

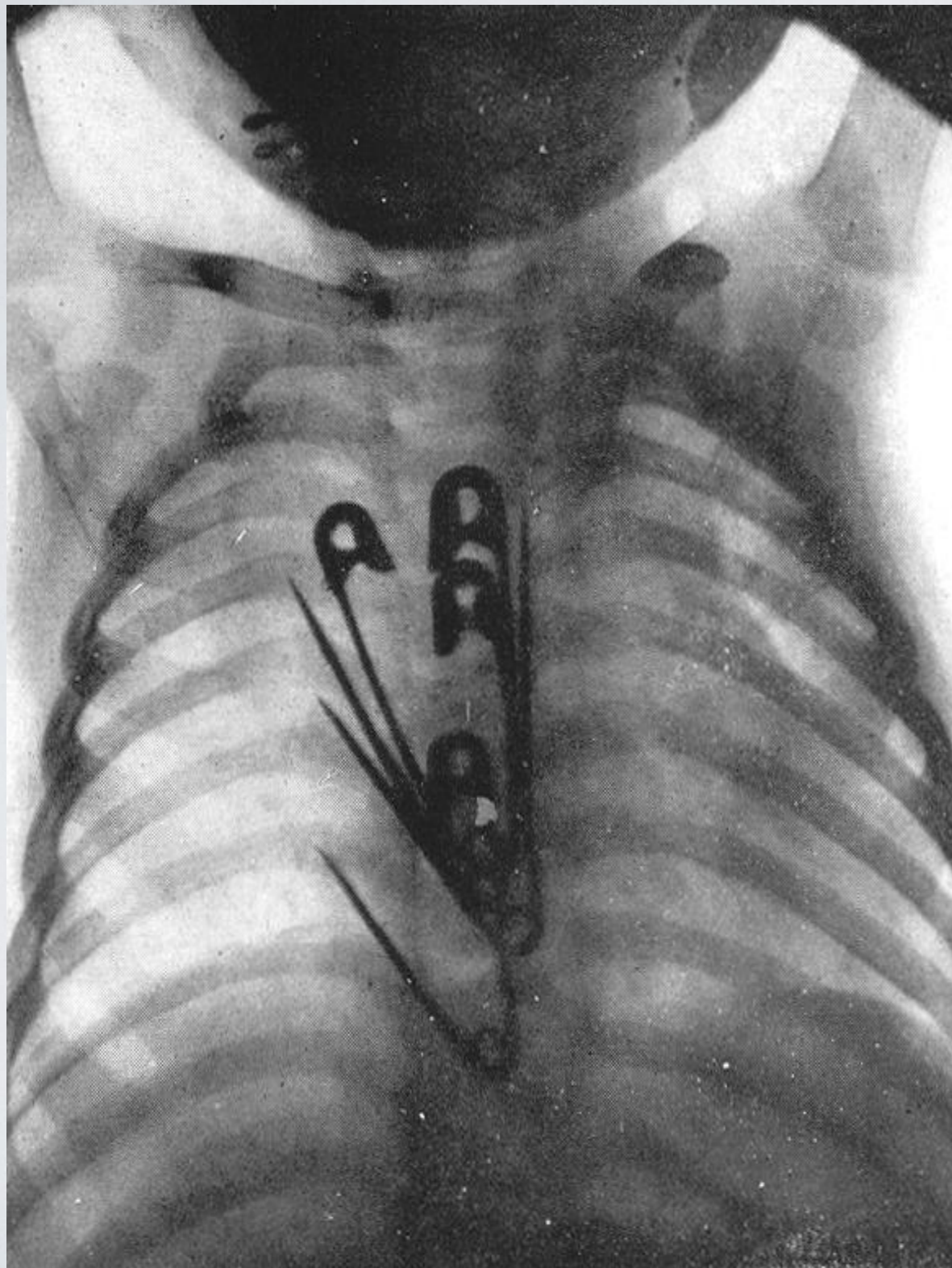
# “Pediatric Aero-Digestive Disorders in the New Century”

A Valley-Mount Sinai Kravis Children's Hospital educational symposium.



CHILDREN'S HEALTH





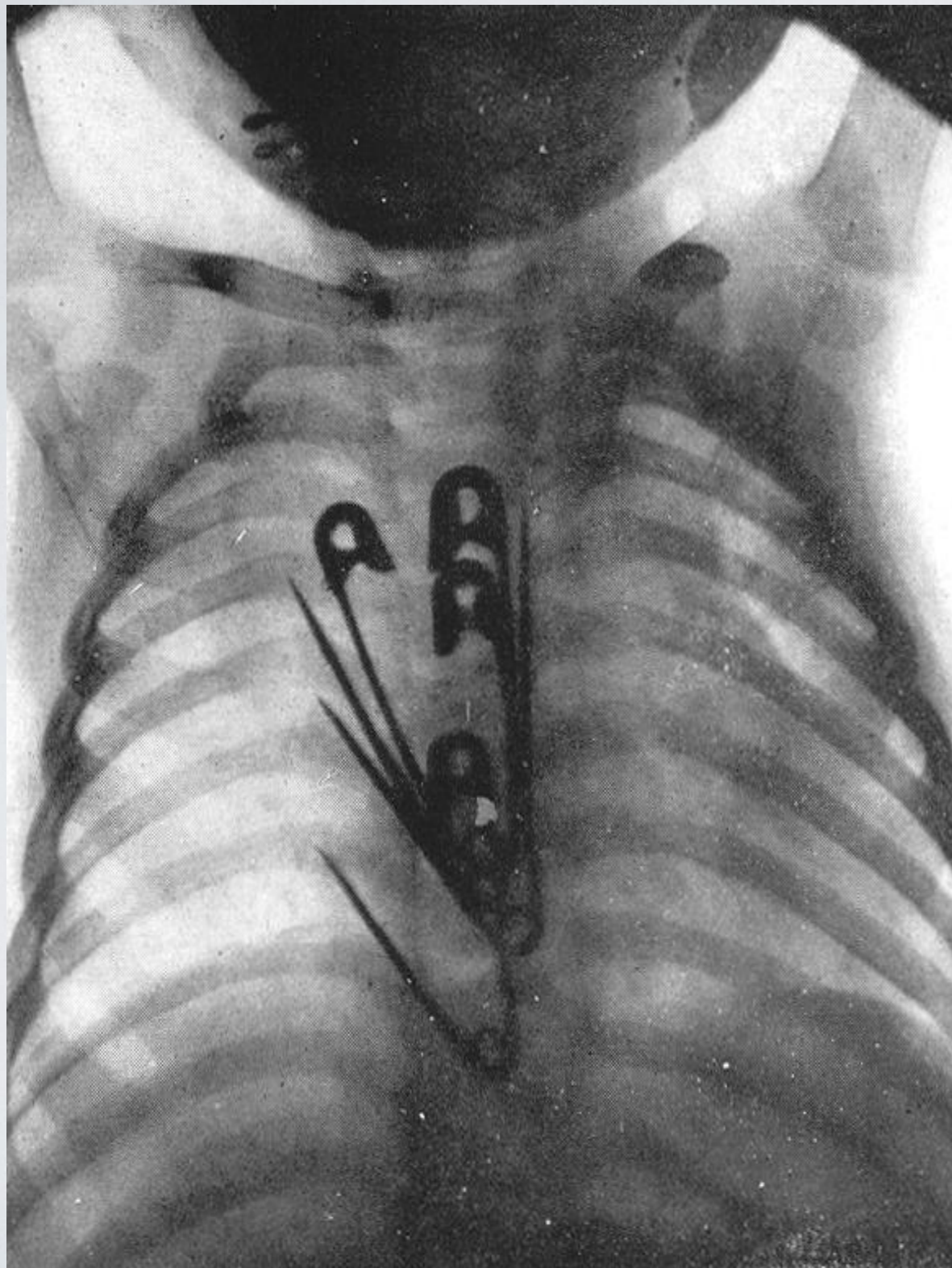
# DYSPHAGIA IN CHILDREN

APRIL 27, 2024

Michael Rothschild, MD

Clinical Professor of  
Otolaryngology & Pediatrics  
Icahn School of Medicine at Mt. Sinai

Past President, NY Pediatric Society  
Past President, American Broncho-  
Esophagological Association



# DISCLOSURE

NO FINANCIAL RELATIONSHIPS OR  
OTHER CONFLICTS OF INTEREST WITH  
ANY ENTITIES MENTIONED IN THIS  
PRESENTATION

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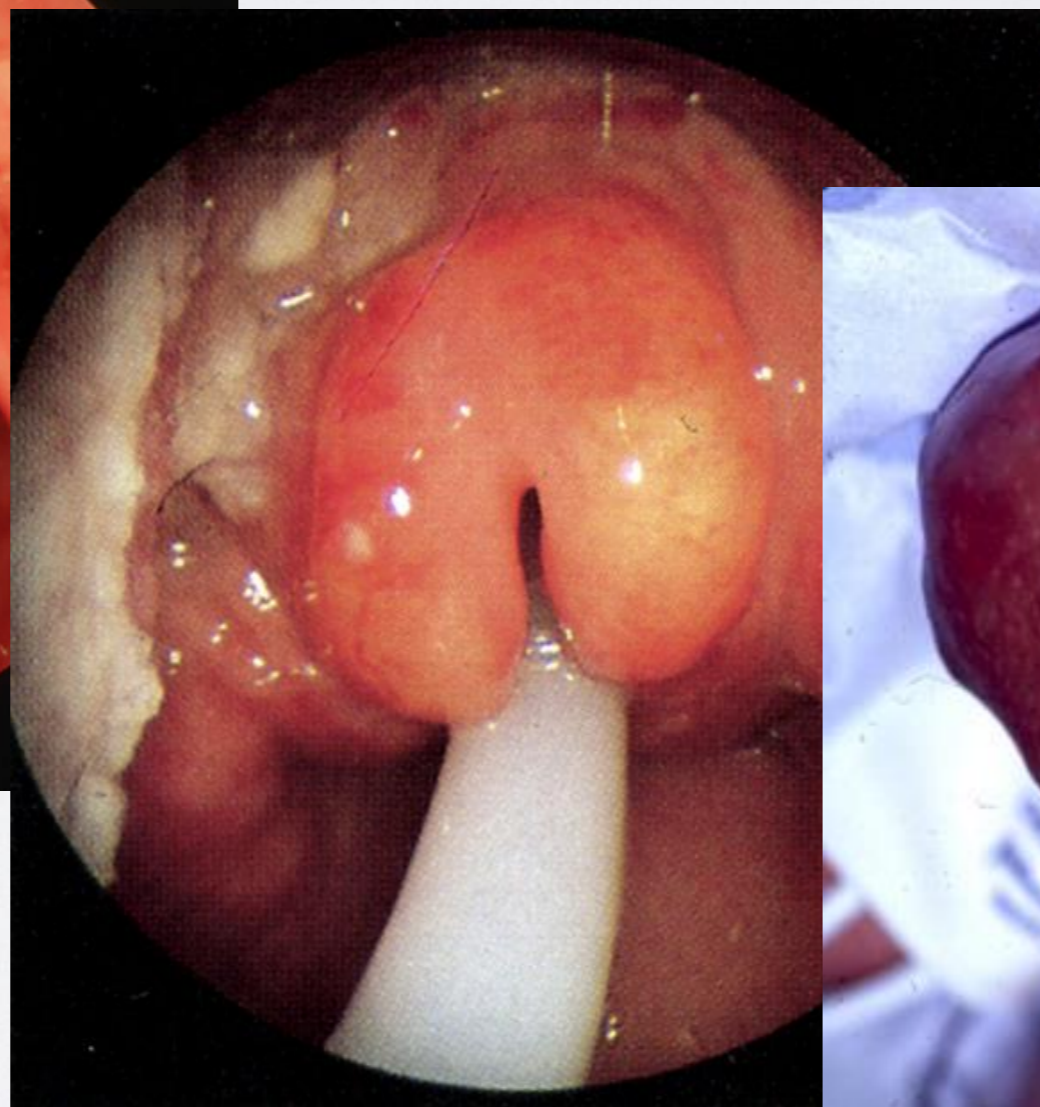
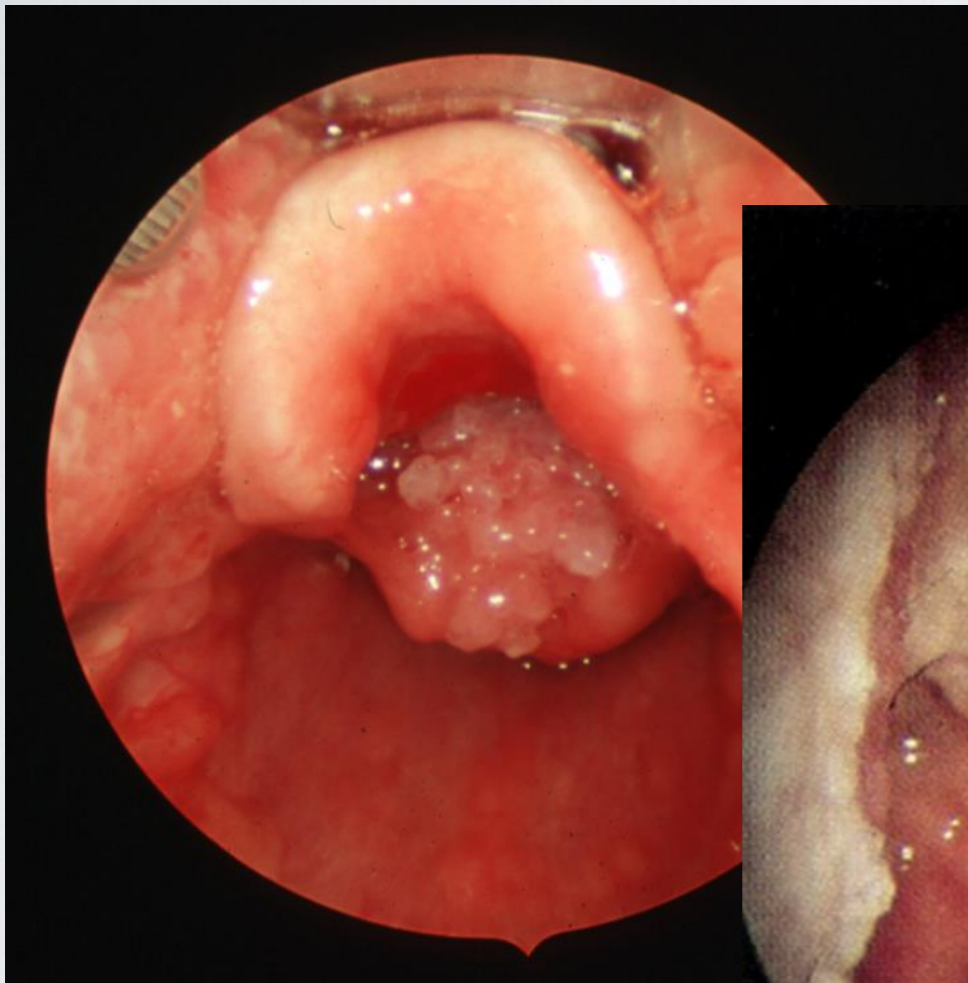
# Faculty Disclosure

- There are no commercial products or services being discussed
- No financial disclosures
- No unlabeled use of a product is being discussed

# **EDUCATIONAL OBJECTIVES**

- 1) TO DESCRIBE THE ANATOMICAL BASIS FOR DYSPHAGIA IN CHILDREN
- 2) TO OUTLINE THE STANDARD METHODS FOR EVALUATION AND WORKUP OF PEDIATRIC DYSPHAGIA
- 3) TO REVIEW MANAGEMENT OF THE COMMON CAUSES OF DYSPHAGIA IN THE PEDIATRIC POPULATION

people think pediatric ENT docs do m



pediatric ENT docs actually do mos



# Michael Rothschild, MD



Englewood,  
New Jersey

Upper East Side,  
Manhattan

Williamsburg,  
Brooklyn



# KidsENT.com



MENU

## Michael Rothschild, MD

Pediatric Ear, Nose & Throat

New York City  
Northern New Jersey

Hello, and thanks for visiting my website!

I am a pediatric ear, nose and throat (ENT) specialist in New York City, with office hours in northern New Jersey and Brooklyn as well. This site provides information about my practice, as well as educational material about common childhood ENT conditions.

You can [book appointments online](#) for the New York or New Jersey office, or for telemedicine visits. If you are new to my practice, you can also fill out all of the registration form online when scheduling your visit. If you prefer, you can still call (212) 996-2995 for an appointment and download the [registration forms](#) as a fillable PDF format from this site.



