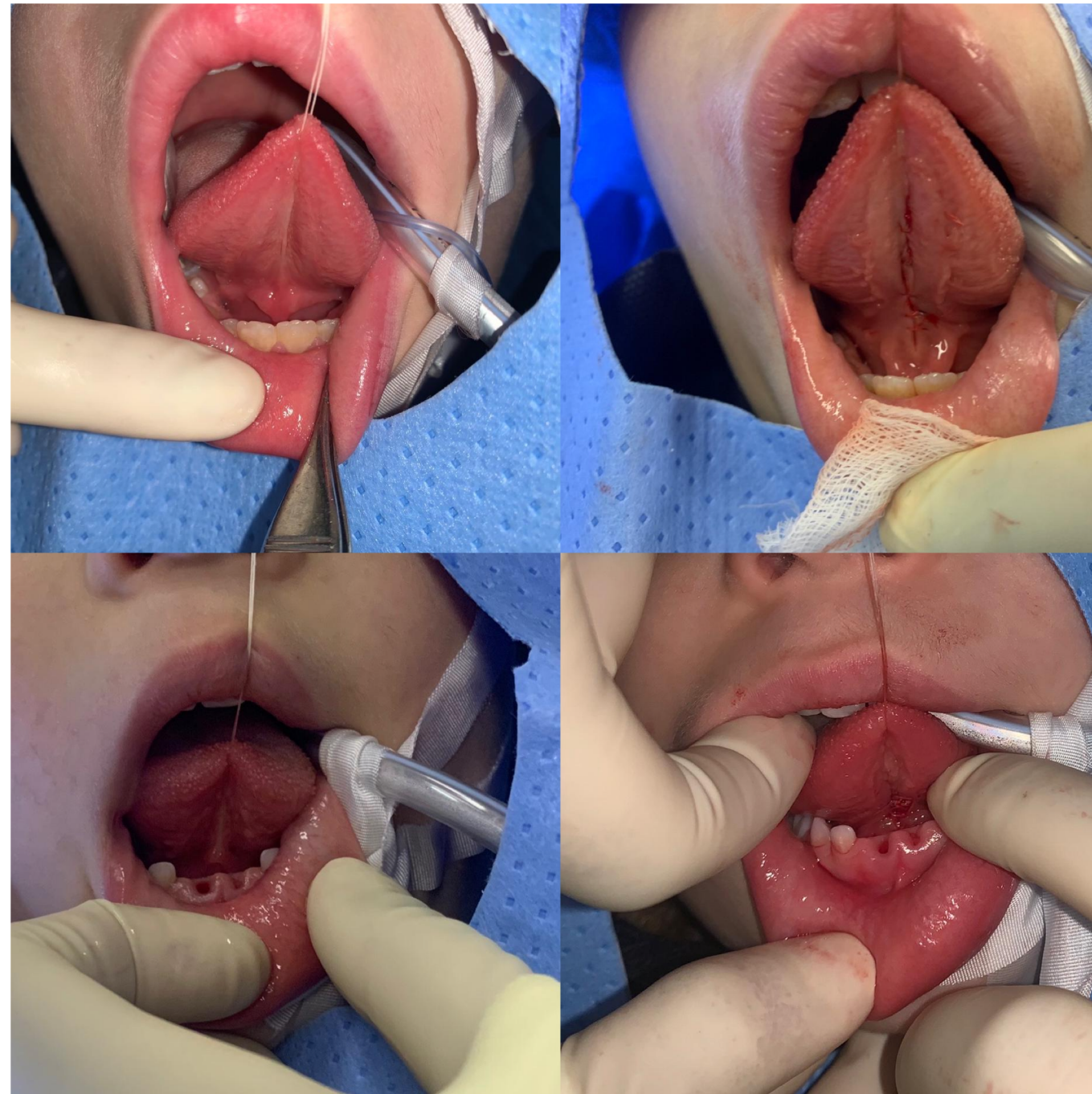
# Pediatric OSA & rhinitis

- Increased airway resistance
- Unstable oral breathing
  - Chin and mandible move posteriorly and inferiorly displacing the tongue in that direction
  - Decreasing length and muscle tension = increase in compliance
- Impaired nasal reflexes
- Does not influence the AHI significantly, but influences symptoms significantly





# Pediatric OSA & ankyloglossia



## Clinical Consensus Statement: Ankyloglossia in Children

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### Abstract

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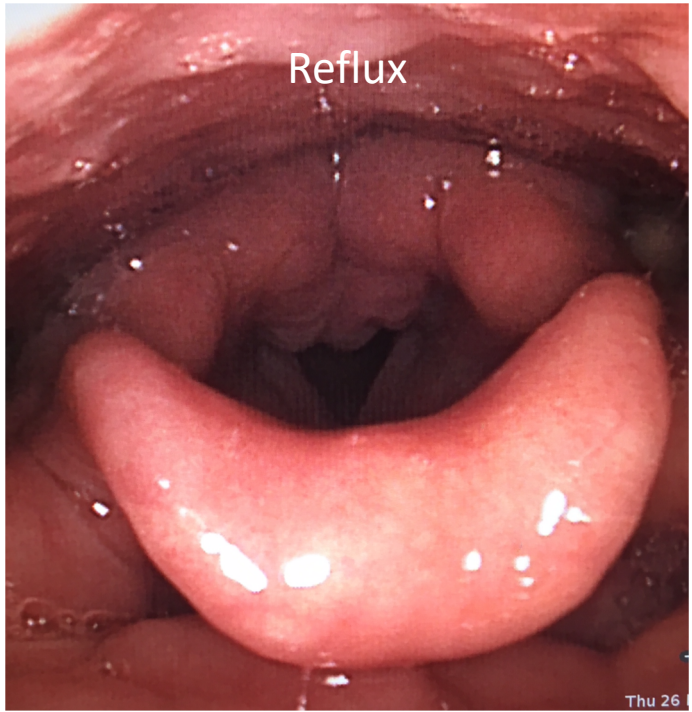
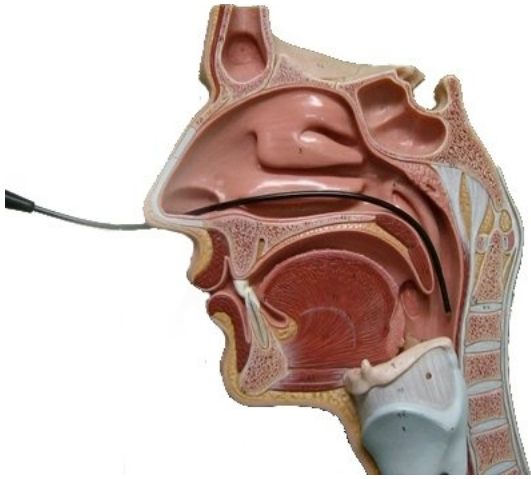
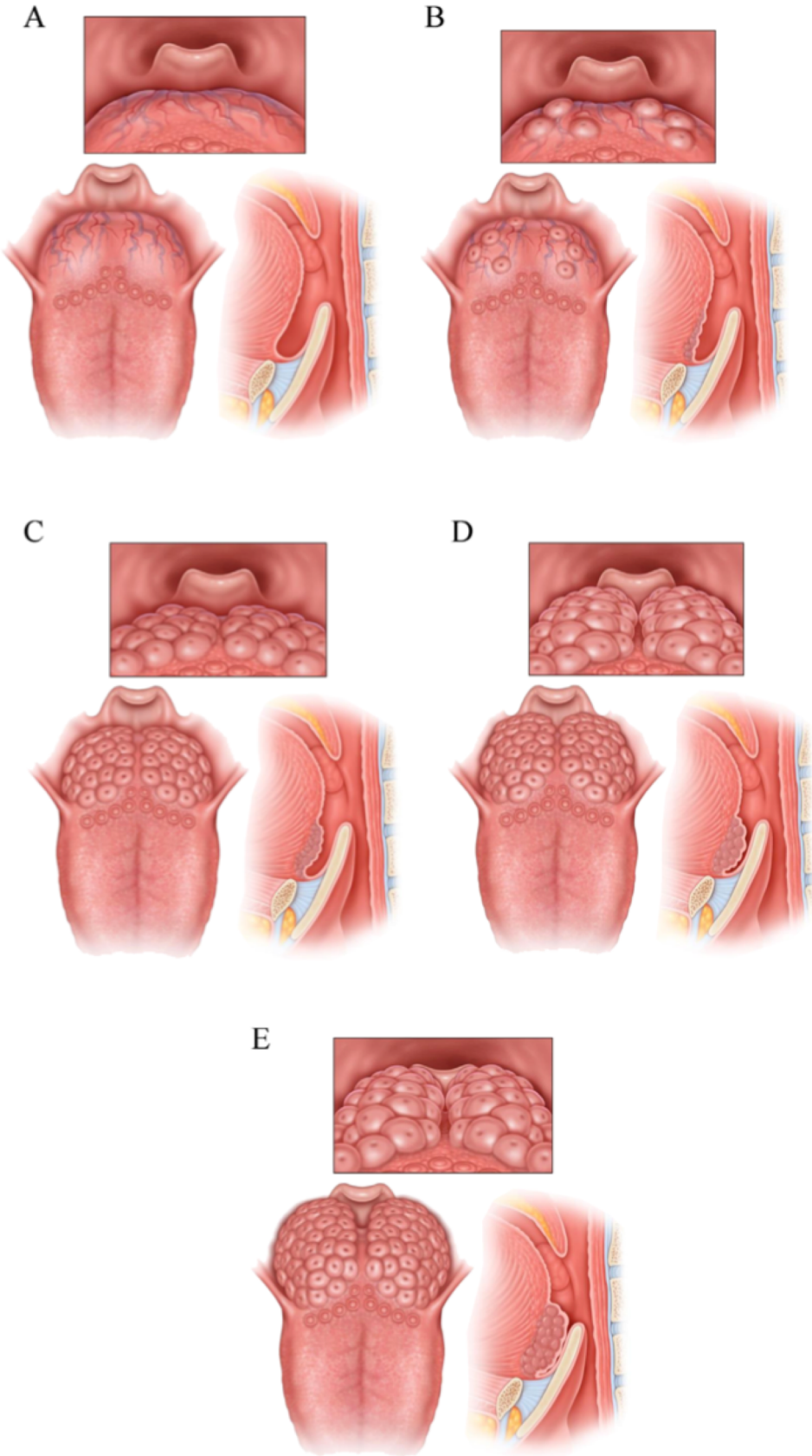
**Table 2.** Statements That Reached Consensus: Buccal Tie/Ankyloglossia and Sleep Apnea.

No.	Statement
36	Surgery to release a “buccal tie” should not be performed.
54	Ankyloglossia does not cause sleep apnea.



# Pediatric OSA & reflux

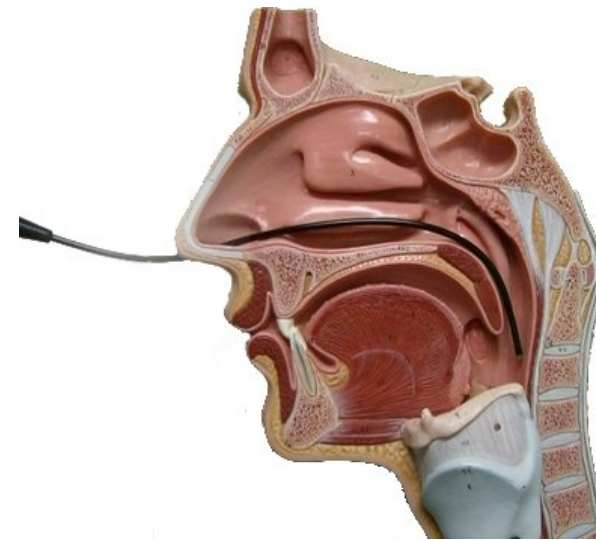
- Lymphoid tissue hypertrophy
- Laryngeal edema
- Laryngospasm
- Laryngomalacia





# Pediatric OSA & laryngomalacia

- 34 children (77.4%) were diagnosed with concomitant OSA

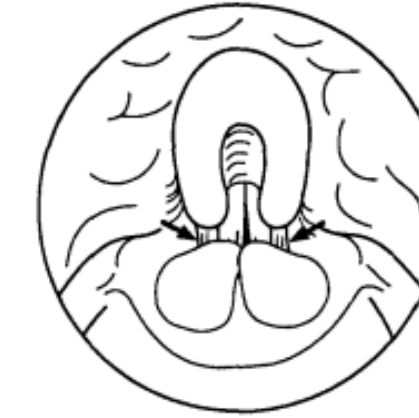


Normal



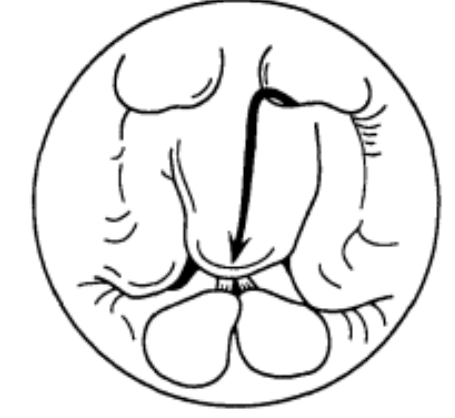
Type 1

Type I



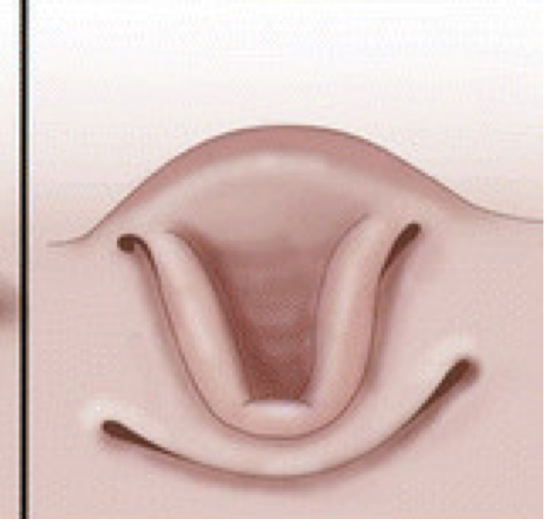
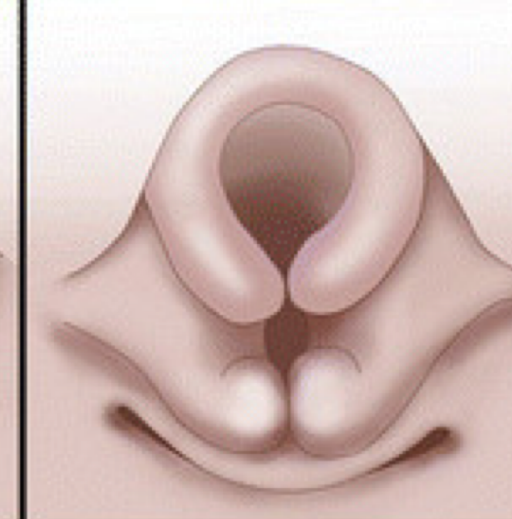
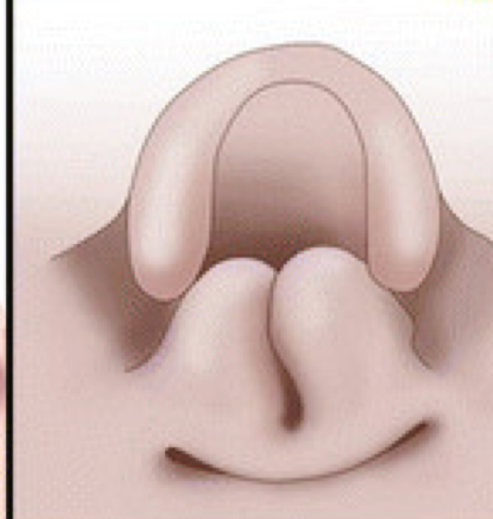
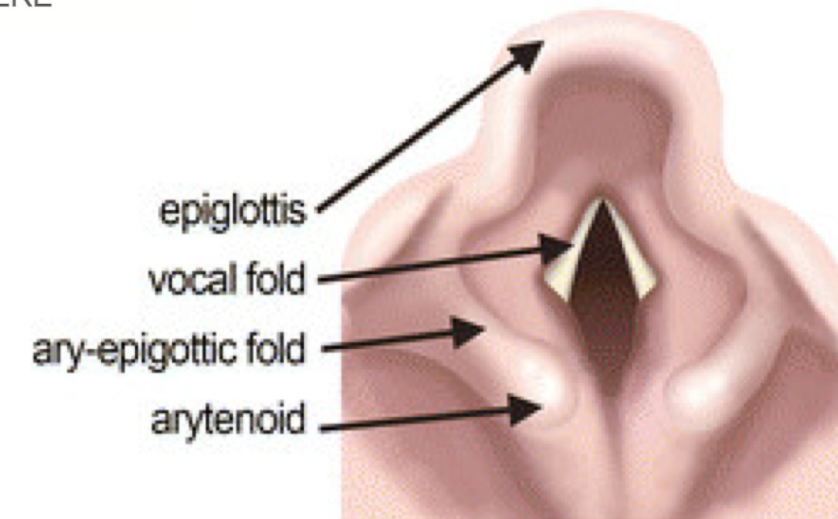
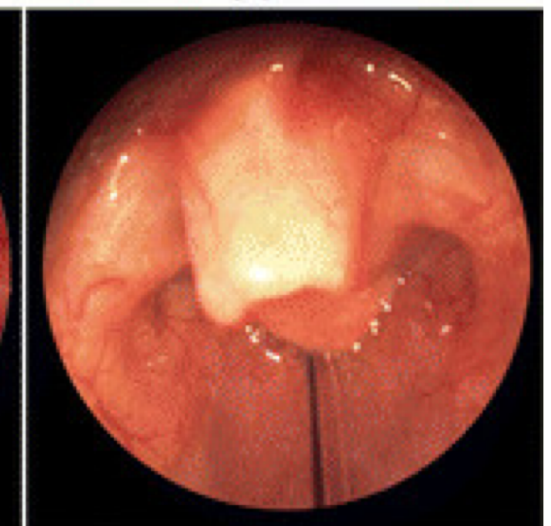
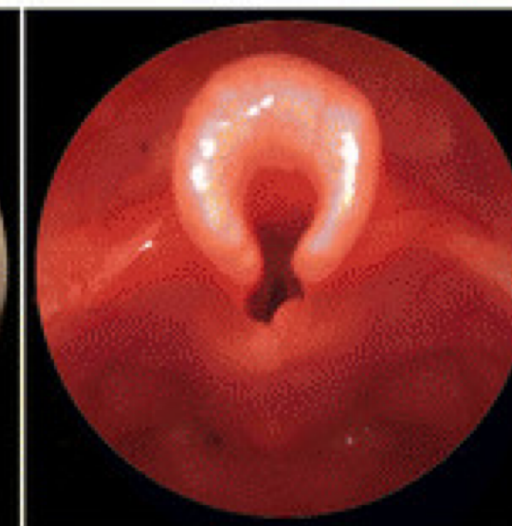
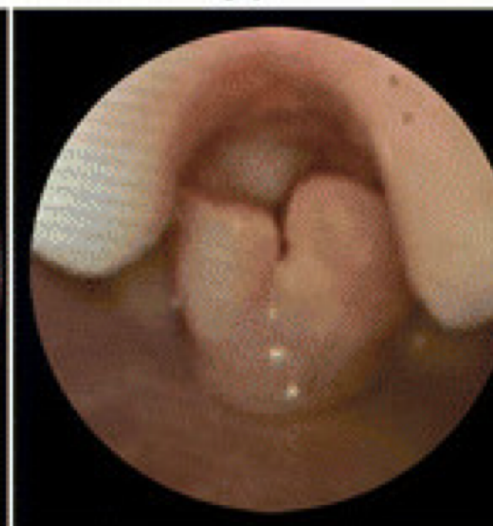
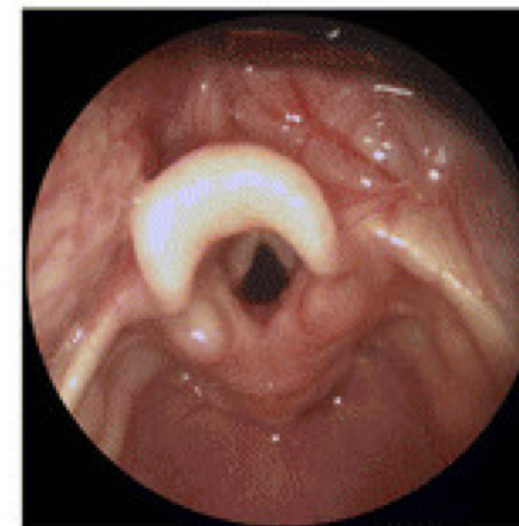
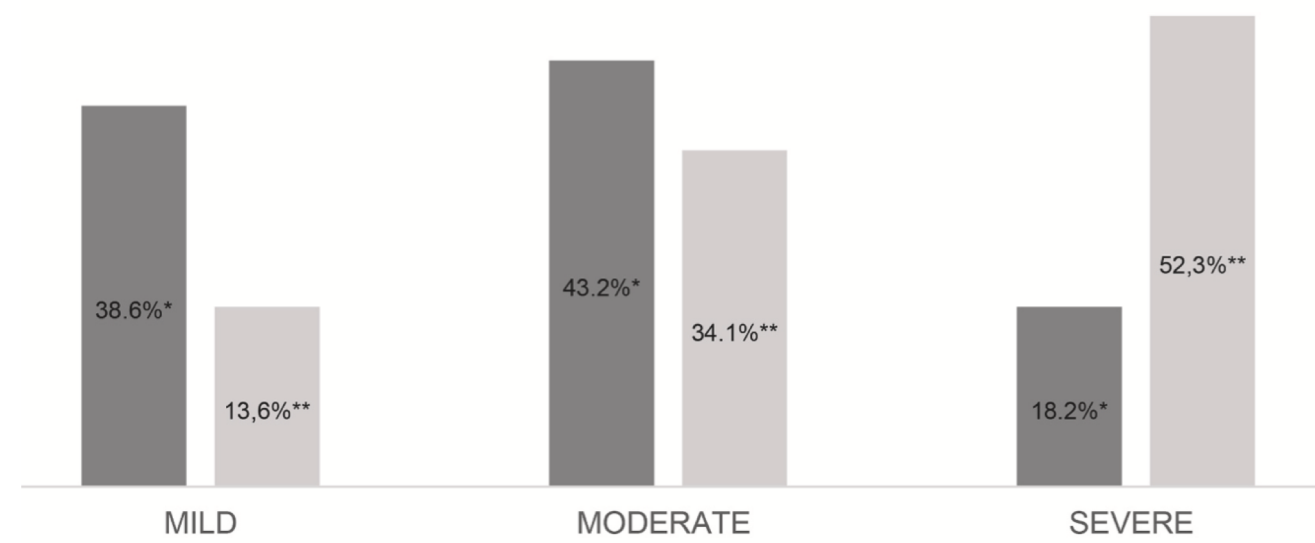
Type 2