**THANK YOU FOR 15 YEARS ON THE LIST**

# [dive.Rothschilddesign.com](http://dive.Rothschilddesign.com)

HOME ABOUT ME BOOK GAME BLOG VIDEO PUBLICATIONS DIVE PROJECTS PHOTOS CONTACT

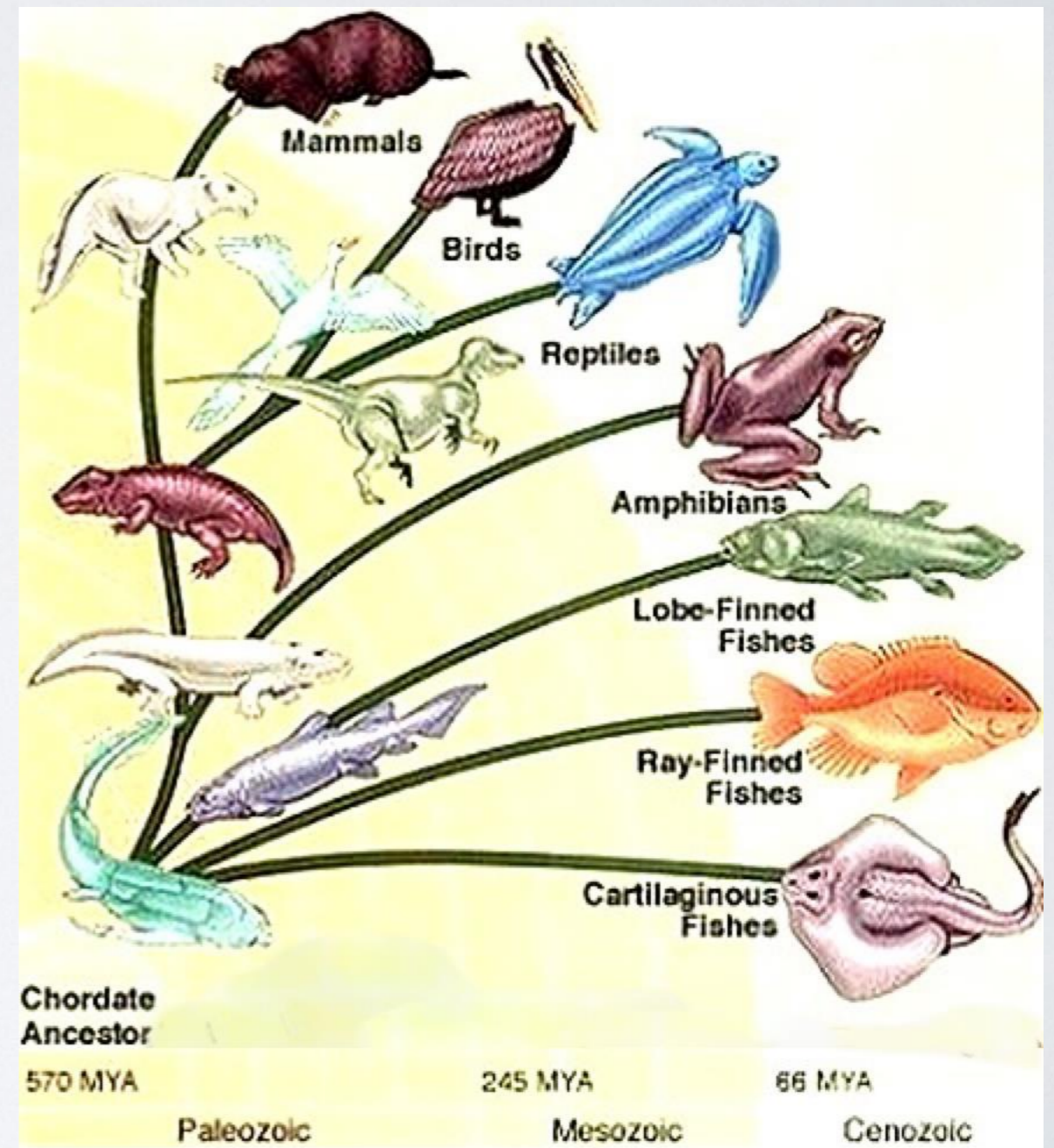
## MICHAEL ROTHSCCHILD

SCUBA DIVING, UNDERWATER PHOTOGRAPHY & VIDEOGRAPHY



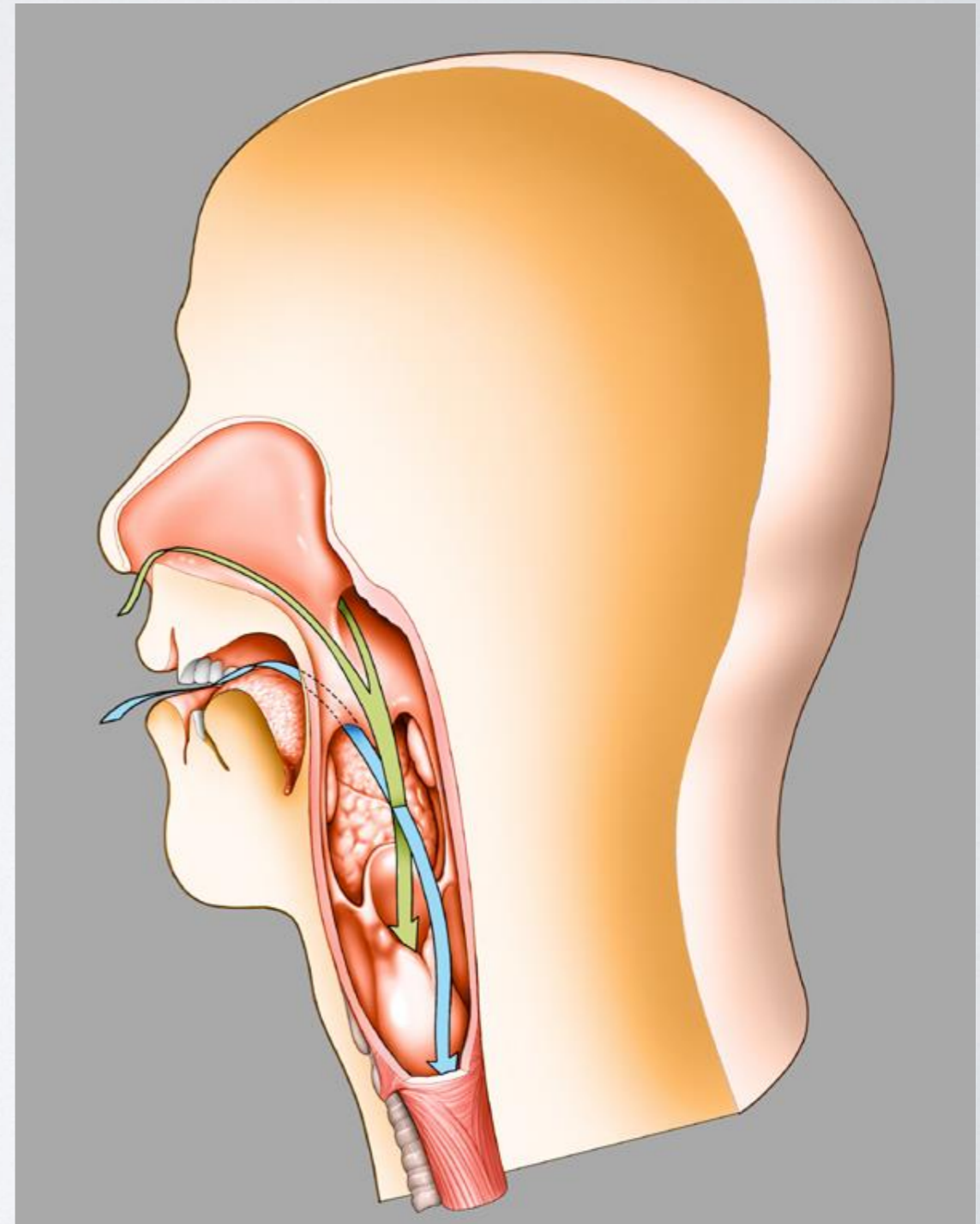
# ANATOMY OF AIR-BREATHING ANIMALS

- 7 classes of vertebrates, 4 of which breath air:
  - Mammals
  - Birds
  - Reptiles
  - Amphibians
- All have an **upper aerodigestive tract**

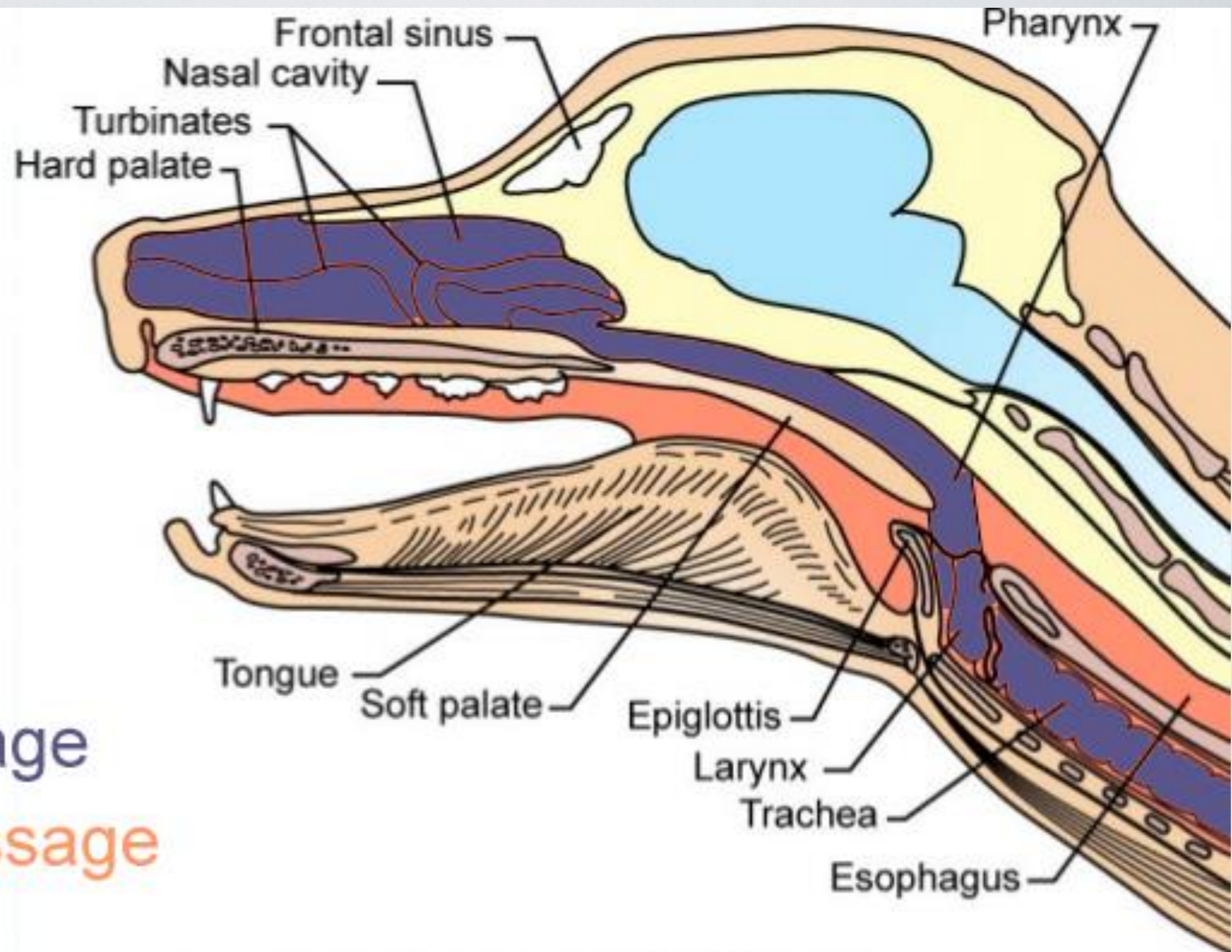


# ANATOMY OF AIR-BREATHING ANIMALS

- UADT: some sharing of luminal space between the air and food passages
- Pathways cross, since trachea is **ventral** to esophagus, but nasal airway is **dorsal** to the mouth

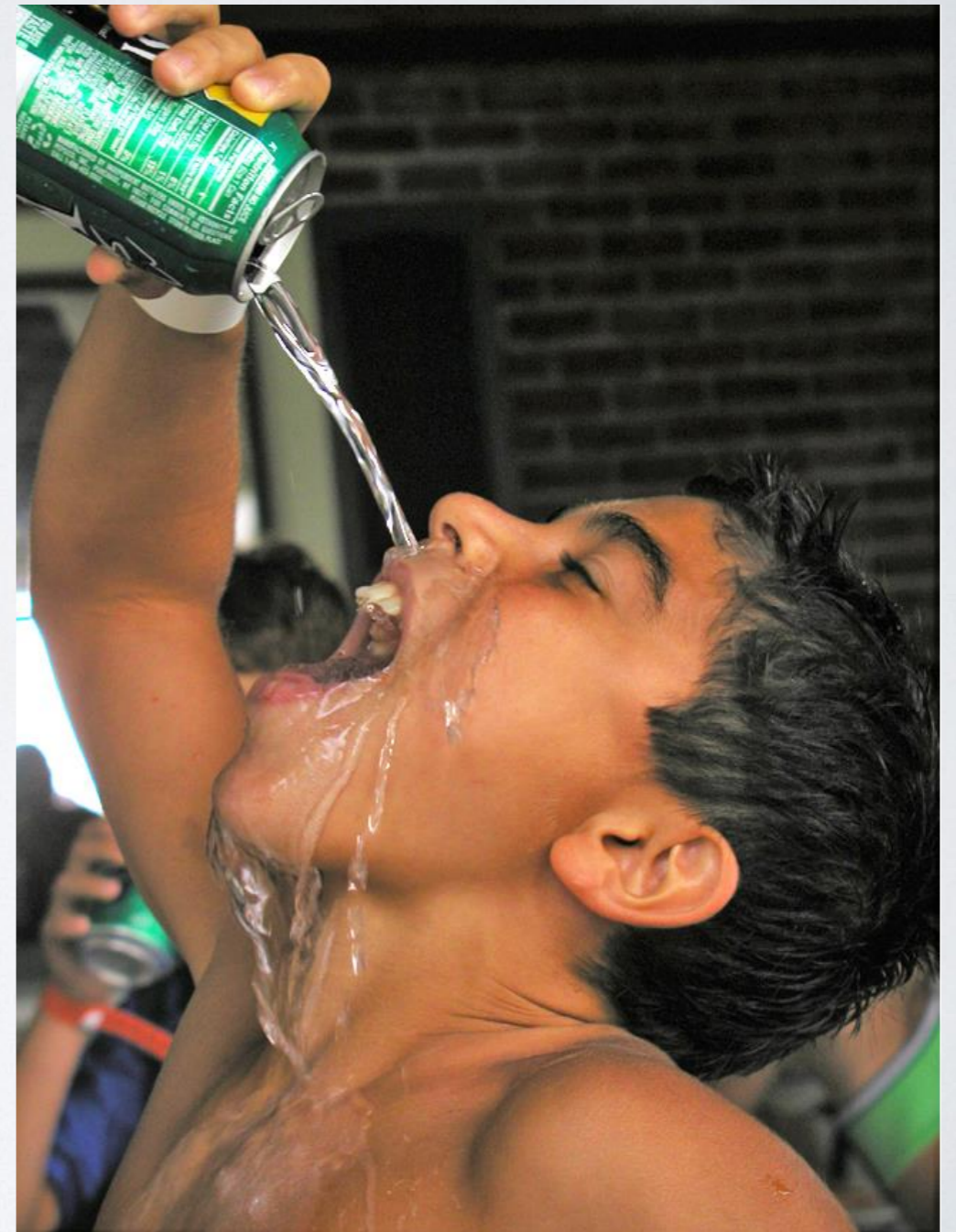


# CROSSING OF AIR & FOOD PASSAGES



# EVOLUTIONARY CHALLENGE FOR AIR-BREATHING ANIMALS

- How do you keep “aero” and “digestive” separate?
- Air entering the digestive tract (AKA aerophagia) → bloating, eructation
- Anything except air entering the airway (AKA aspiration) → potentially lethal
- Aspiration can lead to acute airway obstruction, chronic respiratory failure, sepsis, drowning, pulmonary vascular erosion and hemorrhage