Type II



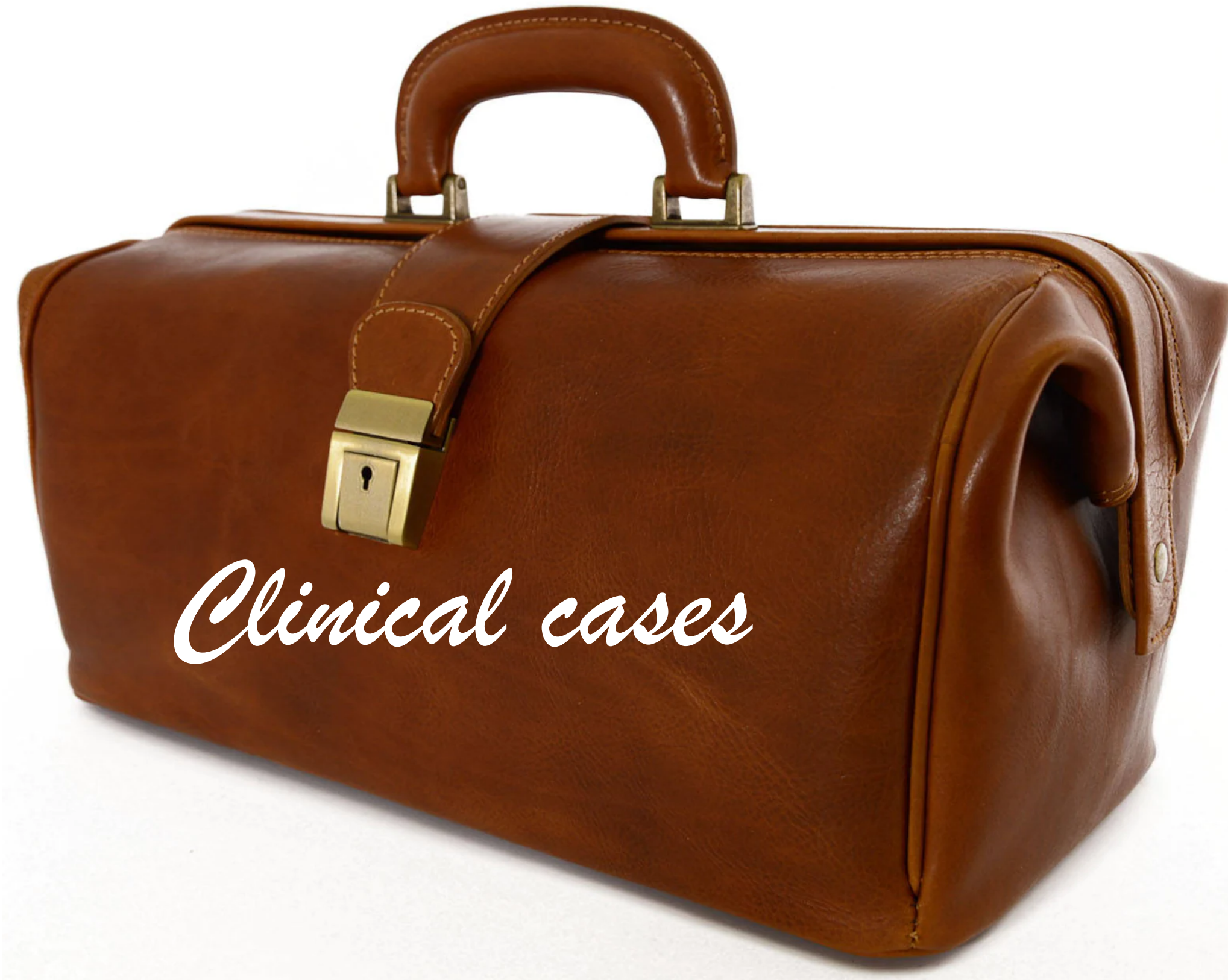
Type 3

Type III



Verkest V, Verhulst S, Van Hoorenbeeck K, Vanderveken O, Saldien V, Boudewyns A. Prevalence of obstructive sleep apnea in children with laryngomalacia and value of polysomnography in treatment decisions. Int J Pediatr Otorhinolaryngol. 2020 Oct;137:110255. doi: 10.1016/j.ijporl.2020.110255. Epub 2020 Jul 12. PMID: 32896360.





*Clinical cases*

# *Caso clínico #1*

- *Francisca, 5 anos*
- *Enviada pela Odontopediatra: Dr. Ruben Trindade*
  - *“Alterações esqueléticas oro-faciais antero-posteriors e sagitais com mordida aberta e tendência para prognatismo mandibular. Interposição lingual. Boca maioritariamente aberta.*
- *Clínica:*
  - *Boca aberta de forma recorrente. Ouve bem e sem OMA. Amígdalas grandes, mas sem amigdalites. Roncopatia só quando está constipada.*
  - *Seguida por Alergologia e medicada.*



# Pediatric OSA: Signs and symptoms

## Pediatric OSA

- Snoring\*
- Difficulty breathing
- Paradoxical breathing
- Pauses, gasps or arousals
- Sleeping in unusual positions
- *Pectus excavatum*
- Diaphoresis
- Morning headaches
- Excessive daytime sleepiness\*
- Decreased school performance
- Enuresis
- Nasal obstruction/mouth breathing
- Irritability/moodiness/hyperactivity
- Lower percentile progression

## Adult OSA

- Snoring
- Apneas detected by others ♂
- Asphyxia
- Microarousals/awakening
- Daytime sleepiness ♂
- Headaches ♀
- Nasal obstruction/mouth breathing
- Memory/concentration deficits
- Irritability
- Depression ♀
- Insomnia ♀
- Driving accidents

# Pediatric OSA: Risk factors

## Pediatric OSA

- Rhinitis and atopic dermatitis
- Recurrent infections
- Adenotonsillar hypertrophy
- Reflux
- Cranio-facial abnormalities
  - Down syndrome
  - Syndromes with midface and/or mandibular hypoplasia
- Neuromuscular disorders
- Mucopolysaccharidosis
- Sickle cell disease
- Secondary tobacco smoke exposure

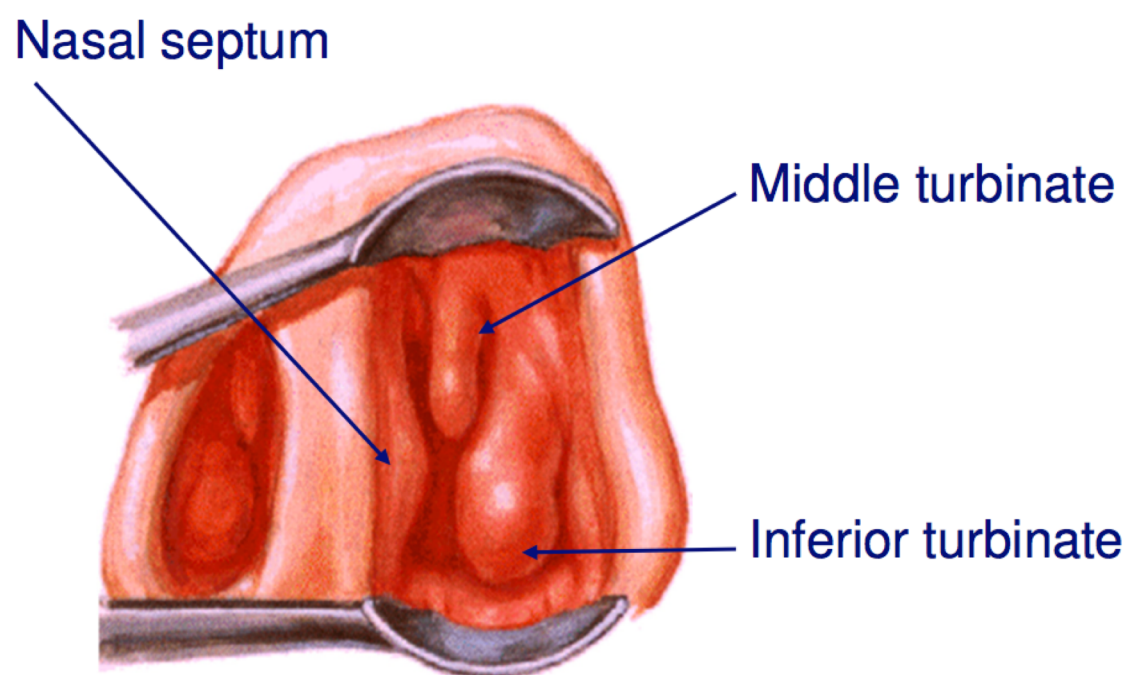
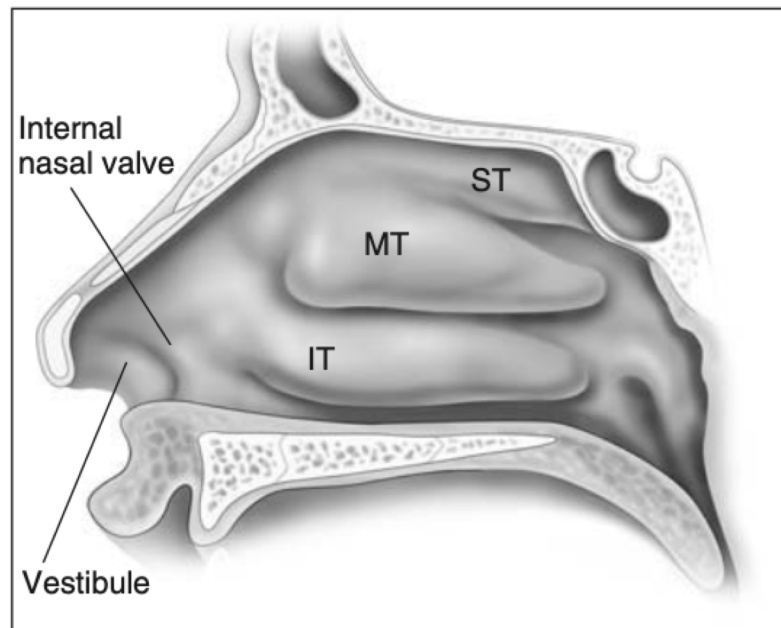
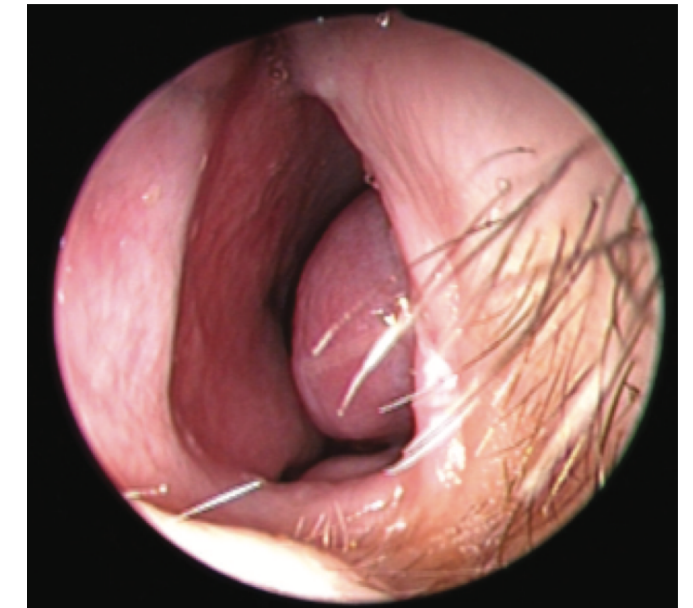
## Adult OSA

- Male gender ♂
- Pregnancy 3T / Menopause
- Alcohol, tobacco
- BZDs or other sedatives
- GERD
- CV disease: HTA, ICC, AF, MI
- Family history
- Rhinitis
- Advanced age
- BMI, maxilomandibular configuration
- Metabolic: Acromegaly, hypothyroidism, DM II
- Craniofacial abnormalities
- Neuromuscular: myotonic dystrophy
- Heritability ~ 1/3 of the AHI variation

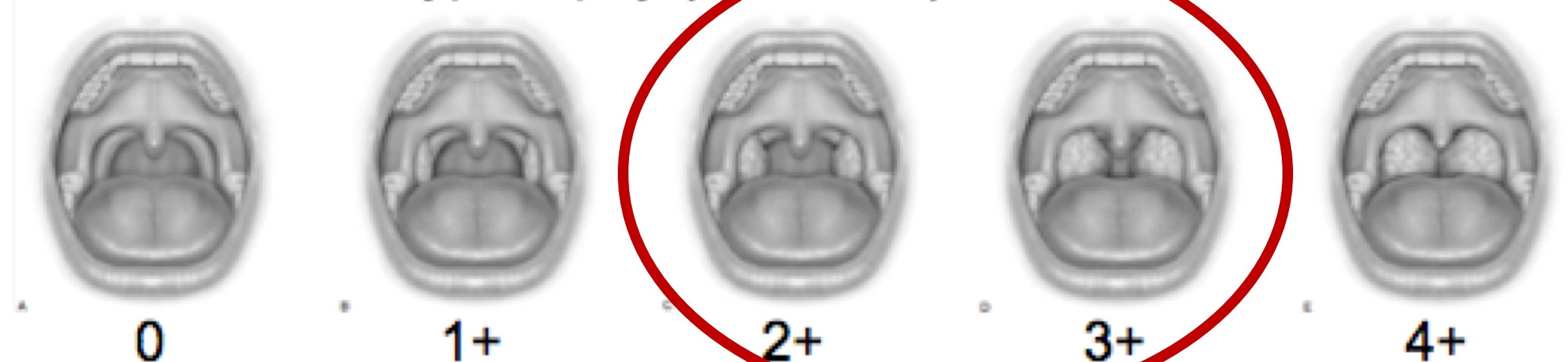


# Caso clínico #1: Francisca, 5 anos

- **Observação**
  - HT dos CI e rinorreia. Amígdalas grau II-III. Freio lingual bem.



## - Tonsil hypertrophy (Friedman)



# Pediatric OSA: Physical examination

## Pediatric OSA

- Dark circles
- Low growth percentile
- Obesity\*
- Craniofacial abnormalities
- Mouth breathing
- Inferior turbinate hypertrophy
- Adenotonsillar hypertrophy\*
- High arched and narrow hard palate
- Hypotonic inferiorly positioned tongue
- Anquiloglossia\*
- Macroglossia
- Laryngomalacia

## Adult OSA

- Obesity (abdominal & neck circumference)
- Retrognathia
- Craniofacial abnormalities
- Mouth breathing
- Inferior turbinate hypertrophy
- Deviated septum
- Nasal masses
- Tonsillar hypertrophy (palatine/lingual)
- Macroglossia
- High arched and narrow hard palate
- Lateral pharyngeal fat deposits
- Low positioned oh hypertrophied soft palate
- Dental malocclusion



# Caso clínico #1 : Francisca, 5 anos

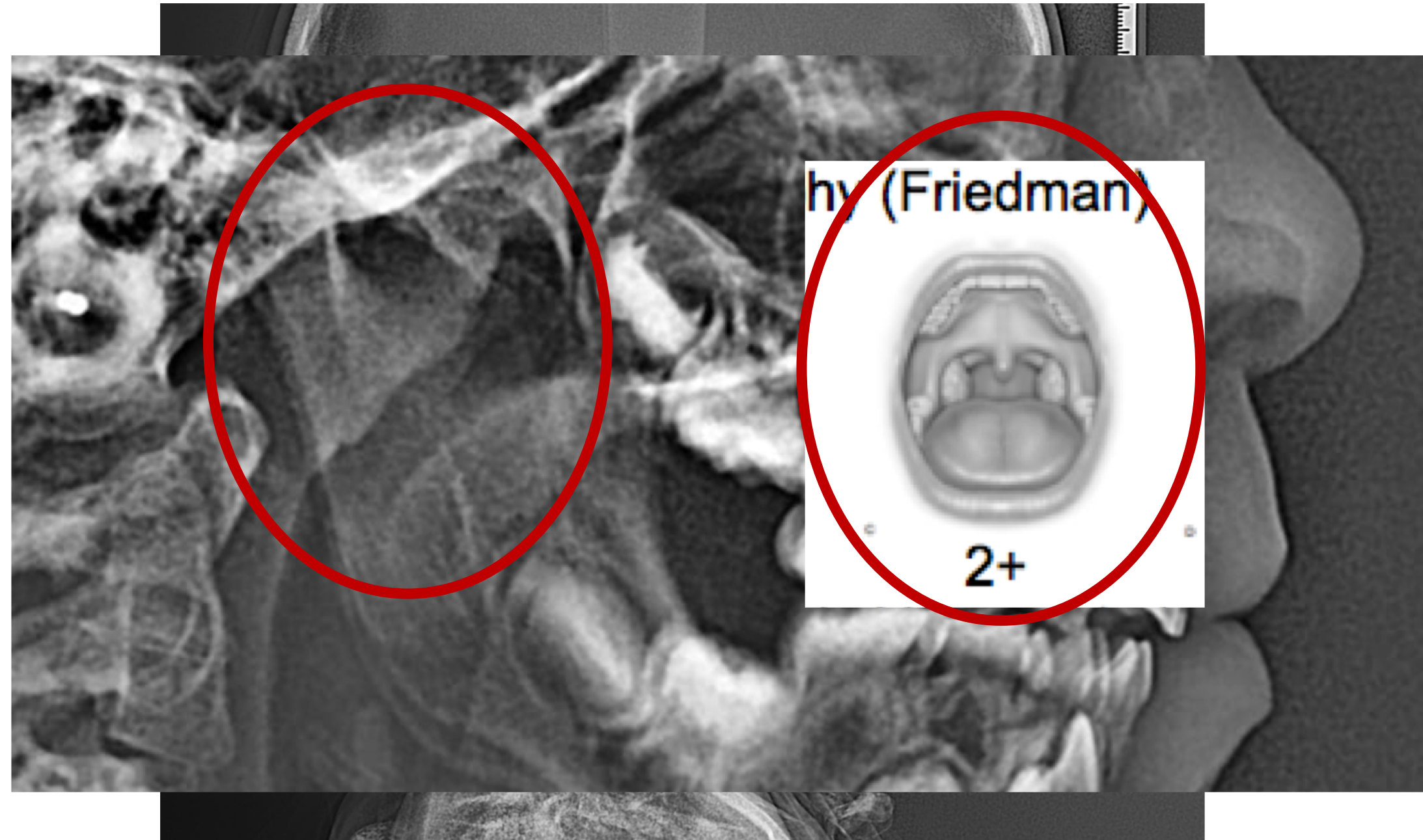
*Imagens cedidas pelo Dr. Ruben Trindade*

What to do?

- Watchful waiting?
- Polysomnography?
- Operate?
  - Adenoidectomy?
  - Adenotonsillectomy?
  - Inferior turbinate reduction?

- Informed consent

- Parents decided to go for surgery: adenotonsillectomy + inferior turbinate reduction



# Pediatric OSA: Adenotonsillectomy

Guideline

## Clinical Practice Guideline: Polysomnography for Sleep-Disordered Breathing Prior to Tonsillectomy in Children

**STATEMENT 1. INDICATIONS FOR PSG:** Before performing tonsillectomy, the clinician should refer children with SDB for PSG if they exhibit any of the following: **obesity, Down syndrome, craniofacial abnormalities, neuromuscular disorders, sickle cell disease, or mucopolysaccharidoses.** *Recommendation based on observational studies with a preponderance of benefit over harm.*



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# Pediatric OSA: Adenotonsillectomy

Guideline

## Clinical Practice Guideline: Polysomnography for Sleep-Disordered Breathing Prior to Tonsillectomy in Children

**STATEMENT 2. ADVOCATING FOR PSG: The clinician should advocate for PSG prior to tonsillectomy for SDB in children without any of the comorbidities listed in statement 1 for whom the need for surgery is uncertain or when there is discordance between tonsillar size on physical examination and the reported severity of SDB. *Recommendation based on observational and case-control studies with a preponderance of benefit over harm.***



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# Caso clínico #1: Francisca, 5 anos



What about post op?

- One month later, breathing much better, parents happy, but...
- *Ainda com olheiras apesar do bom espaço nasal e orofaríngeo*
- *Apurado que o sono mantém-se agitado e com sonolência diurna ocasional*
- *Três vezes por semana acordam as 06 da manhã e vão para a cama as 21h*





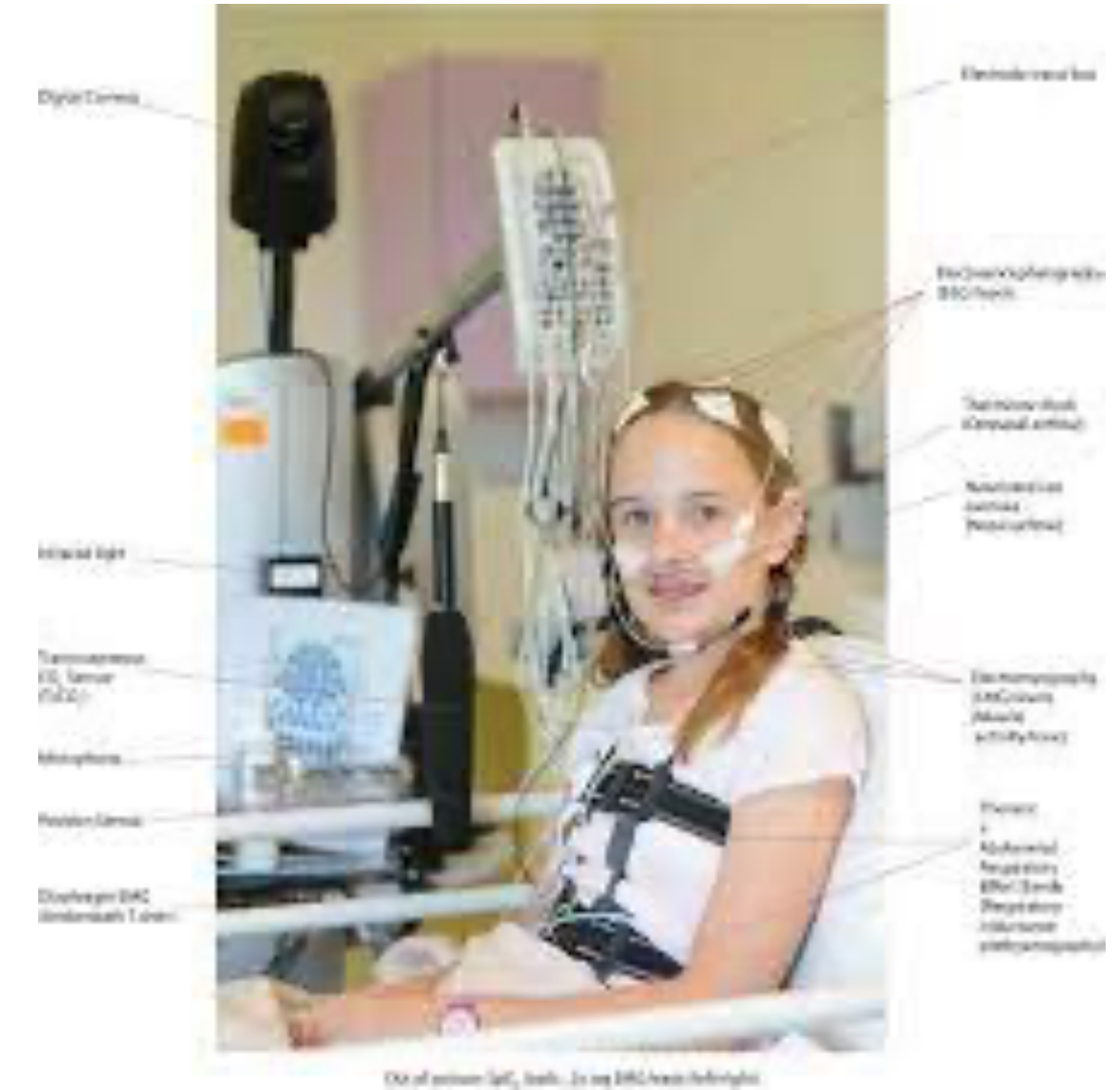
Age Group		Recommended Hours of Sleep Per Day
Newborn	0–3 months	14–17 hours (National Sleep Foundation) <sup>1</sup> No recommendation (American Academy of Sleep Medicine) <sup>2</sup>
Infant	4–12 months	12–16 hours per 24 hours (including naps) <sup>2</sup>
Toddler	1–2 years	11–14 hours per 24 hours (including naps) <sup>2</sup>
Preschool	3–5 years	10–13 hours per 24 hours (including naps) <sup>2</sup>
School Age	6–12 years	9–12 hours per 24 hours <sup>2</sup>
Teen	13–18 years	8–10 hours per 24 hours <sup>2</sup>



# Caso clínico #1: Francisca, 5 anos

What about post op?