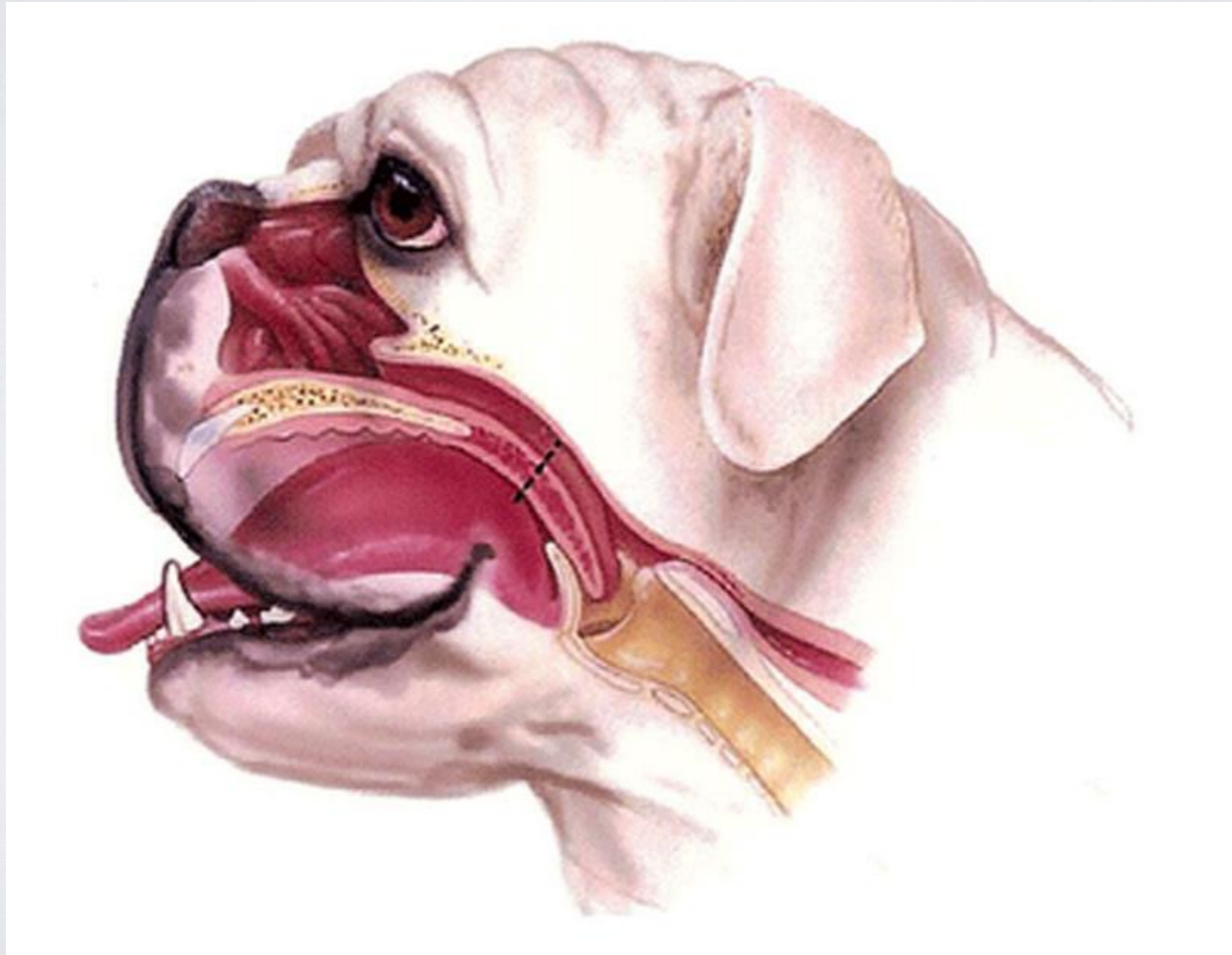
EVOLUTIONARY CHALLENGE:  
PREVENT ASPIRATION

# STRATEGY #1: BYPASS UADT BY PUTTING AIRWAY ENTRANCE FAR CRANIAL TO THE DIGESTIVE TRACT

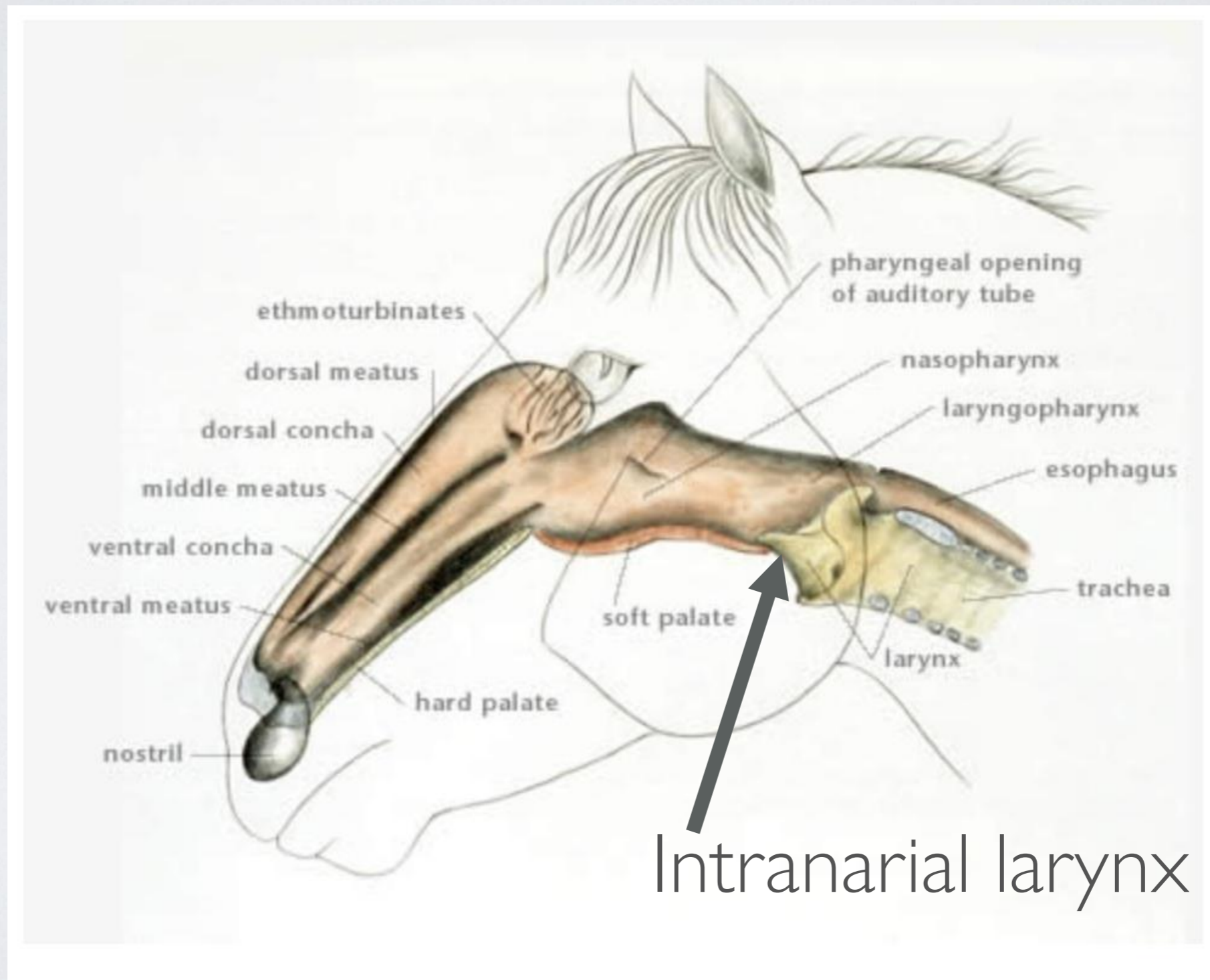




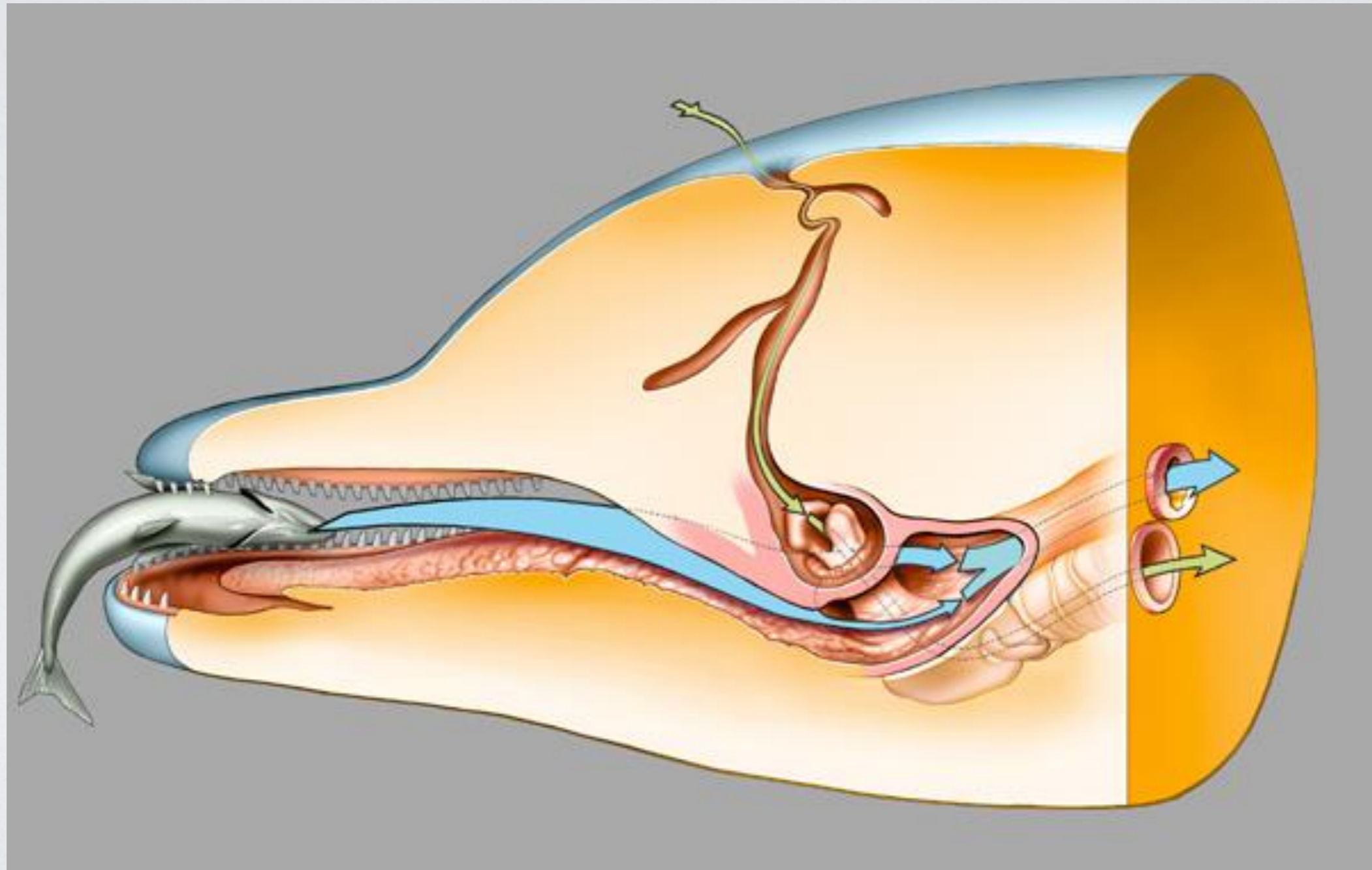
# STRATEGY #2: MINIMIZE THE UADT BY PLUGGING THE ENTRANCE TO AIRWAY INTO THE BACK OF NOSE



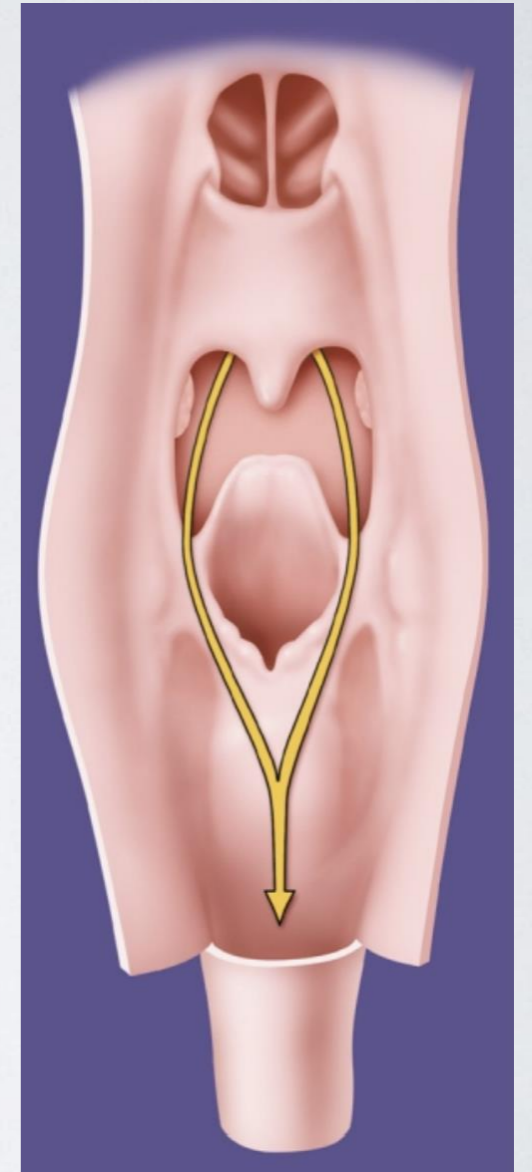
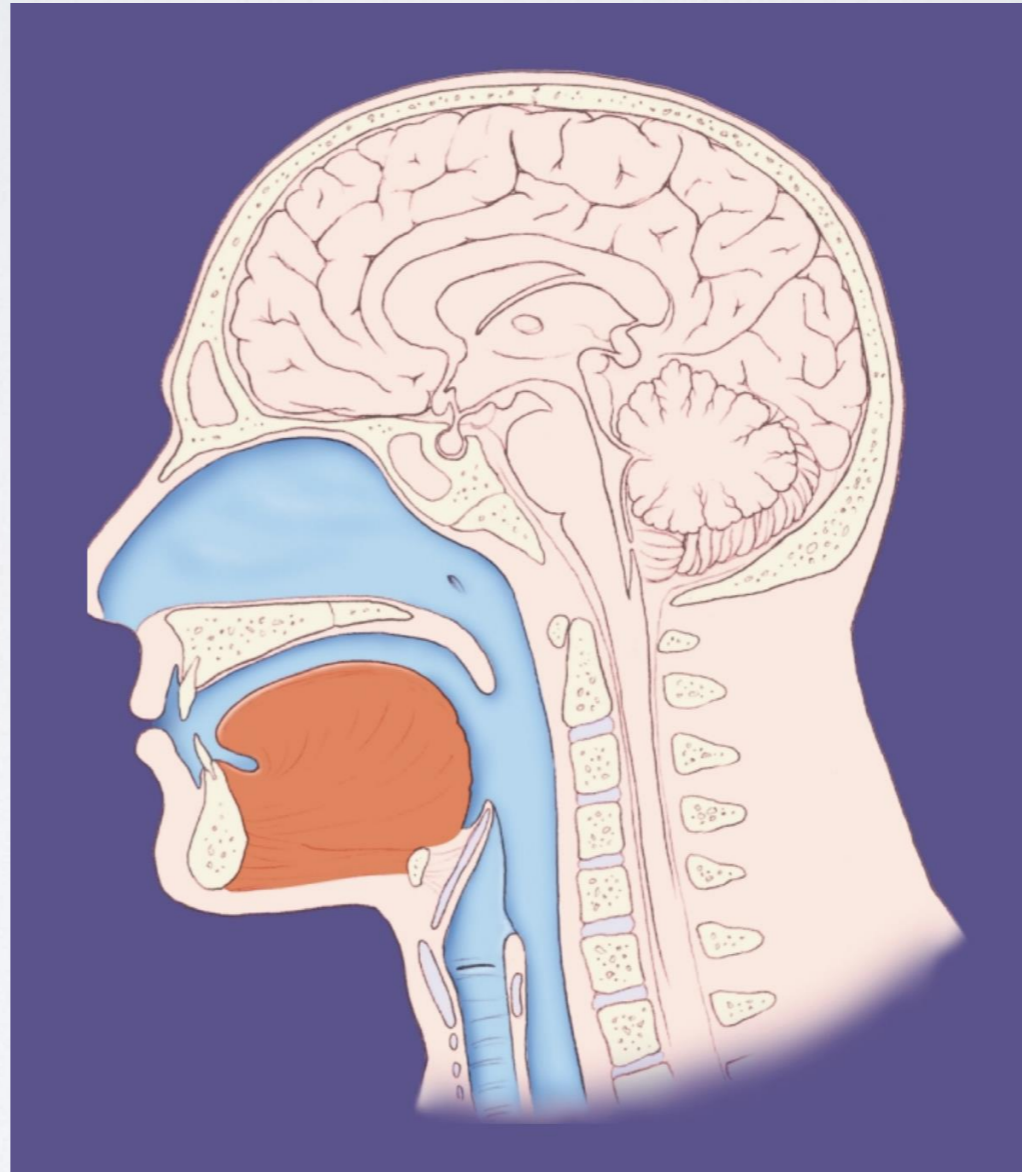
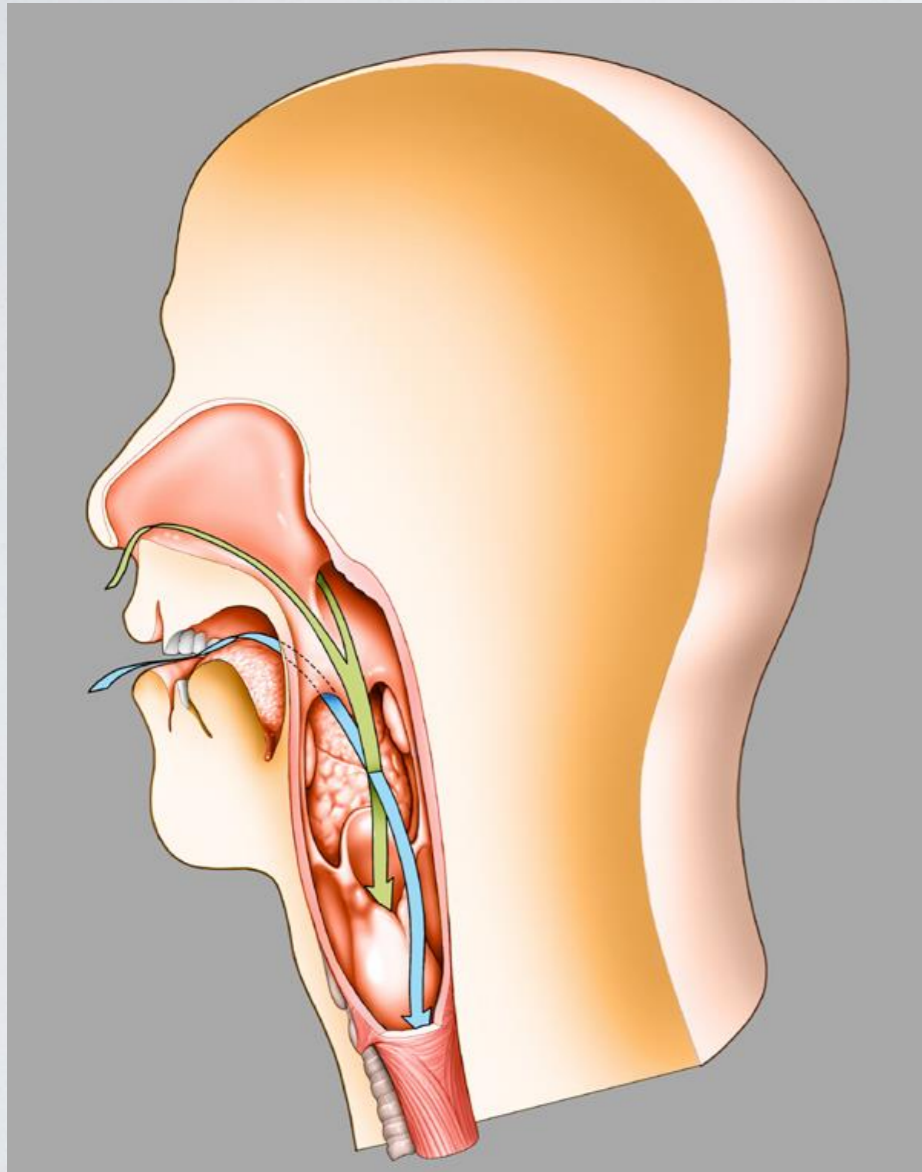
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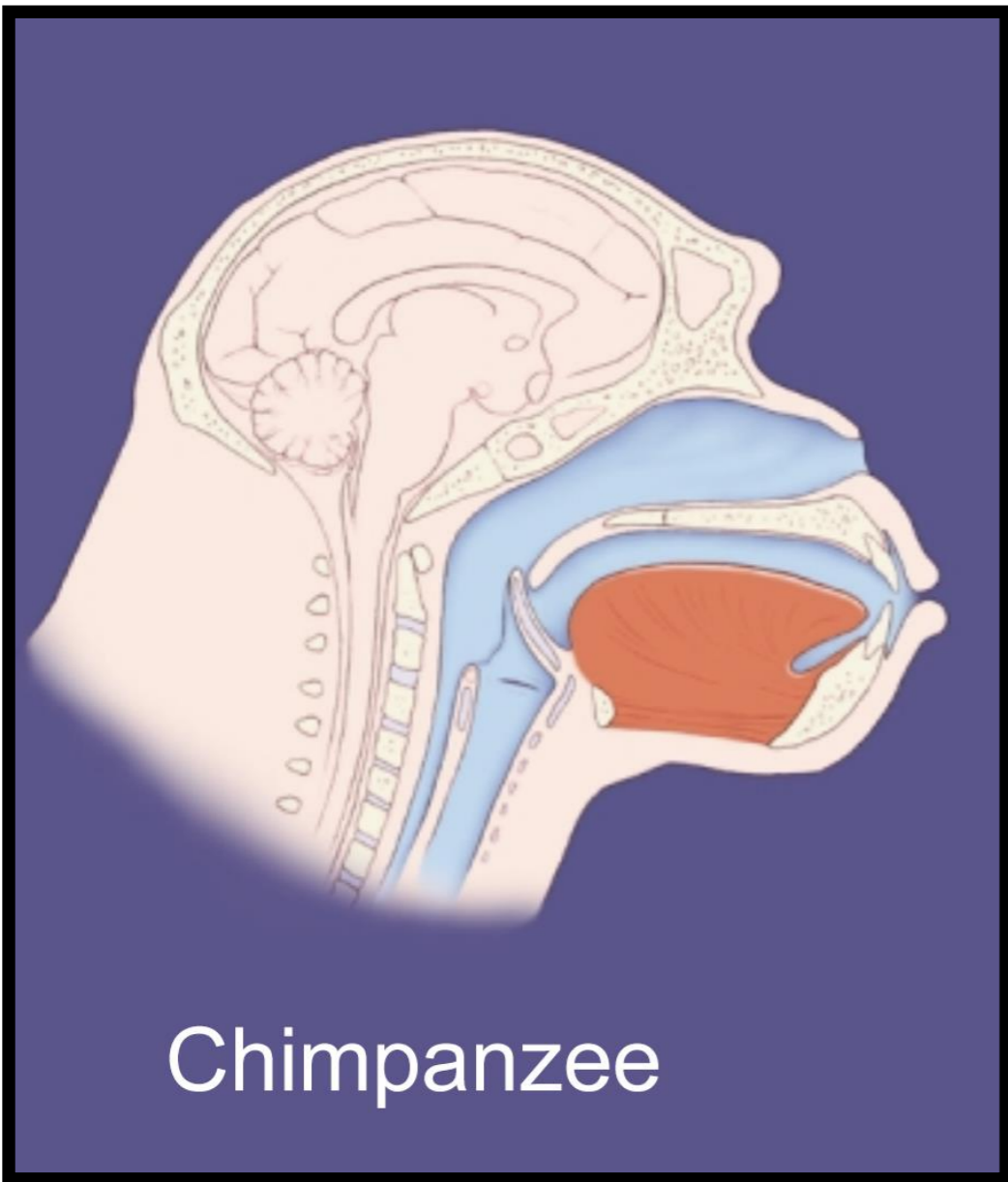