- One month later, breathing much better, parents happy, but...
- Change of anti-histamine. Ordered polysomnography
- **Sleep psychologist!!**
- Back to the **Functional maxillary orthopediatrician** and maintain **Allergologist**
- Maintaining **ORL** evaluation
- Discuss need for actigraphy in the future?





## *Caso clínico #2: Leonor, 6 anos*

- *Enviada pela Odontopediatra: Dra. Beatriz Jordão*
  - *“Mordida cruzada posterior. Resp oral. Roncopatia. Interposição lingual, língua baixa, hipotonia musculos periorais, freio lingual curto, apinhamento dentario e arcadas dentárias pouco desenvolvidas”*

*Imagens cedidas pela Dra. Beatriz Jordão*

*Imagens da minha sobrinha, para efeito representativo*

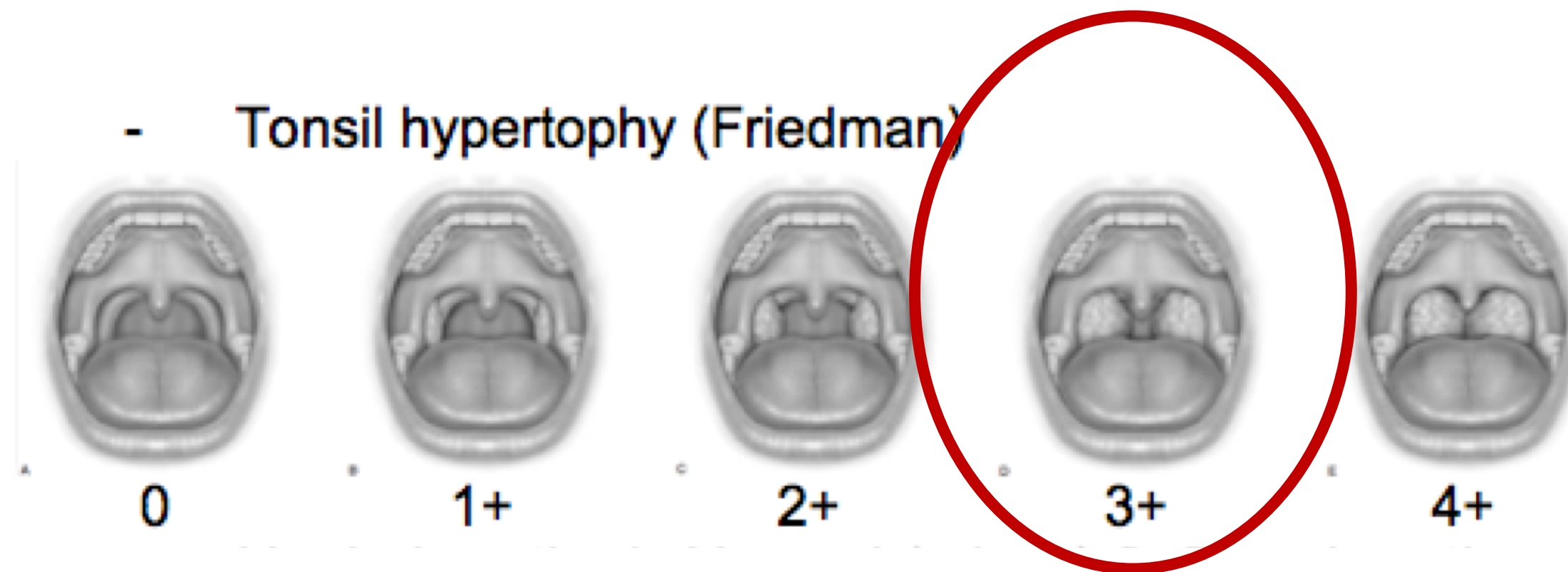
## Caso clínico #2: Leonor, 6 anos

- **Clínica:**

- *Obstrução nasal recorrente, estertoros raros, prurido nasal e ocular. Roncopatia sem apneias. Sono irrequieto. Nega hipoacusia. 2 OMA e 1 amigdalite.*
- *Seguida por Terapia da Fala, Gastroenterologia e Cardiologia: Vômitos e toracalgia retrosternal. EDA com biópsias negativas*

- **Observação**

- *Rinorreia, crostas, pouco espaço por congestão e HT dos CI. Amígdalas grau III. Freio lingual curto.*





## Caso clínico #2: Leonor, 6 anos

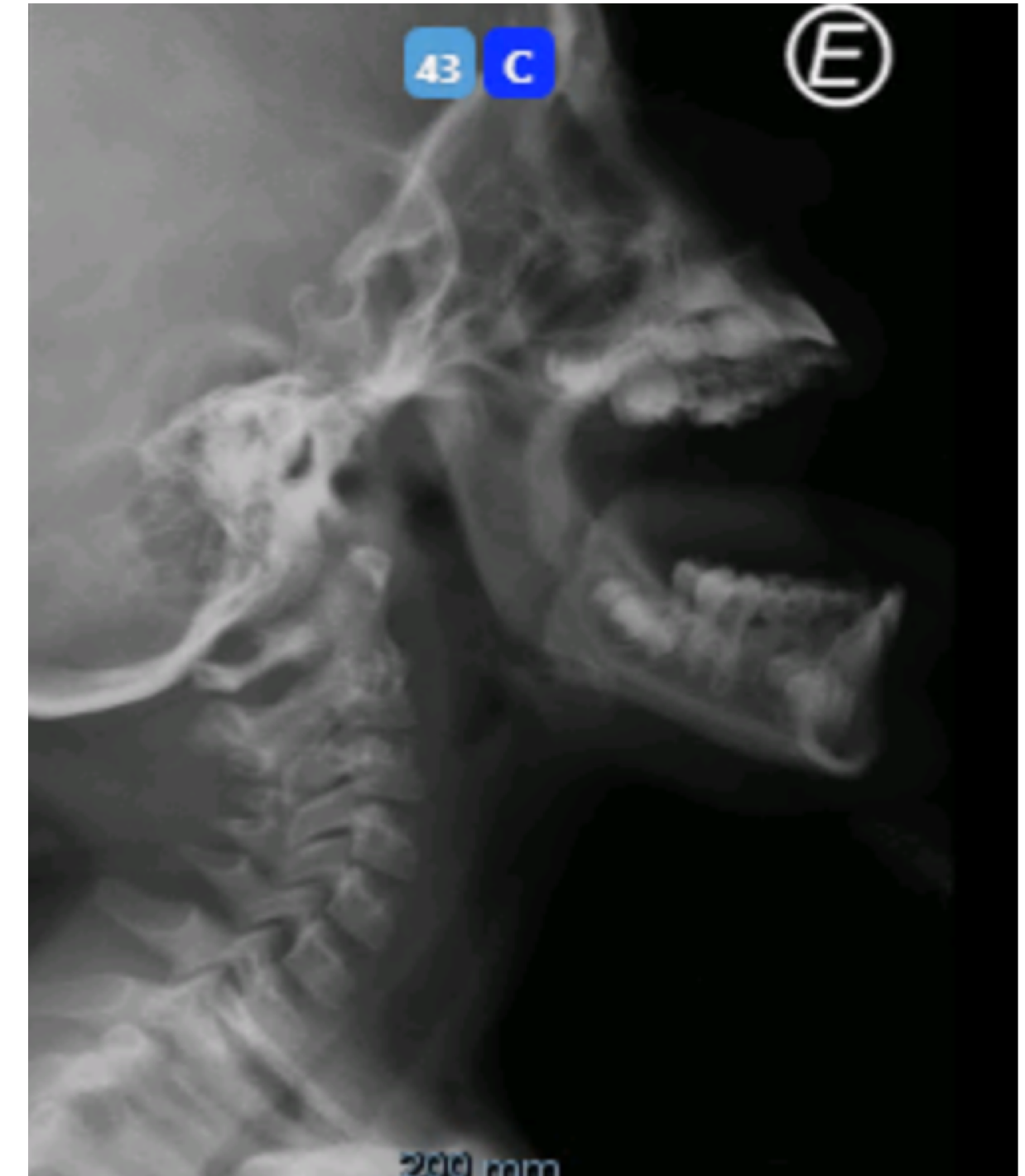
- *Proposto*
  - *Montelucaste 4mg, levocetirizine 10 gotas, mometasona nasal durante um mês. Polissonografia se não melhorar. Ponderar fazer testes com restrição de lactose e gluten em casa.*
  
- *1 mês depois*
  - *Sem roncopatia, mas mantem queixas de obstrução nasal e sono irrequieto.*
  - *Mantem olheiras e HT dos CI, amígdalas e freio curto.*

Expert consensus and clinical guidelines suggest the consideration of a trial of **INS and OM** for a period **1–6 months in children** with **mild-to-moderate OSAS** and **adenotonsillar hypertrophy**, especially if parents refuse surgery

# Caso clínico #2: Leonor, 6 anos

- *Exames complementares*
  - *Analises: Hemograma, função renal e hepática, APTT, TP (INR) e IgE total*
  - *RX cavum: Relatório afirma “permeabilidade da nasofaringe”*

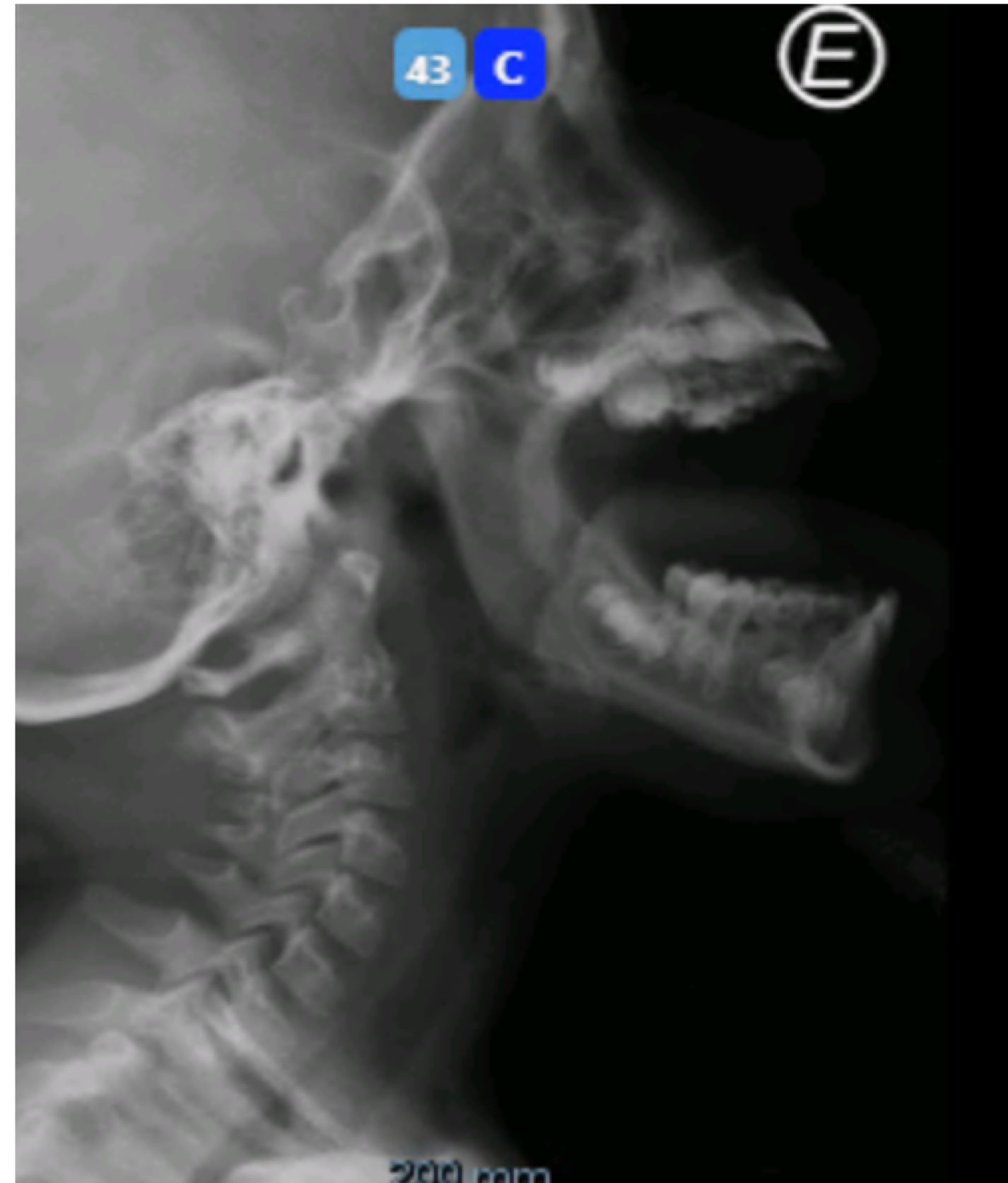
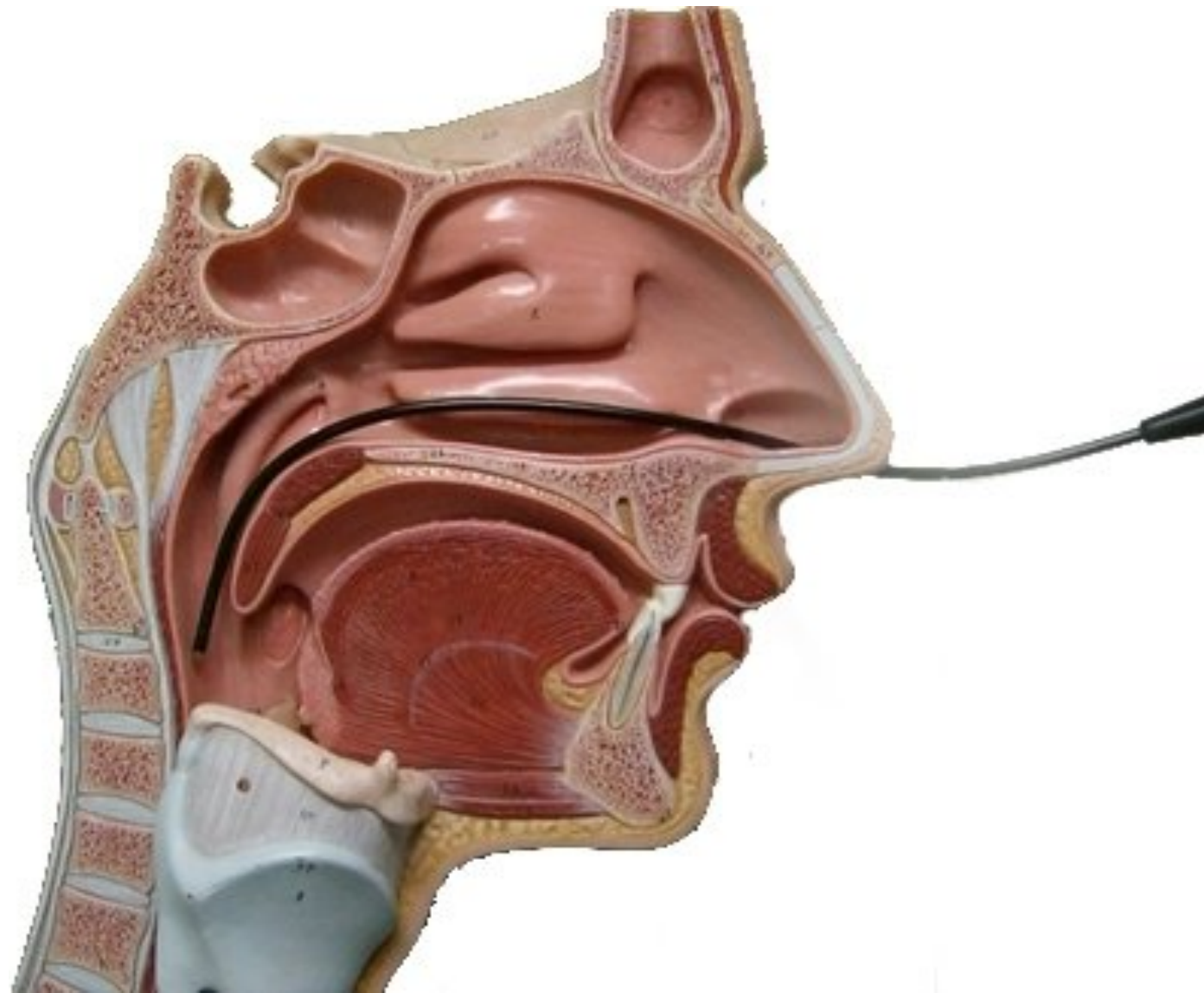
Tempo de Protrombina (TP)			
Tempo de Protrombina	<b>11.90</b>	segundos	10.30 - 12.80
INR	<b>1.09</b>		Intervalo Terapeu INR 2,0 - 3.5
T de Tromboplastina Parcial activ.(aPTT)			
T de Tromboplastina Parcial activ.(aPTT)	<b>26.40</b>	segundos	23.00 - 31.90
Urémia			
Urémia	<b>18</b>	mg/dL	17 - 39
Creatininémia			
Creatininémia	<b>0.33</b>	mg/dL	0.50 - 1.10
Aspartato aminotransferase (AST)			
Aspartato aminotransferase (AST)	<b>34</b>	U/L	5 - 36
Alanina aminotransferase (ALT)			
Alanina aminotransferase (ALT)	<b>29</b>	U/L	24 - 44
Imunoglobulina E Total			
Imunoglobulina E Total	<b>7.60</b>	UI/mL	Idade V. Médio V.





## Caso clínico #2: Leonor, 6 anos

- *Radiografia de perfil versus nasofaringolaringoscopia*



## *Caso clínico #2: Leonor, 6 anos*

- *Proposto*
  - *Polissonografia e provável cirurgia ou só cirurgia*
- *O que fizemos?*
  - *Adenoamigdalectomia? Total? Parcial?*
  - *Redução dos cornetos com radiofrequencia*
  - *Frenuloplastia*

## *Caso clínico #2: Leonor, 6 anos*

- *Reavaliação*
  - *Artralgia da ATM – durou 1 mês. Encaminhada para **Fisioterapia** da ATM e já fazia **Terapia da fala** pós frenuloplastia*
- *2 anos e meio depois com quase 9 anos*
  - *Sem obstrução nasal. Medicação só no inverno ou quando tem queixas nasais*
  - *Sem episódios de vômitos ou dor retroesternal*
  - *Sono tranquilo*
  - *Sem infeções. Atopia da pele e exames de **Imunoalergologia** mantem-se sem alterações*
  - *Mantem seguimento na **Odontopediatria** com boa resposta aos expansores*
  - *Pais continuam satisfeitos*



# Pediatric OSA: associated comorbidities

## Pediatric OSA

- Asthma
- Hypoxemia and hypercapnia
- CV: pulmonary HT, cor pulmonale, HT
- Sinus arrhythmia
- Enuresis
- Mouth breathing, upper airway infections
- CH, CF, DM, diabetes
- (
- Supplement

**STATEMENT 4. Tonsillectomy for obstructive sleep-disordered breathing:** Clinicians should ask caregivers of children with obstructive sleep-disordered breathing (oSDB) and tonsillar hypertrophy about comorbid conditions that may improve after tonsillectomy, including growth retardation, poor school performance, enuresis, asthma, and behavioral problems. Recommendation

## Clinical Practice Guideline: Tonsillectomy in Children (Update)

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## *Caso clínico #3: Vicente, 6 anos*

- *Enviada pela Odontopediatra: Dra. Joana Frois e encaminhado para Dentária por Terapia da fala*
  - *“Criança agitada, Mordida cruzada bilateral, tendência para prognatismo, subdesenvolvimento maxilar superior. Roncopatia. Hipertrofia amigdalina.”*

*Imagens cedidas pela Dra. Joana Frois*

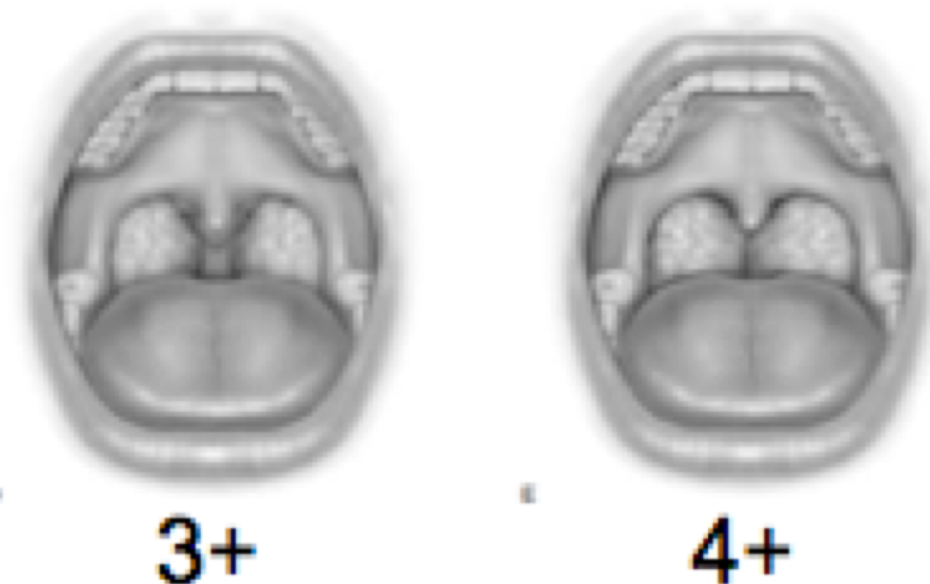
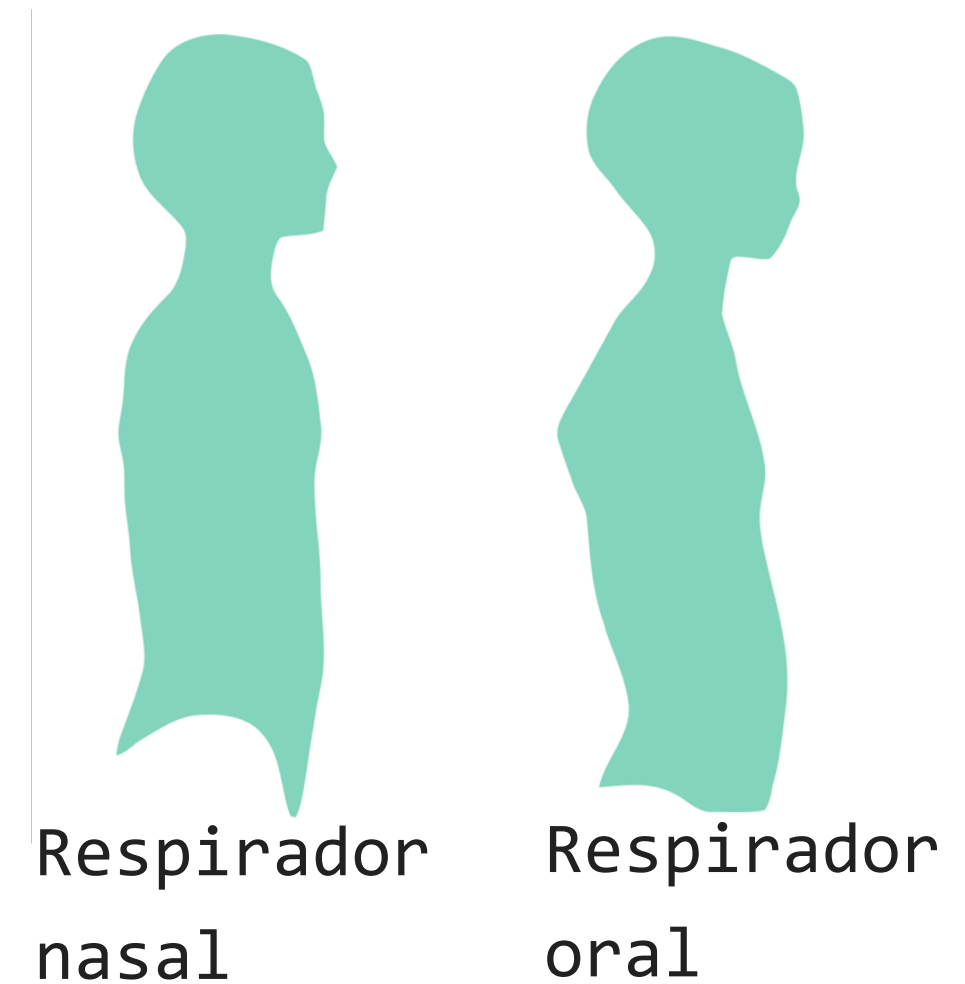
## Caso clínico #3: Vicente, 6 anos