# STRATEGY #3: PROTECT THE UADT BY EVOLVING SOPHISTICATED SWALLOWING MECHANISMS, VOCAL CORDS AND COUGH REFLEXES

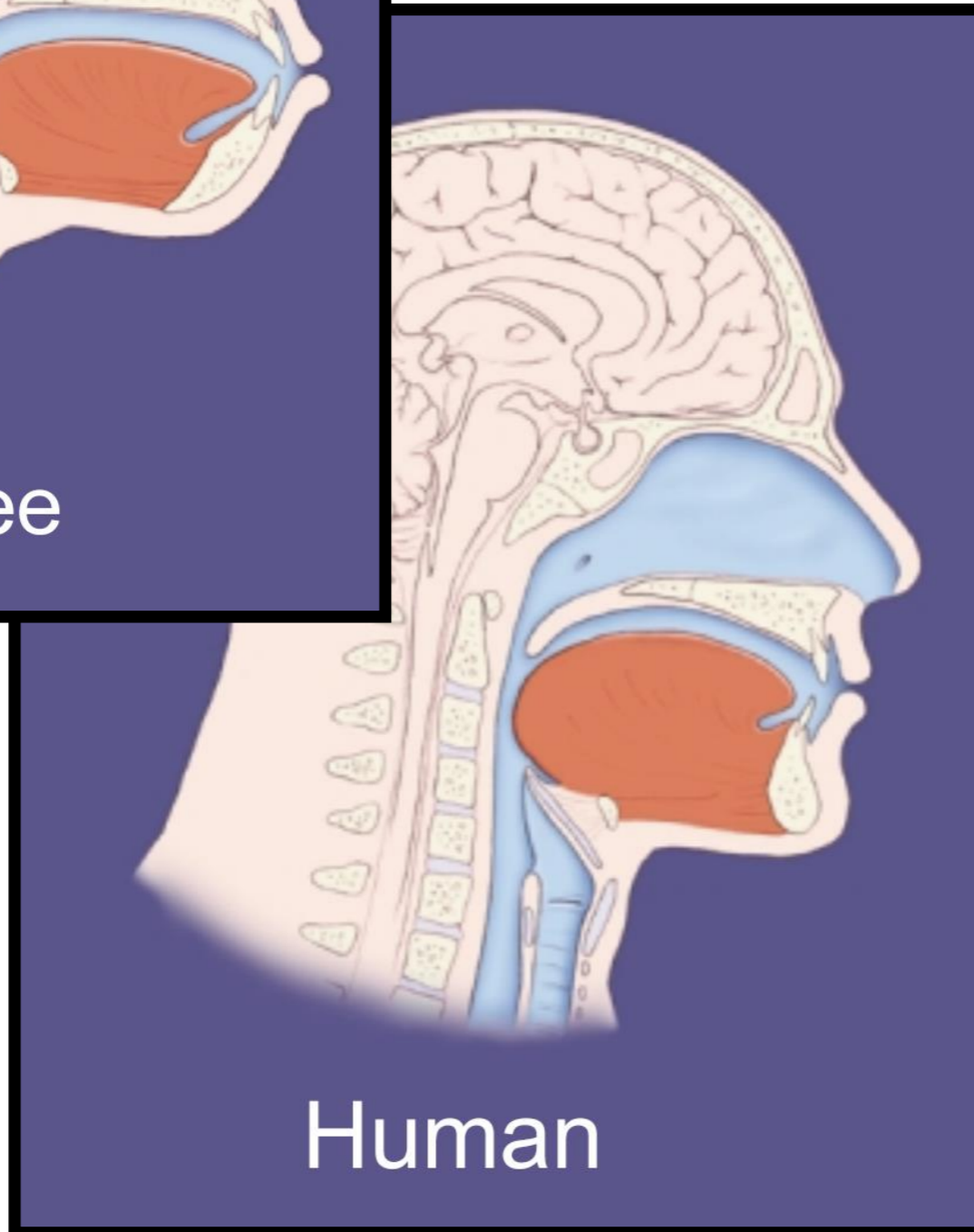


# HUMAN UADT (ADULT)

- Tongue is **partially in the pharynx** (unique among mammals)
- Larynx is **far from the skull base** and nasopharynx
- **Large supralaryngeal pharynx shared** by air and food passages
- Pro: Phonation and language (?), greater transoral airflow during exertion.
- Con: Sleep apnea, laryngopharyngeal reflux & aspiration