- **Clínica:**

- “Roncopatia ligeira, nega apneia, nega esternutos, prurido nasal ou ocular, nega obstrução nasal. Nega amigdalites ou OMA de repetição.
- Alteração na articulação dos r’s e l’s.”
- Seguimento Fisioterapia e Terapia da fala

- **Observação**

- Desvio do septo para a direita, rinorreia, HT dos CI, pouco espaço
- Amígdalas grau III-IV, palato duro alto e estreito



Imagens cedidas pela Dra. Joana Frois



## Caso clínico #3: Vicente, 6 anos

- *Um mês depois*
  - *Mantem levocetirizine e fluticasone nasal.*
  - *Mantem roncopatia, obstrução nasal, cansaço.*
  - *Olharento*
  - *Rinoscopia: Congestão nasal, pouco espaço, HT dos CI, desvio do septo para a direita.*
  - *Orofaringe: Palato alto e estreito, freio da lingua curto, apinhamento dentário, amígdalas grau III-IV*

<b>Imunoglobulina E Total</b>	<b>351.00</b>
1 ano	3.5 7.3 15.2
2 anos	3.0 9.5 29.5
3 anos	1.8 5.5 16.9
4 anos	8.6 24.3 68.9
7 anos	12.9 45.6 161.3
10 anos	23.7 116.2 570.6
14 anos	20.1 62.6 195.0
Adultos	14.0 41.0 120.0



## Caso clínico #3: Vicente, 6 anos

- *Polissonografia?*
  - *Em teoria, sim, sem dúvida, na prática... É difícil*



# Pediatric OSA - International Classification of Sleep Disorders ICSD-3

- Criteria A and B must be met
- A. The presence of one or more of the following:
  - Snoring.
  - Labored, paradoxical, or obstructed breathing during the child's sleep.
  - Sleepiness, hyperactivity, behavioral problems, or learning problems.
- B. PSG demonstrates one or both of the following:
  - One or more obstructive apneas, mixed apneas, or hypopneas, per hour of sleep.

OR

- A pattern of obstructive hypoventilation, defined as at least 25% of total sleep time with hypercapnia ( $\text{PaCO}_2 > 50 \text{ mm Hg}$ ) in association with one or more of the following:
  - Snoring.
  - Flattening of the inspiratory nasal pressure waveform.
  - Paradoxical thoracoabdominal motion.

*Note: AASM adult diagnostic criteria may be used for patients aged 13 to 18 years*



# Pediatric OSAS: Complementary evaluations

- Polissonography (PSG) level I

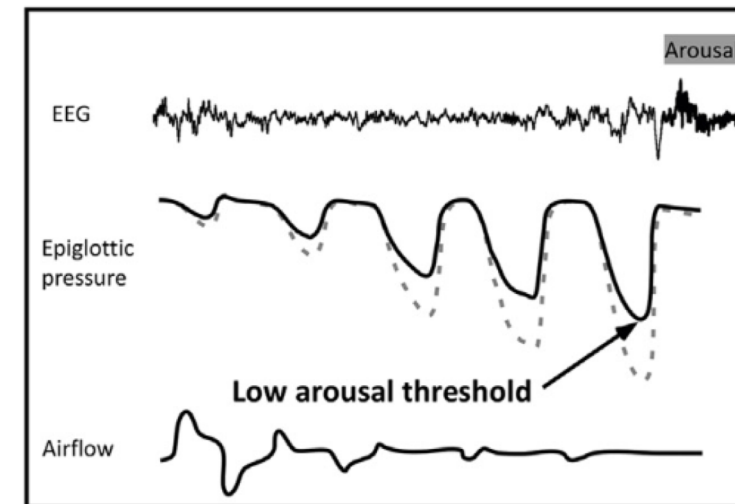
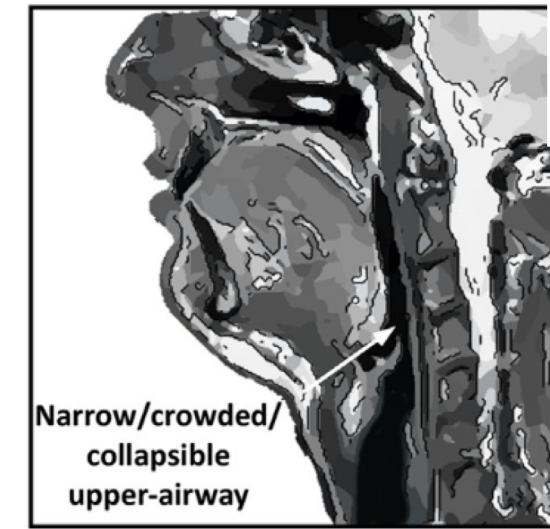
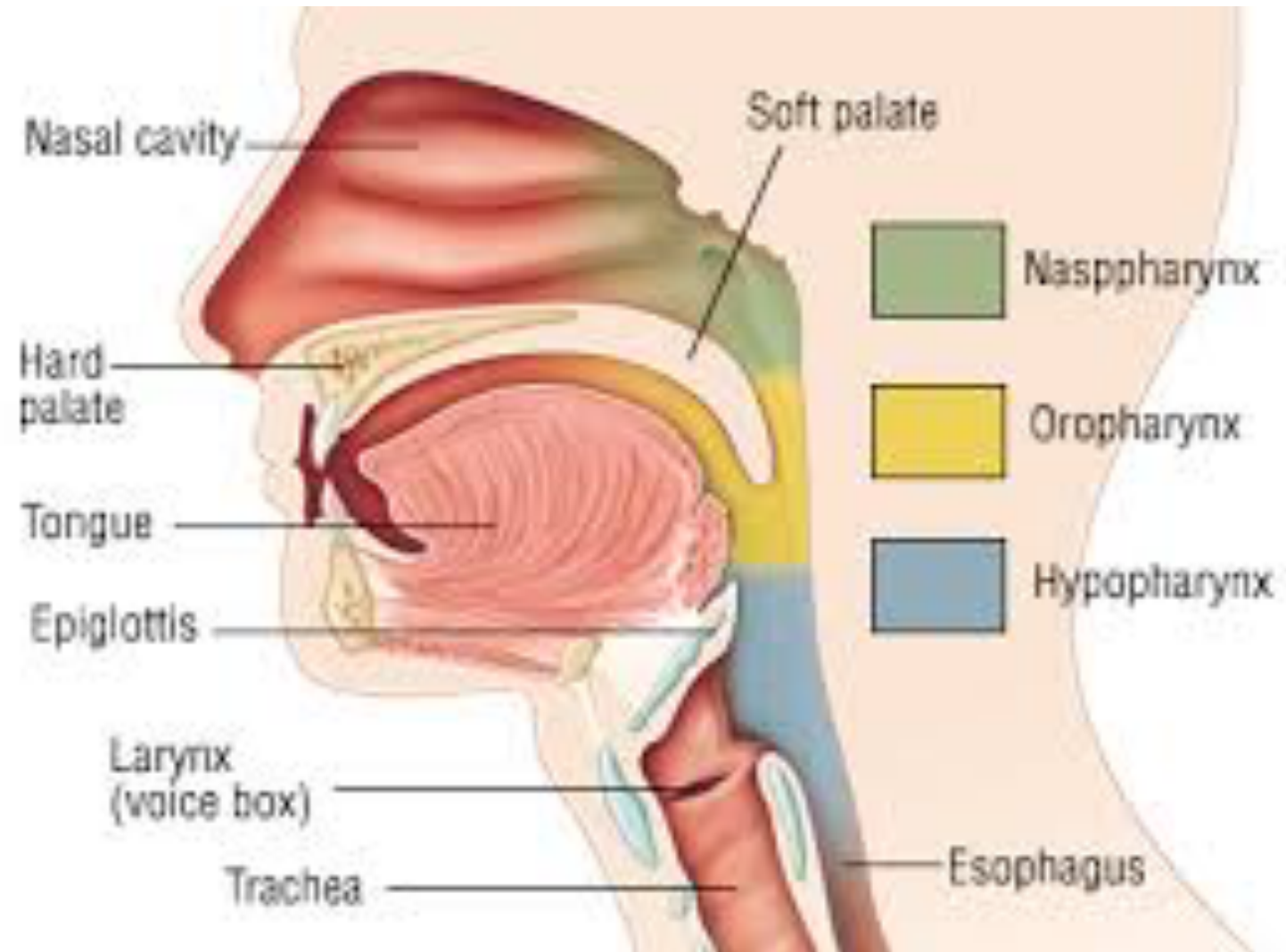
Or...

- PSG level III
- “Nap” PSG
- Overnight continuous pulse oximetry
- Audio & video monitoring

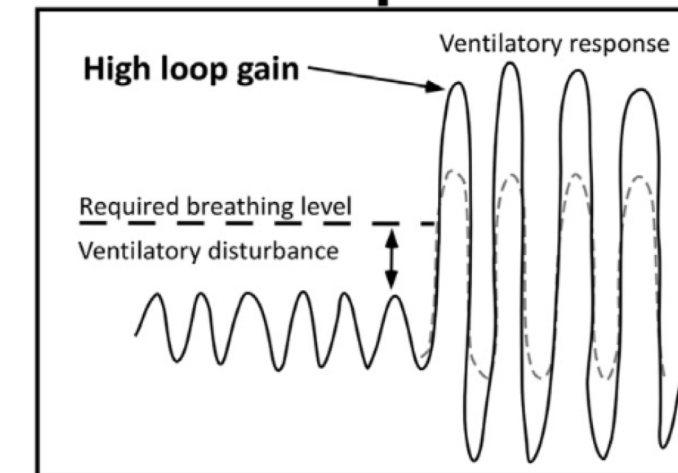
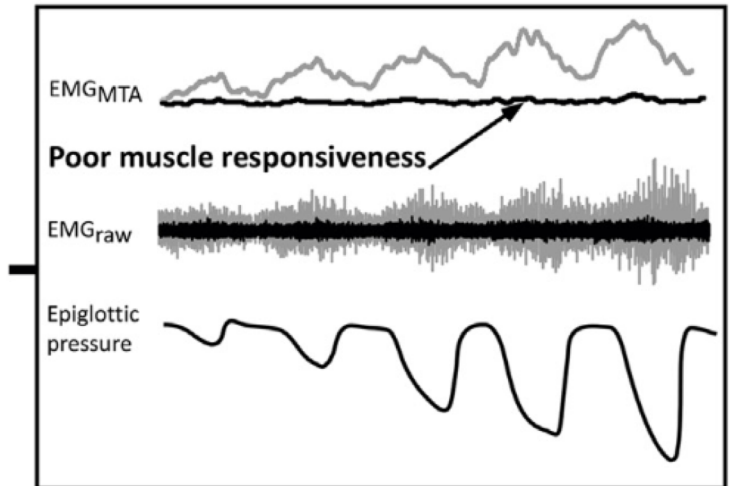
Disease severity DOES NOT  
CORRELATE with surgical success  
Treatment must be personalized

Low negative predictive value; a  
negative result is insufficient to  
exclude OSA

# Physiopathology of OSAS



OSA



Obstructive hypoventilation: In the child, there is a different pattern of **recruitment of dilator muscles**, characterised by **greater muscular activation** that is able to prevent complete collapse of the airways.

## Caso clínico #3: Vicente, 6 anos

- *Proposto:*
  - *Adenoamigdalectomia parcial, frenuloplastia e redução dos cornetos inferiores*
  - *Pais preferiram total*
- *Pós operatório*
  - *Já não ressona, mas queixas de rinorreia e epistaxis ocasionais*
  - *Revisão terapêutica*
  - *Voltar **Odontopediatria** - Ortopedia funcional dos maxilares*
  - *Consulta de **Alergologia***
  - *Manter seguimento **ORL***
  - *Manter **Terapia da Fala** - Miofuncional orofacial*
  - *Manter **Fisioterapia***

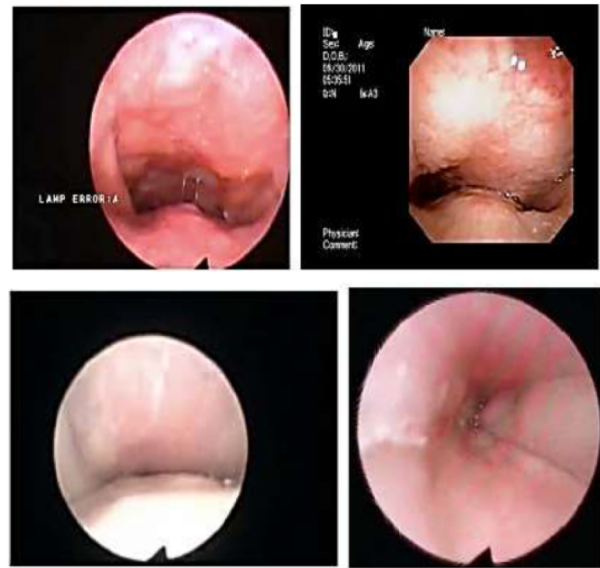


# Pediatric OSA: Drug induced sleep endoscopy

## POLISSONOGRAPHY, WHAT ELSE?

### VOTE

- Velopharynx
- Oropharynx
- Tongue base
- Epiglottis



### NAVOTEL

- Nose
- Adenoids
- Velopharynx
- Oropharynx
- Tongue base
- Epiglottis
- Larynx

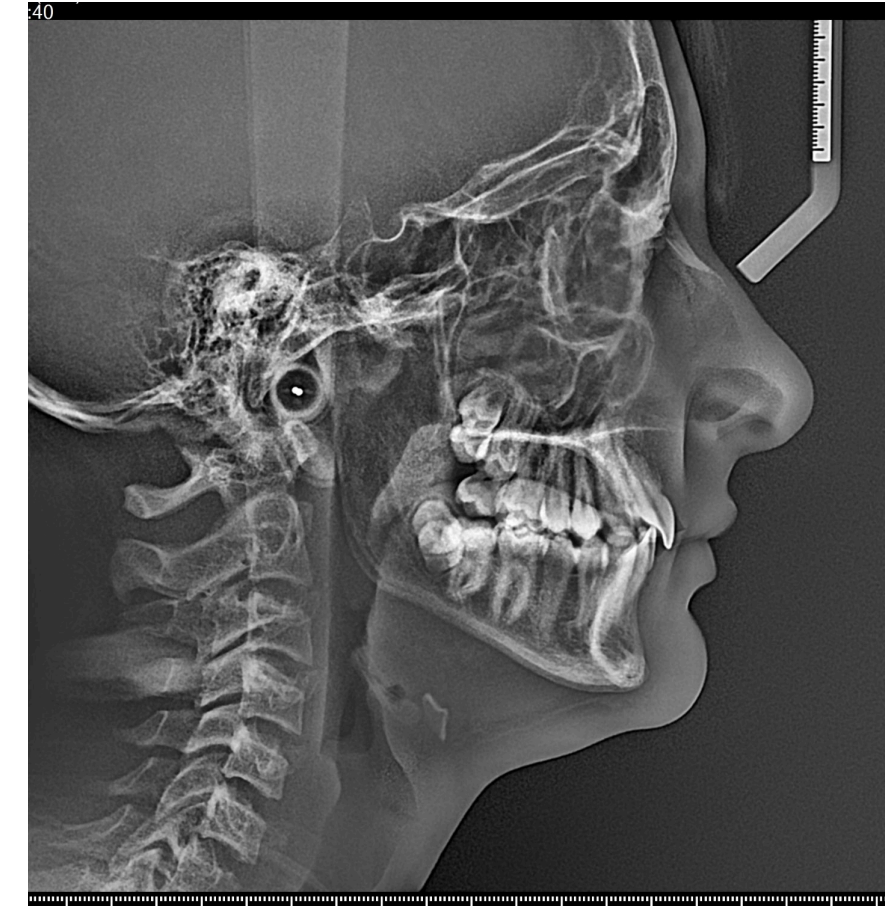
**DISE does not modify decisions in cases of significant adenotonsillar hypertrophy but **should** be used in persistence of apnea after adenotonsillectomy.**

1 - Galluzzi F, Pignataro L, Gaini Rm, Garavello W. Drug induced sleep endoscopy in the decision-making process of children with obstructive sleep apnea. Sleep Med 2015; 16: 331-335.

# Caso clínico #4: Salvador, 14 anos



- Aparelhos de OFM desde 2017
- Mantem respiração oral. Cefaleias.



Imagens cedidas pela Dra. Joana Frois



# Caso clínico #5: Guilherme, 6 anos

- *Clínica:*

- *Encaminhado inicialmente por OFM. Operado em dez 2020 aos 3 anos ao freio lingual e adenoids. Desde então respiração melhor, já tem aparelho, boa expansão. Mantem seguimento TF e OFM*
- *Enviado de novo por neuropediatria do HFF. Seguimento por ausências - suspeita de epilepsia versus narcolepsia com cataplexia. Fez EEG, RM CE, PSG, TLMS.*
- *PSG com IAH de 2/h. maioria dos eventos AC + hipopneias.*
- *Poucas queixas sugestivas de SAOS*
- *Medicado com montelucaste e fluticasona nasal*

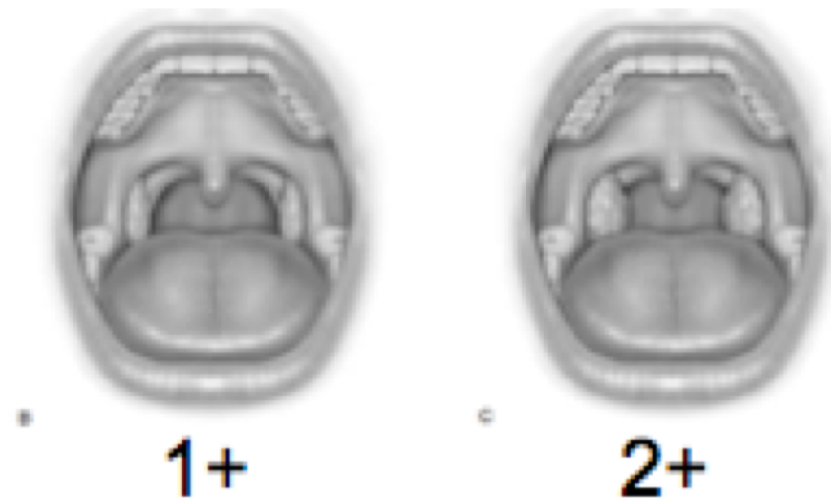
- *Observação*

- *Bom espaço nasal*
- *Amígdalas grau I-II, palato duro bem expandido, freio lingual bem*



## Caso clínico #5: Guilherme, 6 anos

- *Proposto:*
  - *Optimização da medicação respiratória*
  - *Esperar por mais algum “evento”*
  - *Pedido RX cavum, discutido hipótese de NFL*
  
- *Ponderar adenoamigdalectomia, mas mais por causa da hipótese de epilepsia, mesmo que não comprovada*



## *Caso clínico #6: Mateus, 2 anos*

- *Clínica:*
  - *Encaminhado por OFM e TF-TMF Inês Mendes. “Falta de selamento labial, roncopatia, sialorreia, boca entreaberta e protrusão. Pedido avaliação auditive e das VAS”*
  - *Frenuloplastia à nascença. Ainda a amamentar.*
  - *Obstrução nasal recorrente, prurido nasal e conuntival. Nunca usou chucha. Sem história de OMA ou amigdalites de repetição*
  - *Familia do pai com asma, proprio pai tem asma sem queixas*
- *Observação*
  - *Otoscopia: Otite sero-mucosa*
  - *Rinoscopia: Rinorreia mas cornetos bem*
  - *Palato duro até bem, amigdalas grau II-III*

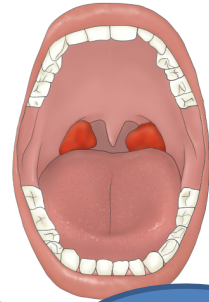
## *Caso clínico #6: Mateus, 2 anos*

- *Proposto:*
  - *1 mês de Pulmicort nasal acqua 32mcg, montelucaste 4mg, xyzal 4 gotas*
  - *Depois reavaliação e fazer timpanograma no mesmo dia da consulta*
- *O meu parecer e o que explico aos pais*
  - *Tem provavel rinite que poderá passar com a idade*
  - *Com medicação as queixas podem melhorar muito e até reverter*
  - *Se mantiver respiração alterada poderá ter indicação para adenoidectomia + amigdalectomia parcial*
  - *Pelas alterações da linguagem e otite sero-mucosa, provavelmente terá indicação de adenoidectomia + miringotomia com colocação de tubos transtimpânicos*
  - *Por causa do risco anestésico, normalmente tento esperar até os 3 anos antes de operar, a não ser que haja situações de gravidade*



# Breathing disturbances: Surgical approaches

Many surgeries...  
Not one size fits all



Midline glossectomy,  
lingual tonsilectomy,  
tongue base RF,  
suspension

Adenotonsilectomy, uvulo-  
palatopharyngoplasty, anterior  
palatoplasty, RF palatoplasty,  
sclerotherapy, expansion  
pharyngoplasty

Epiglottopexy, partial  
epiglottectomy,  
arytenoidectomy,  
tracheotomy



Septoplasty, endoscopic  
sinus surgery,  
turbinectomy, rhinoplasty



Maxilomandibular  
advancement, hypoglossal  
nerve stimulator, hyoid  
suspension, bariatric surgery





**“I don’t mind if you nap at your desk.  
Your snoring keeps everyone else awake.”**

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