Chimpanzee



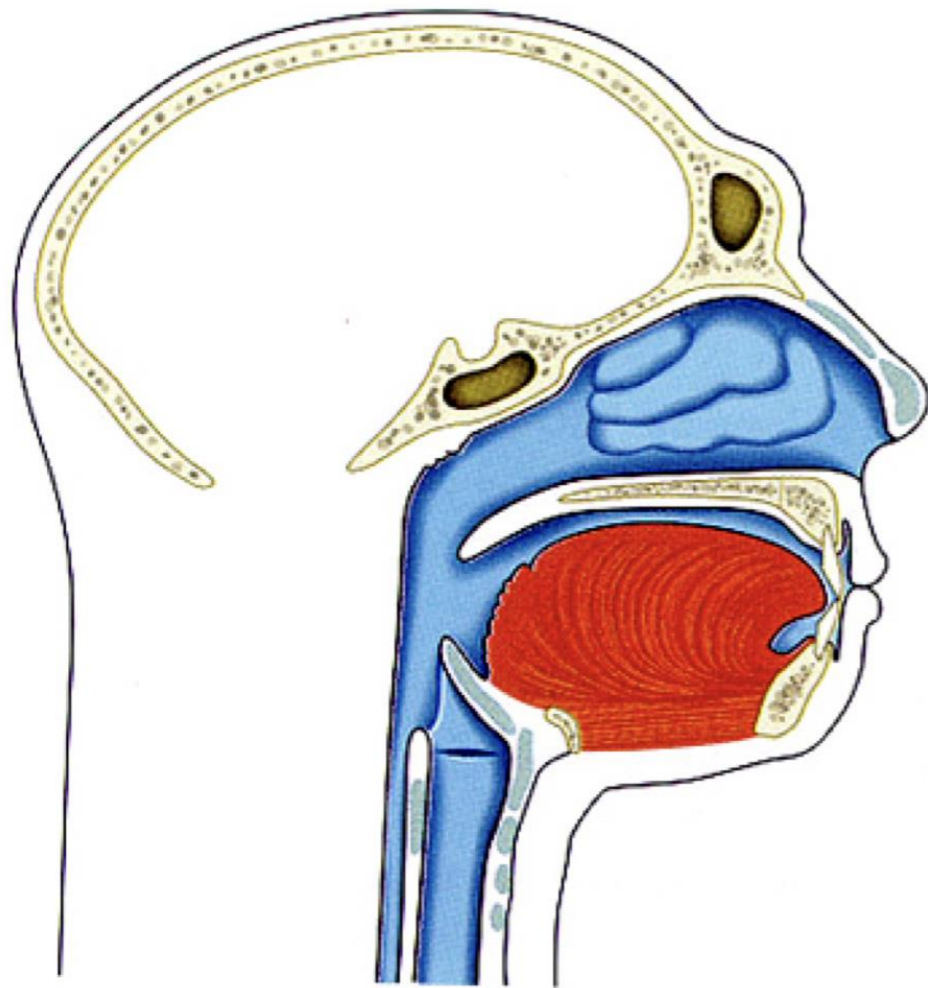
Human

## MODERN ADULT HUMANS

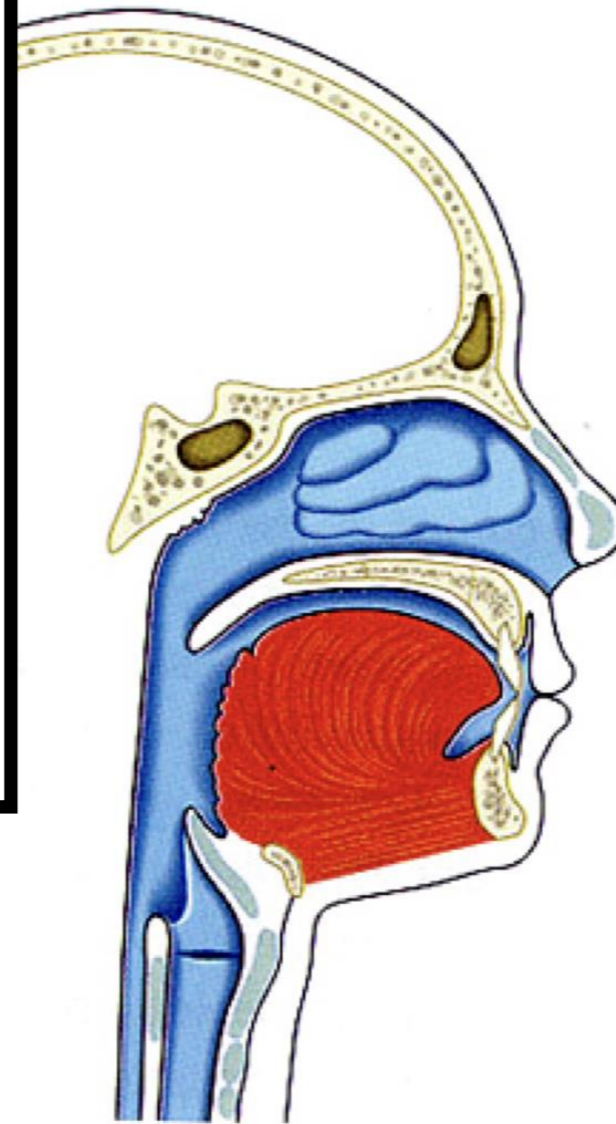
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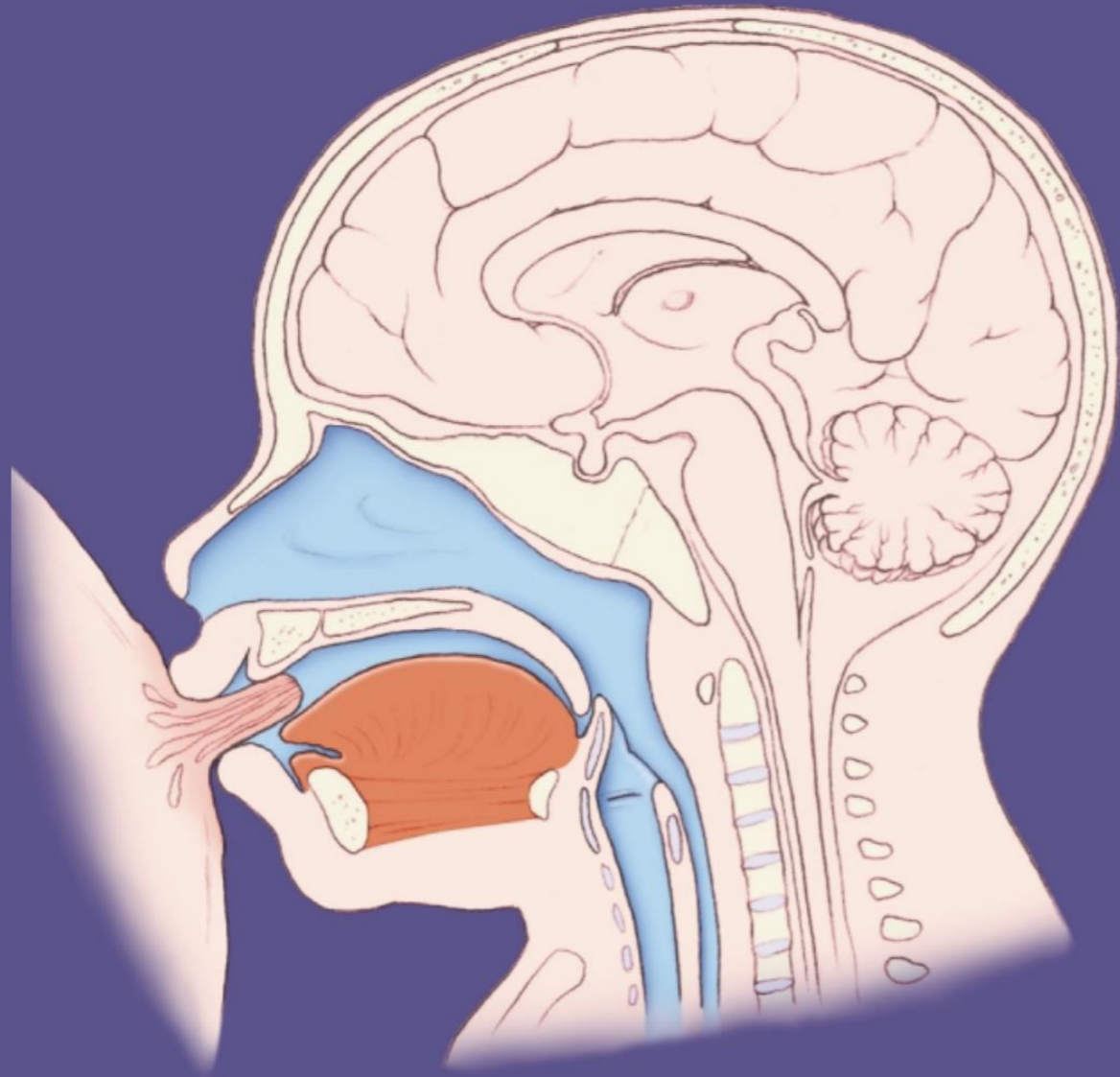
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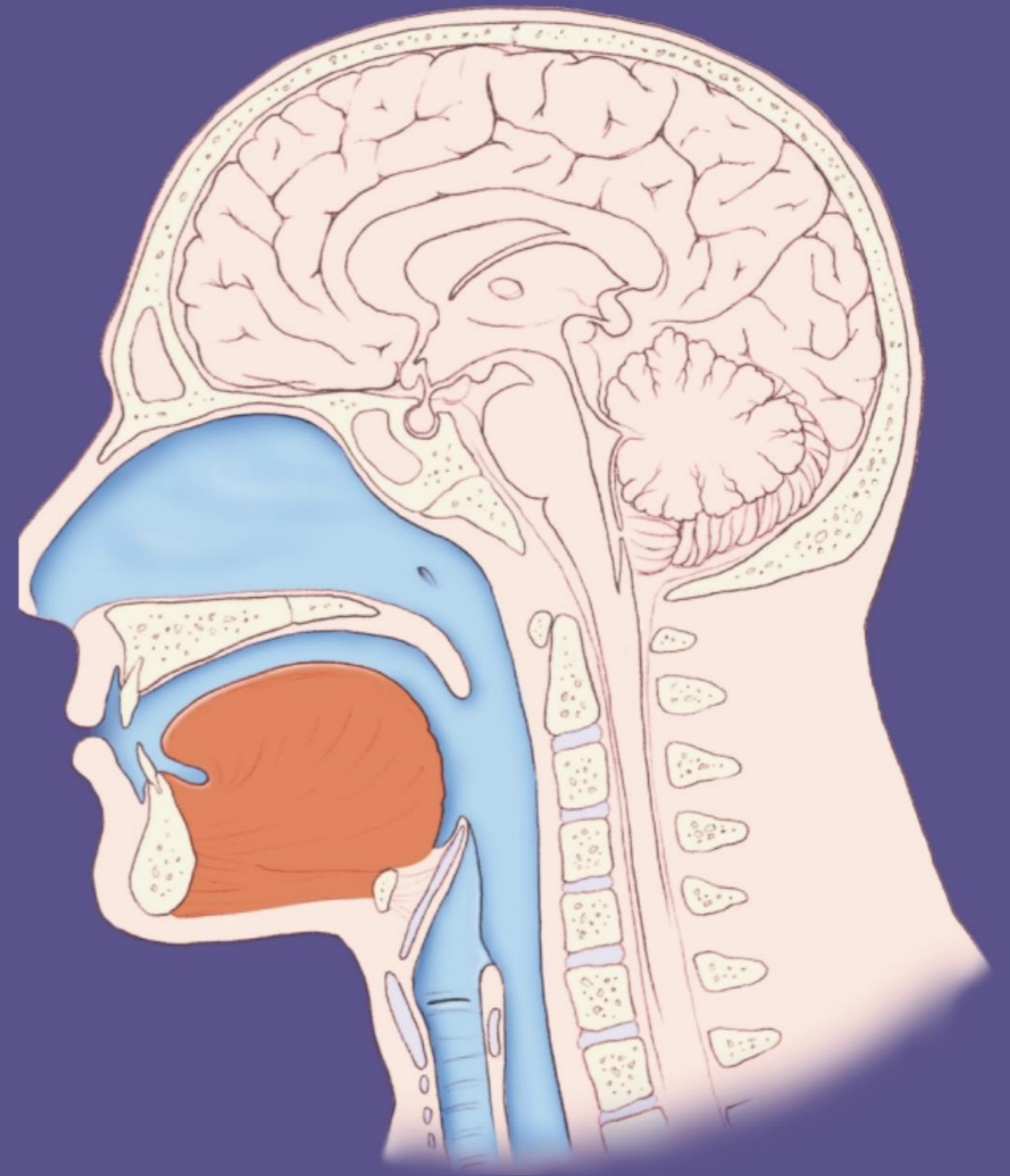
**Homo Neanderthalensis  
(Neandertal)**



**Homo Sapiens  
(Modern Man)**



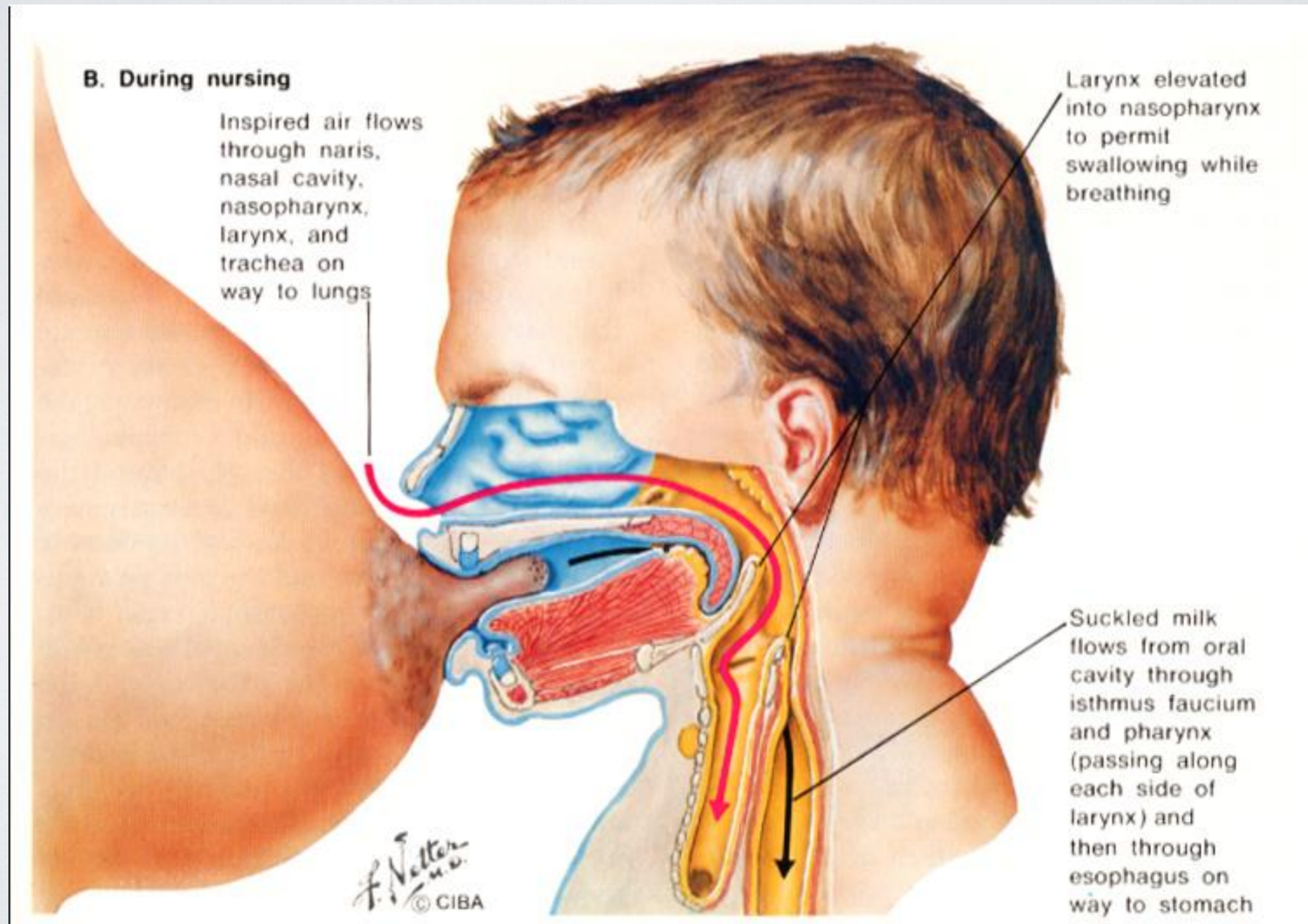
Infant

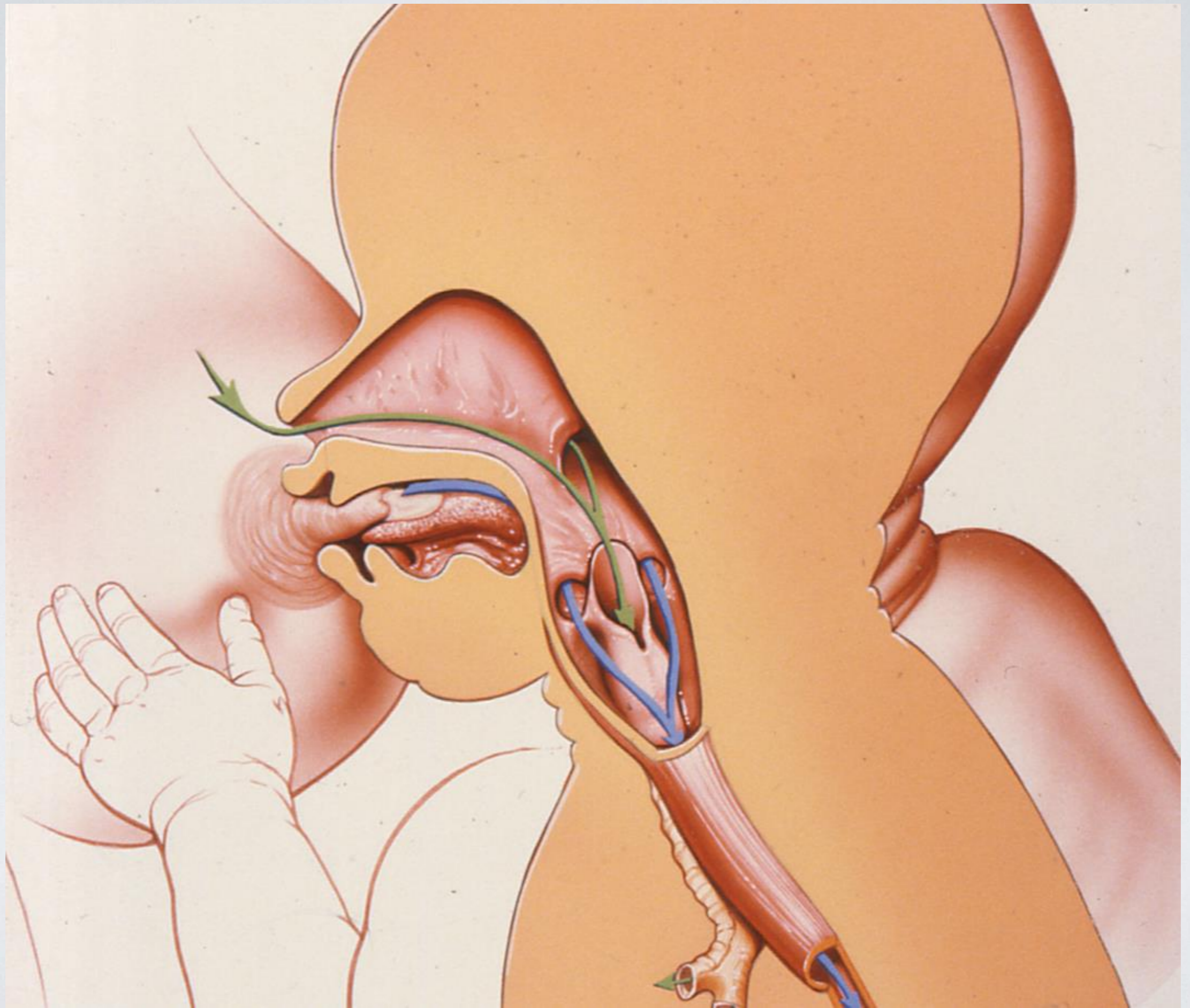


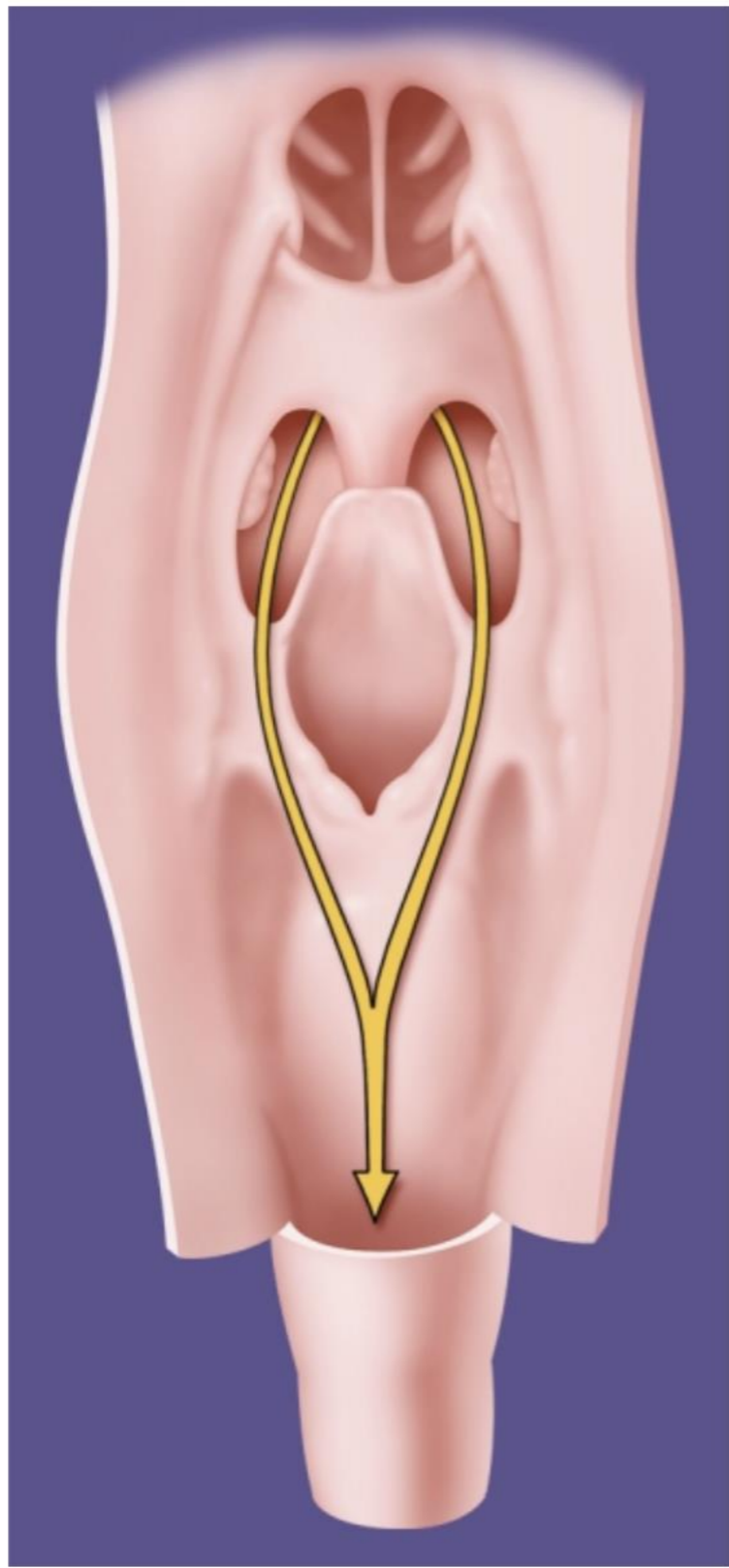
Adult



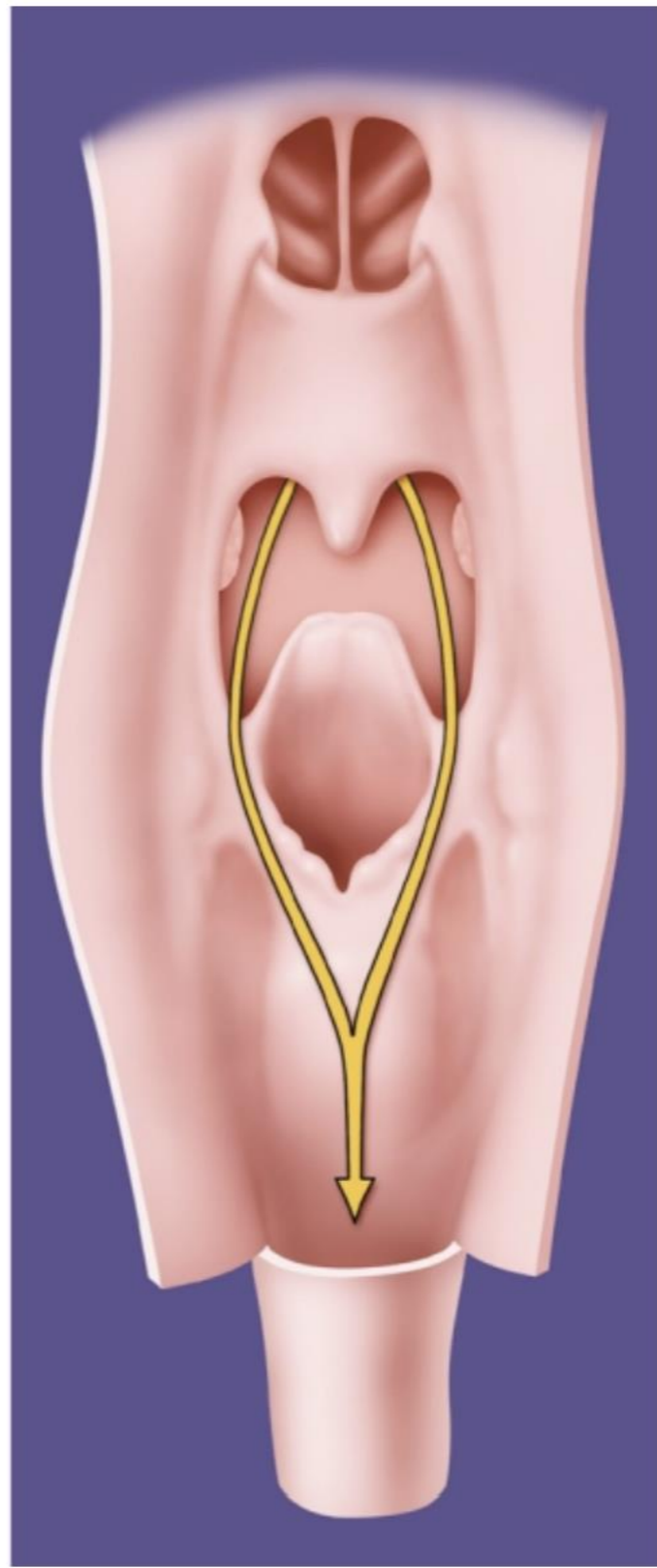
# DEVELOPMENT OF UAD TRACT FUNCTION IN HUMANS





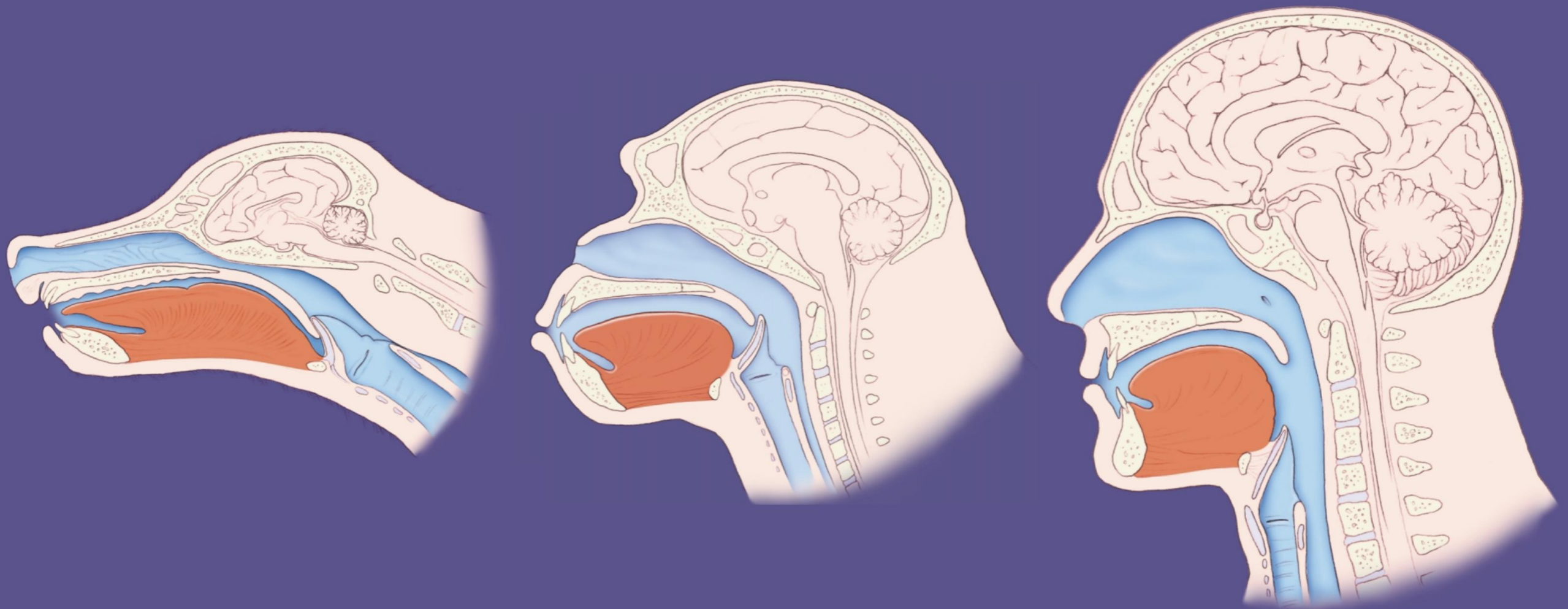


Human  
Infant



Human  
Adult

# ASPIRATION: THE PRICE OF SPEECH? CONTROVERSIAL!



Dog

Chimpanzee

Human

# HUMAN UADT (INFANT)

- Anatomical arrangement similar to lower mammals and early hominids (closer to an intranarial larynx)
- Pros: Continuous breathing while feeding over long periods, liquid diet means no need to swallow large solid food boluses
- Cons: More dependent on nasal airway

# PEDIATRIC DYSPHAGIA

- Most “pediatric ENT” dysphagia is associated with problems that present in infancy
- Issues arising in later childhood are more likely to be in the realm of GI
- Acute dysphagia (eg. pharyngitis, stomatitis) not the focus of this talk



# PEDIATRIC DYSPHAGIA (ENT VERSION)

- Nasal
- Oral
- Hypopharyngeal
- Neuromuscular
- Beyond the cricopharyngeus

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# NEONATAL RHINITIS



**NeilMed**<sup>®</sup>  
**Naspira Drops**<sup>™</sup>  
New!  
Babies & kids  
by Dr. Mehta<sup>™</sup>

Drug Free Sterile Nasal Saline Ampoules

**Quick Relief for Nasal Mucus**

12 Sterile Saline Ampoules

CHOKING HAZARD – Small parts. Use with adult supervision only  
Contents: 12 Single-Use Ampoules 1 mL each (0.034 fl oz)

Roll over image to zoom in



frida baby<sup>®</sup>  
**NoseFrida**<sup>®</sup>  
The OG SnotSucker<sup>®</sup>

PEDIATRICIAN  
#1  
RECOMMENDED BRAND

1 Nasal Aspirator  
4 Hygiene Filters



Infant Safe  
**KID'S XLEAR**<sup>®</sup>  
NATURAL SALINE  
**NASAL SPRAY**  
AMERICA'S #1 BEST SELLING  
with XYLITOL

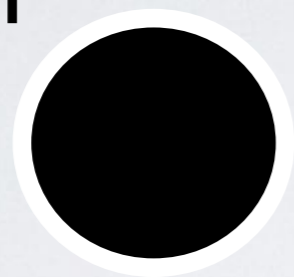
20 YEARS  
NATURAL  
**NASAL SPRAY**  
WITH  
XYLITOL

VIATES  
GESTION,  
NS AND  
ECTS  
Y RELIEF

0.75 fl oz / 22 mL

# Airway Compromise: 0.5 mm of Mucosal Edema

Newborn



3.5 mm

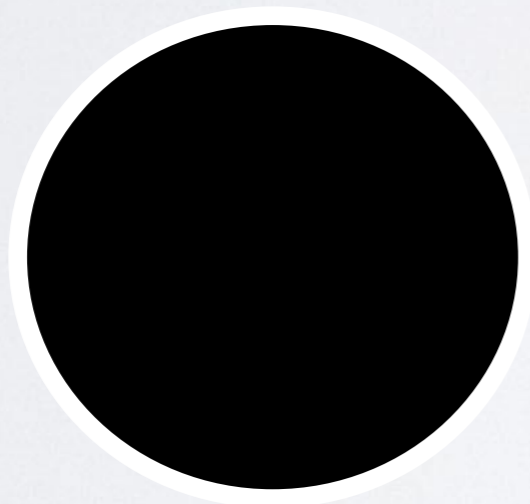


2.5 mm

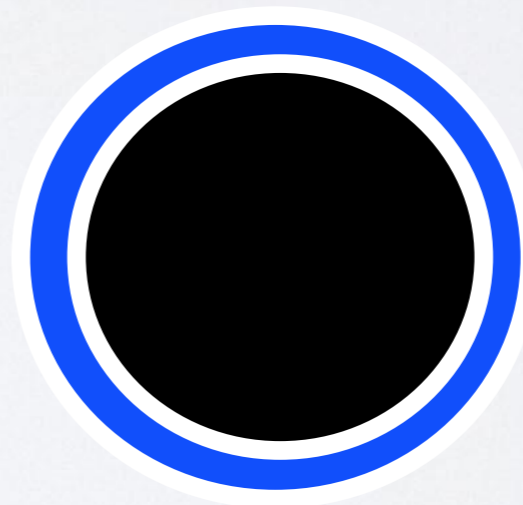
~50% area  
reduction

---

Adult



7.5 mm

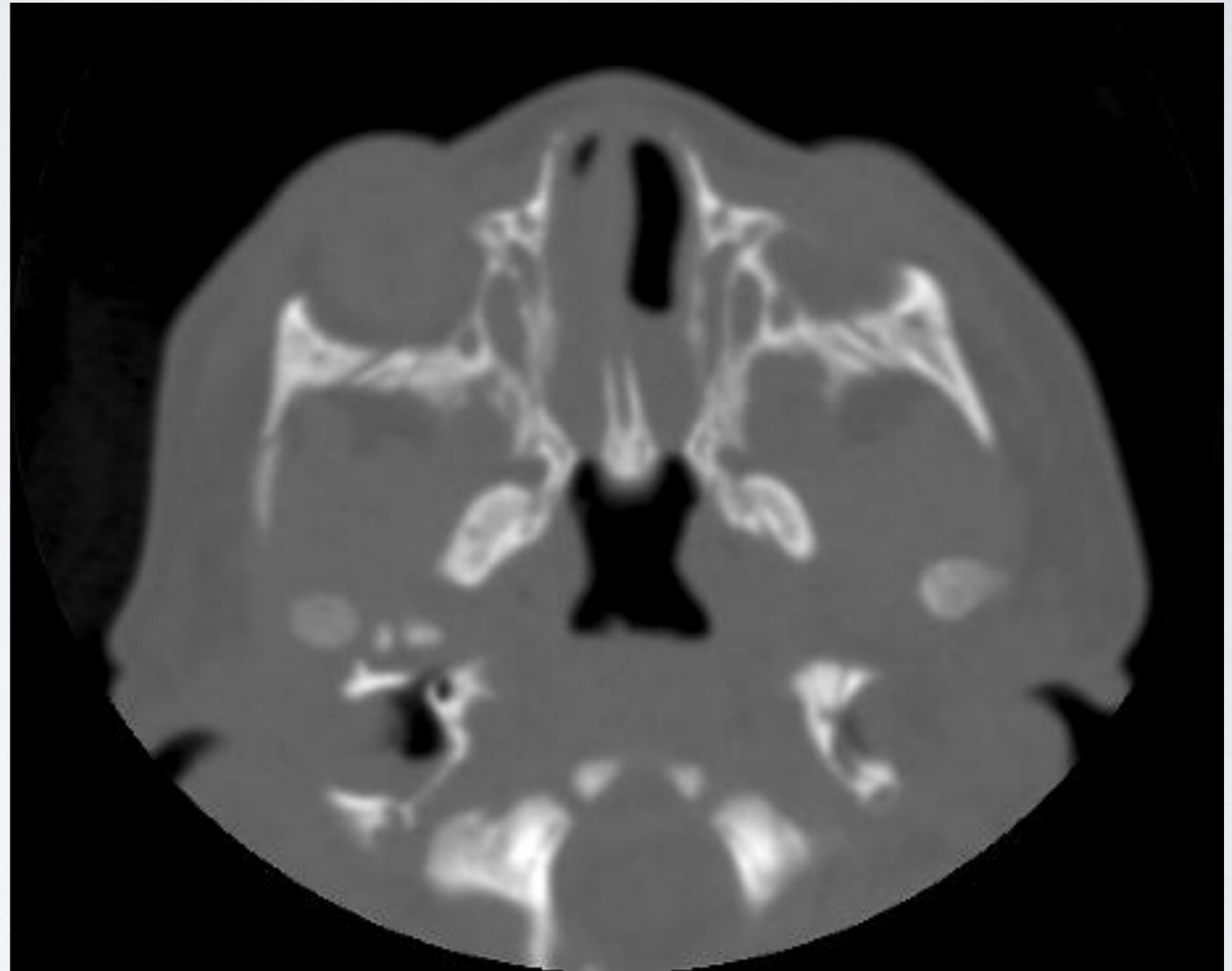


6.5 mm

~25%  
area  
reduction

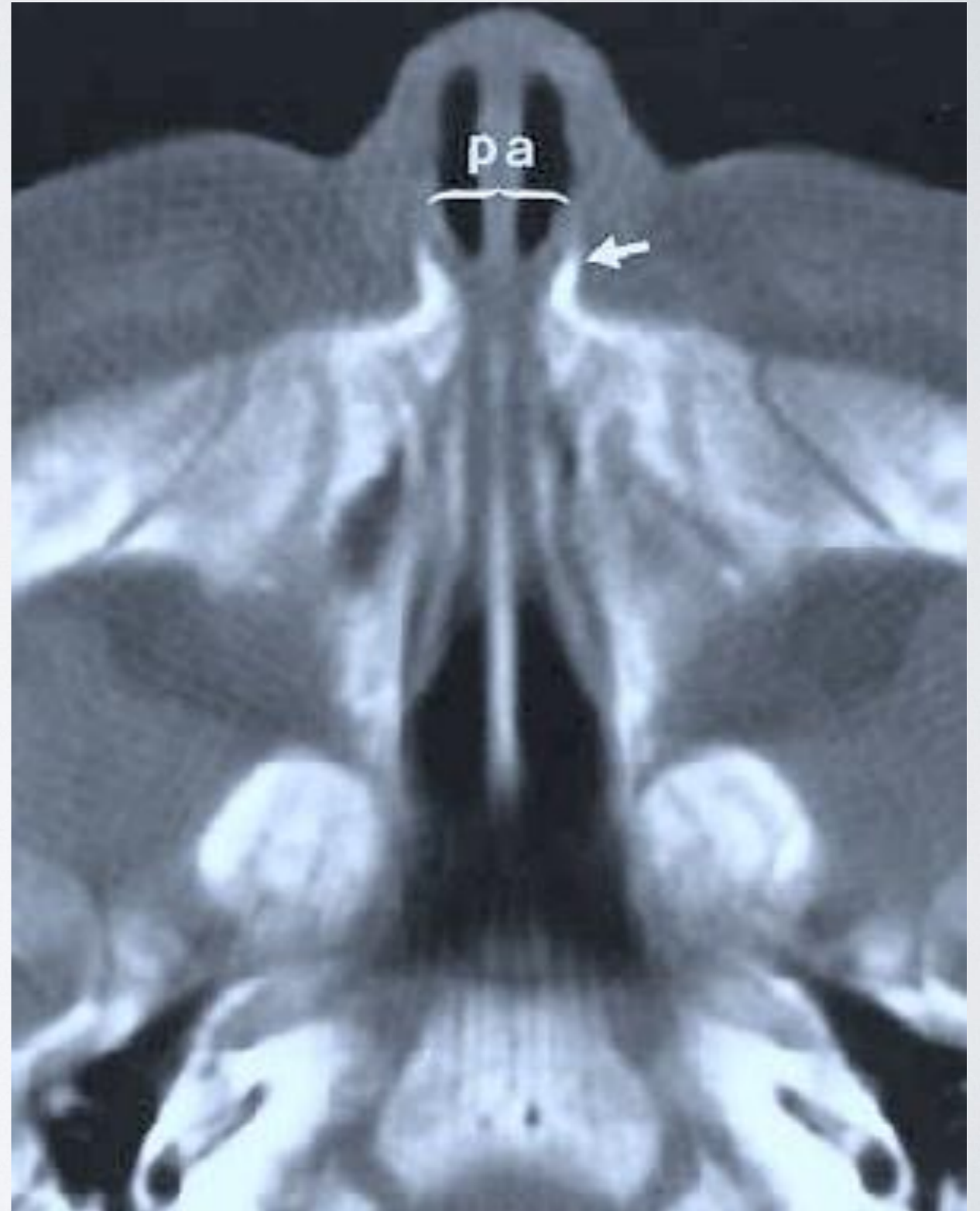
# BILATERAL CHOANAL ATRESIA

- One of the few neonatal surgical emergencies in ENT
- Consider tracheotomy if other major anomalies



# PYRIFORM APERTURE STENOSIS

- Early surgery vs conservative management (topical steroids) depending on degree of stenosis



# NOWCA

- Nasal Obstruction Without Choanal Atresia
- AKA midnasal stenosis
- Nasal Ciprodex
- Expectant management
- Surgical results usually poor
- Consider MRI as opposed to CT scan



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Introducing.....

## The Image Gently Think-A-Head Campaign

Improving the Use of Head CT Scans in Children

### Breaking News

[4/23/2019: Computed tomography scanning in pediatric trauma: Opportunities for performance improvement and radiation safety](#)

[4/16/2019: Choice of Tube Extremity for Emission of the Lowest Radiation Dose in Pediatric Patients](#)

Take the Image Gently® pledge!



[Pledge to Image Gently!®](#)

For group certificates, please click [here](#).

*"I really admire the Image Gently program and what you are trying to do for parents and children...It took me by complete shock when I found out that a barium enema even used radiation...This goes to show exactly how BIG the gap is between healthcare and parents with radiation." TB 12.15.18*

[Image Gently Mission Statement Update](#)



- Infants are particularly dependent on nosebreathing for the first six weeks of life
- Optimizing nasal airway is important
- In deciding on intervention for many of these conditions, weight gain is a good metric to follow



# PEDIATRIC DYSPHAGIA (ENT VERSION)

- Nasal
- **Oral**
- Hypopharyngeal
- Neuromuscular
- Beyond the cricopharyngeus

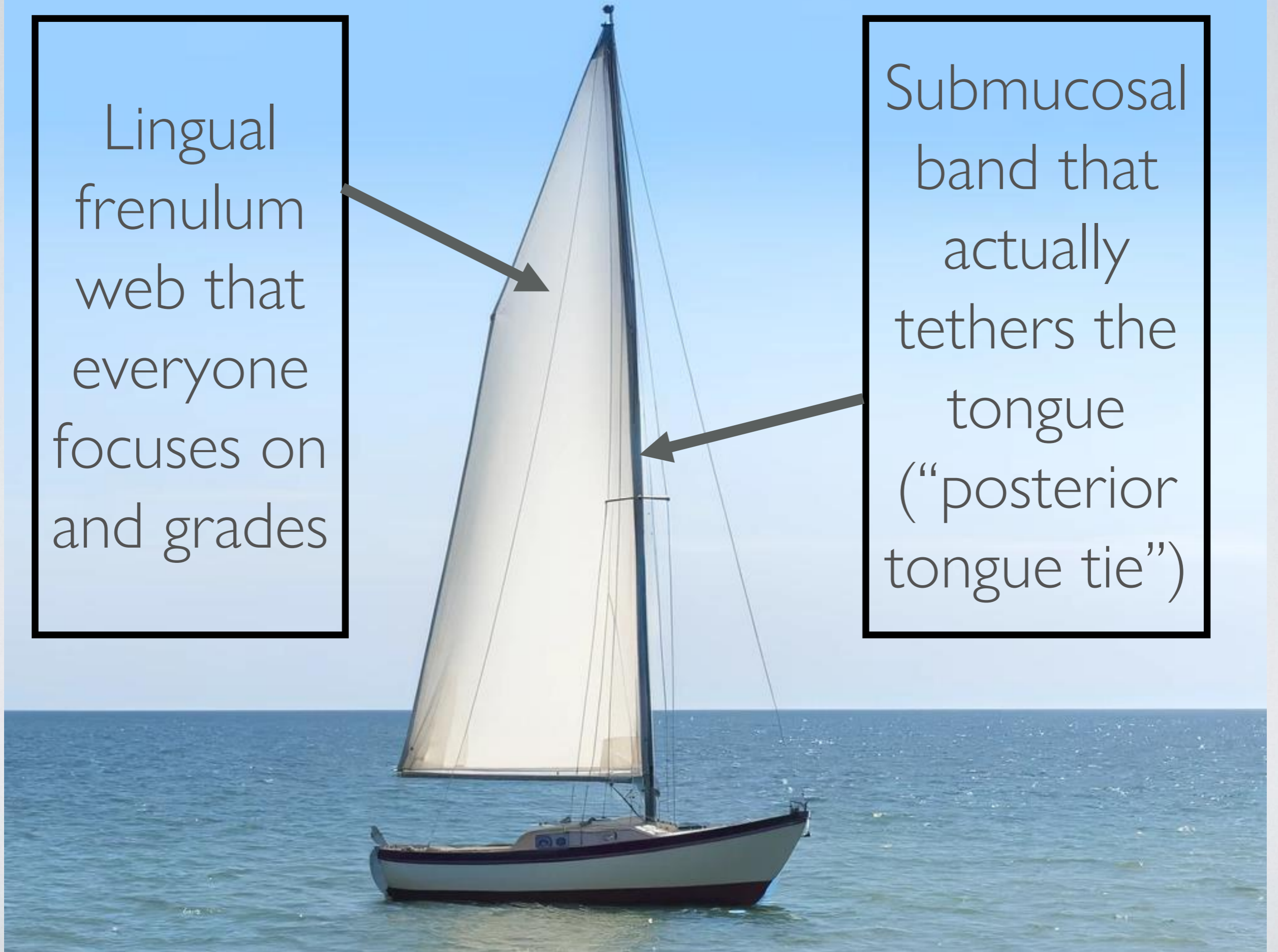
# ORAL TIES

- Lots of nonsense out there
- Limited real data
- Neonatal lingual frenotomy seems to help, even with “posterior” ankyloglossia, in SELECTED cases of feeding problems (e.g. nipple pain, aerophagia, slow nursing)
- Labial frenoplasty primarily for diastema, around age one
- Not much evidence for speech benefits
- Not much evidence for addressing other ties



Lingual  
frenulum  
web that  
everyone  
focuses on  
and grades

Submucosal  
band that  
actually  
tethers the  
tongue  
("posterior  
tongue tie")



# The New York Times

December 18, 2023



OPERATING PROFITS

## *Inside the Booming Business of Cutting Babies' Tongues*

Dentists and lactation consultants around the country are pushing “tongue-tie releases” on new mothers struggling to breastfeed.

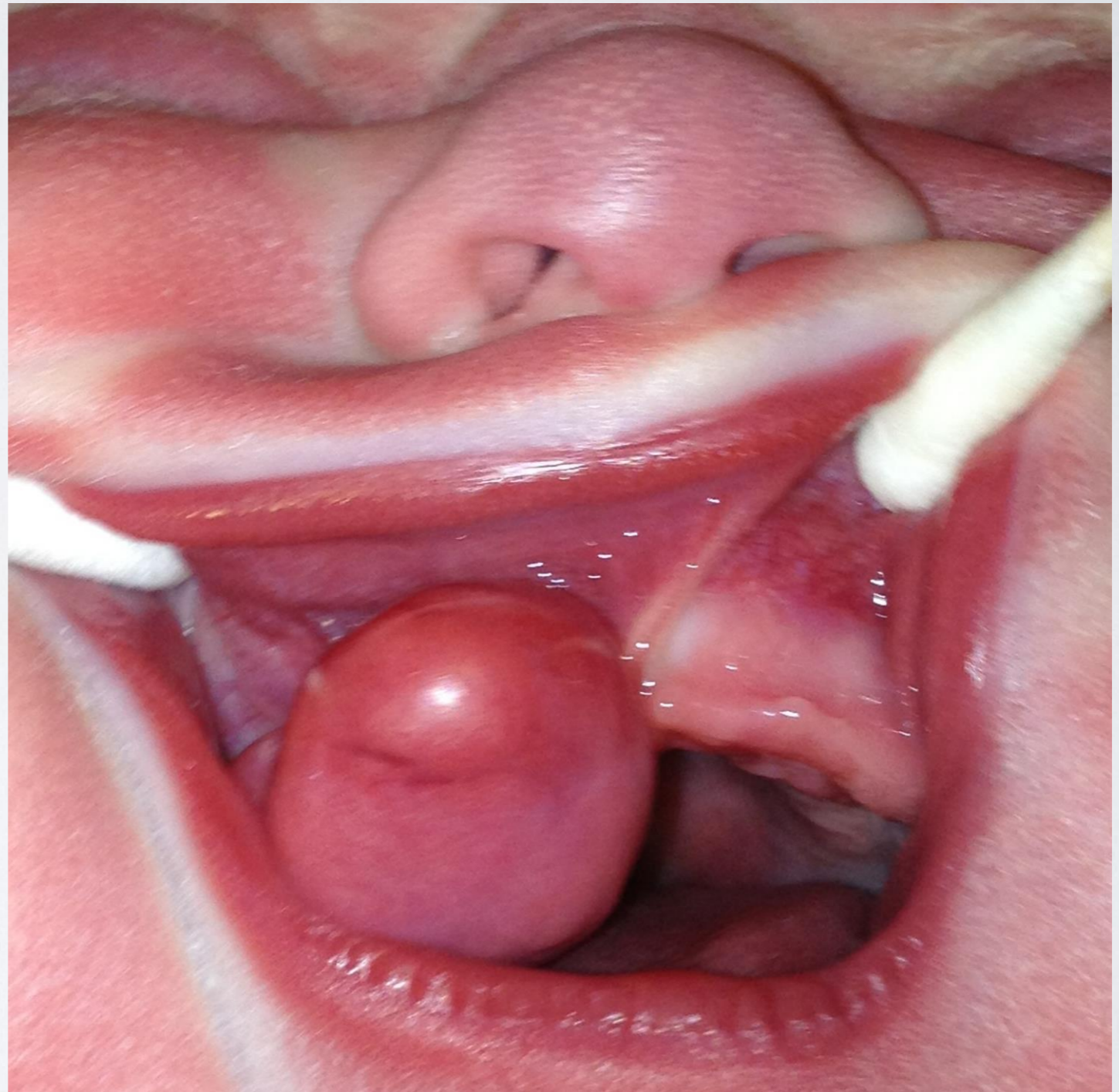
# OTHER ORAL SOURCES OF INFANTILE DYSPHAGIA

Cleft lip  
and palate



# OTHER ORAL SOURCES OF INFANTILE DYSPHAGIA

Epulis and  
other masses



# OTHER ORAL SOURCES OF INFANTILE DYSPHAGIA

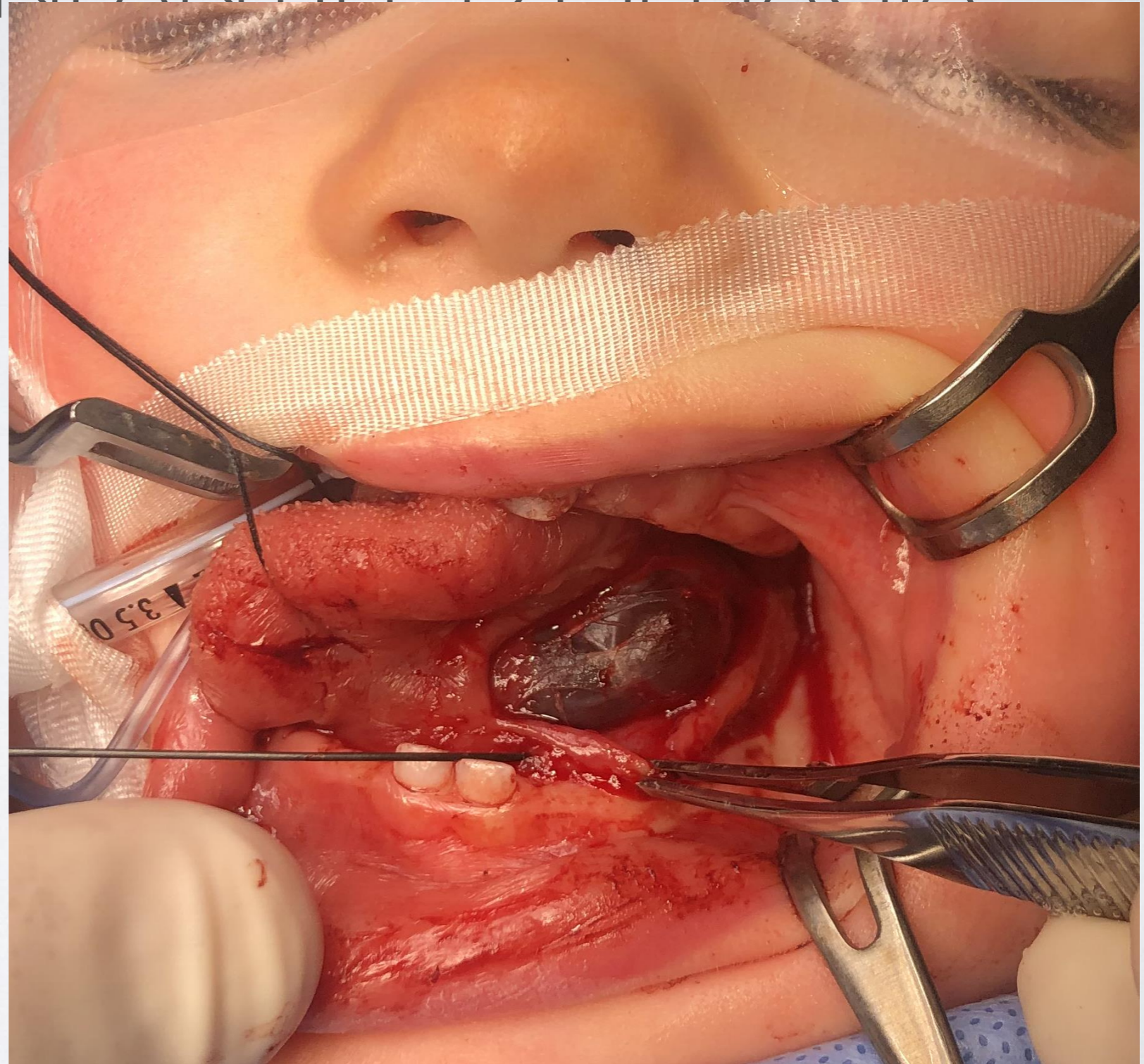
Beckwith-  
Wiedemann  
and other  
macroglossia





# OTHER ORAL SOURCES OF INFANTILE DYSPHAGIA

Ranula



# OTHER ORAL SOURCES OF INFANTILE DYSPHAGIA

Micrognathia  
or retrognathia

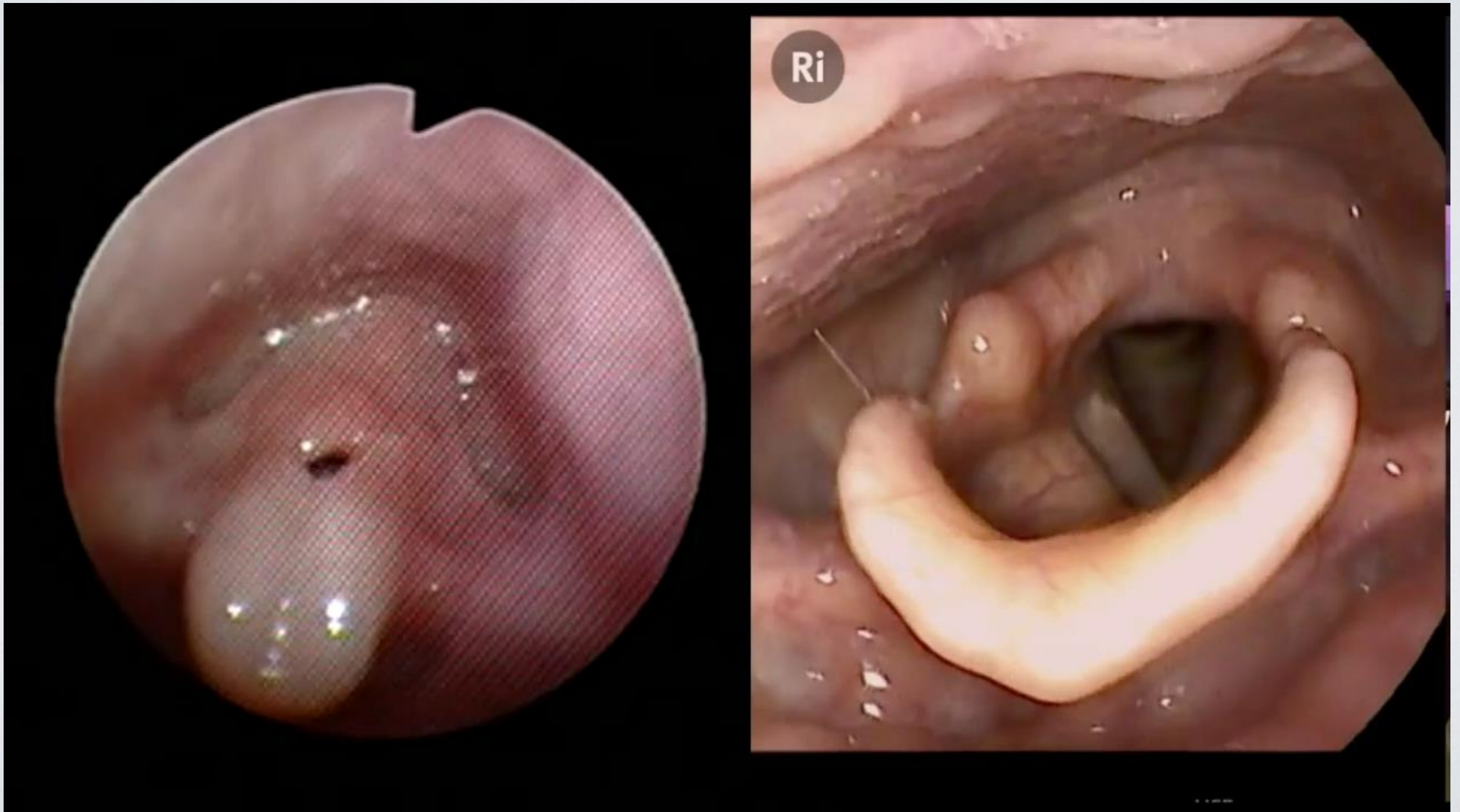


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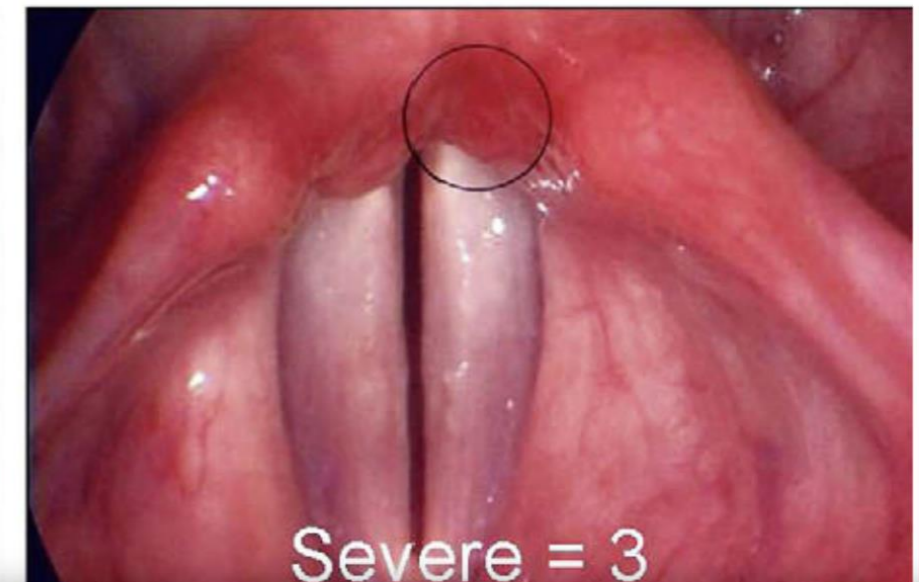
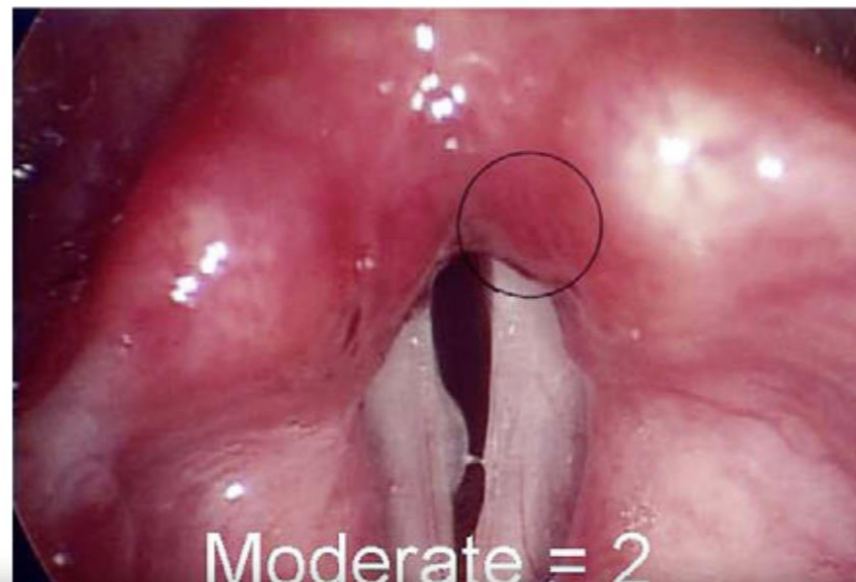
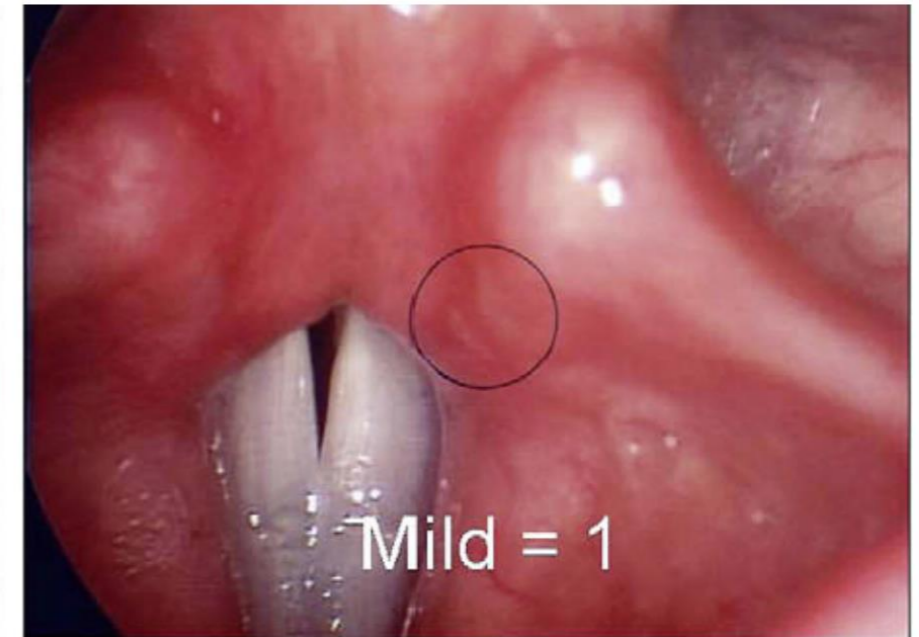
# HYPOPHARYNGEAL SOURCES OF INFANTILE DYSPHAGIA

## Laryngomalacia



# HYPOPHARYNGEAL SOURCES OF INFANTILE DYSPHAGIA

Reflux  
laryngitis



**Flexible laryngoscopy: a comparison of fiber optic and distal chip technologies-part 2: laryngopharyngeal reflux.**

R. Eller

Mark A Ginsburg

D. Lurie

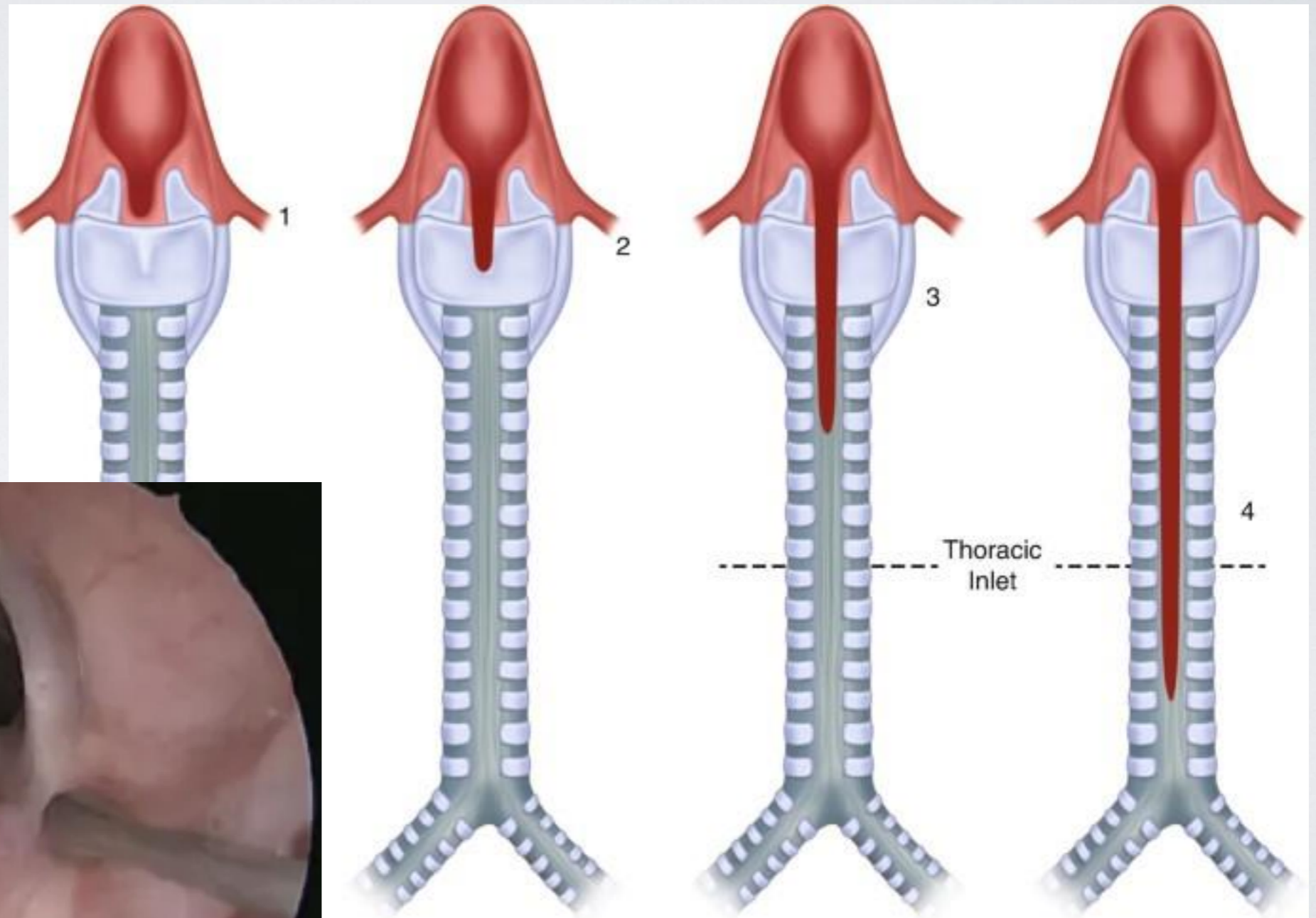
Y. Heman-Ackah

K. Lyons

R. Sataloff

# HYPOPHARYNGEAL SOURCES OF INFANTILE DYSPHAGIA

Laryngeal  
cleft

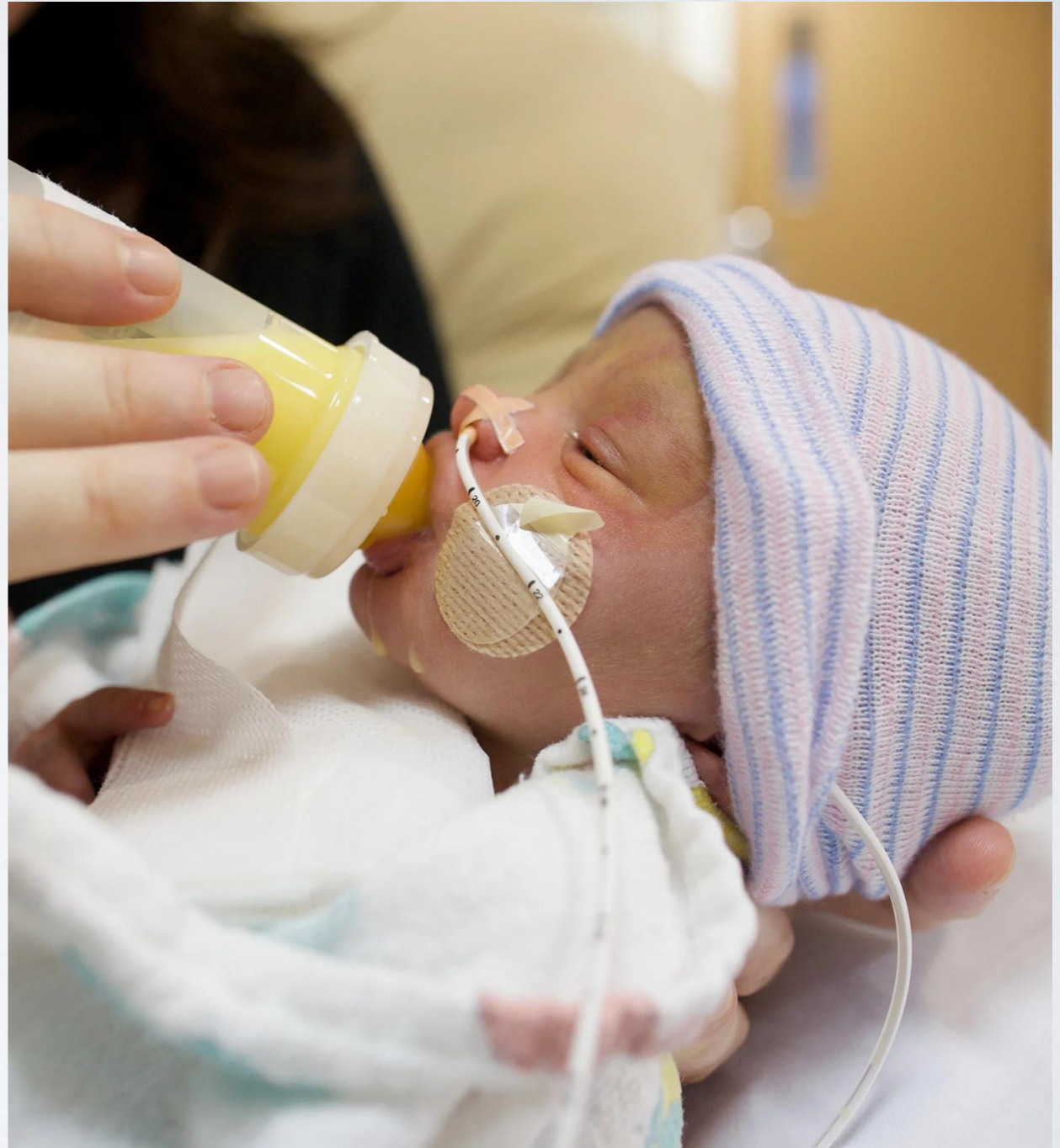


# PEDIATRIC DYSPHAGIA (ENT VERSION)

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# NEUROMUSCULAR SOURCES OF INFANTILE DYSPHAGIA

- Prematurity
- Congenital muscular dystrophy
- Neuropathy
- Myopathy
- Cerebral palsy





# NEUROMUSCULAR SOURCES OF INFANTILE DYSPHAGIA

- Common concern is aspiration
- Protection of human UADT relies on precise control and coordination of swallow, VC function, and protective reflexes (e.g. cough)
- Thickened feeds?
- Feeding therapy?
- G-tube?

# MBS VS. FEES

- Looking for aspiration, penetration, cough trigger
- Googling MBS and FEES may give you a lot of information about the fees associated with the purchase of mortgage backed securities



# MBS VS. FEES

- Modified Barium Swallow
  - Shows oral phase and below the cricopharyngeus
  - Less discomfort
  - Less reliance on cooperation
  - Less operator dependent
- Functional Endoscopic Evaluation of Swallowing
  - No radiation
  - Easier scheduling logistics (no coordinating SLP and radiology)
  - Can be done at bedside in NICU / PICU
  - Can compare handling of different real foods
  - Can see aspiration of normal secretions
  - Can be recorded and reviewed if any concern re operator

# PEDIATRIC DYSPHAGIA (ENT VERSION)

- Nasal
- Oral
- Hypopharyngeal
- Neuromuscular
- **Beyond the cricopharyngeus**

# BEYOND THE CRICOPHARYNGEUS



- Rings
- Slings
- Achalasia
- EoE
- Strictures
- Stenosis
- TEF
- Etc...

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CHILDREN'S HEALTH

