AIR-204 - Crying and Screaming Aren't Always Bad: Pediatric Airways

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Objectives

- Identify differences between adult and pediatric airways
- Distinguish between respiratory distress and failure and arrest
- Identify common pediatric airway concerns
- Discuss management of pediatric airway concerns

What Causes a Kid to Die?

#1 – Trauma

Respiratory compromise

Shock

Cancer

Congenital defects

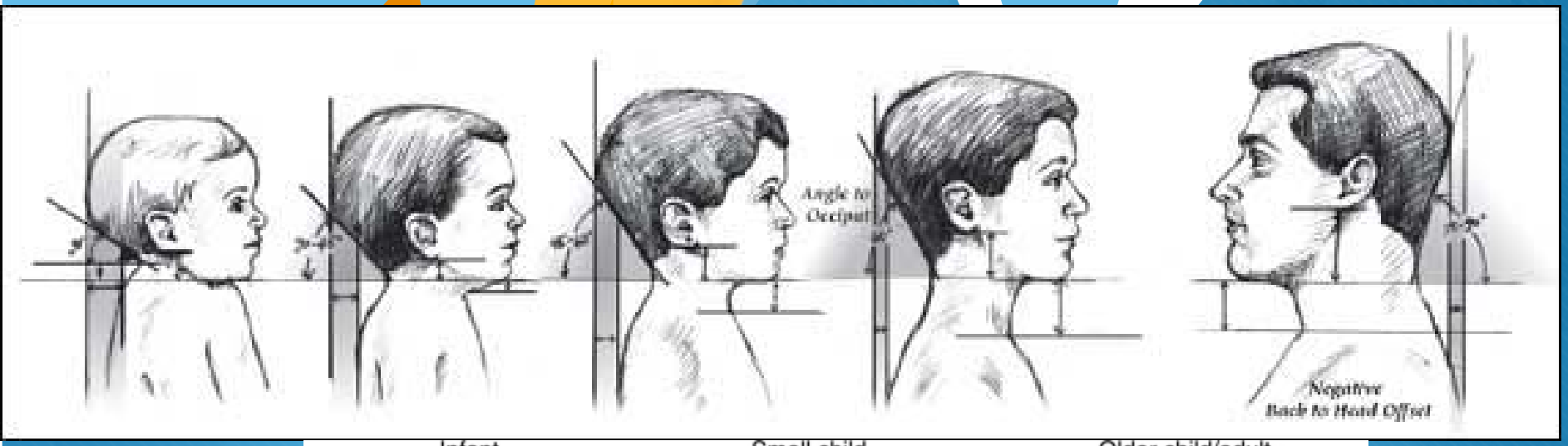
It is rare to have an primary cardiac emergency

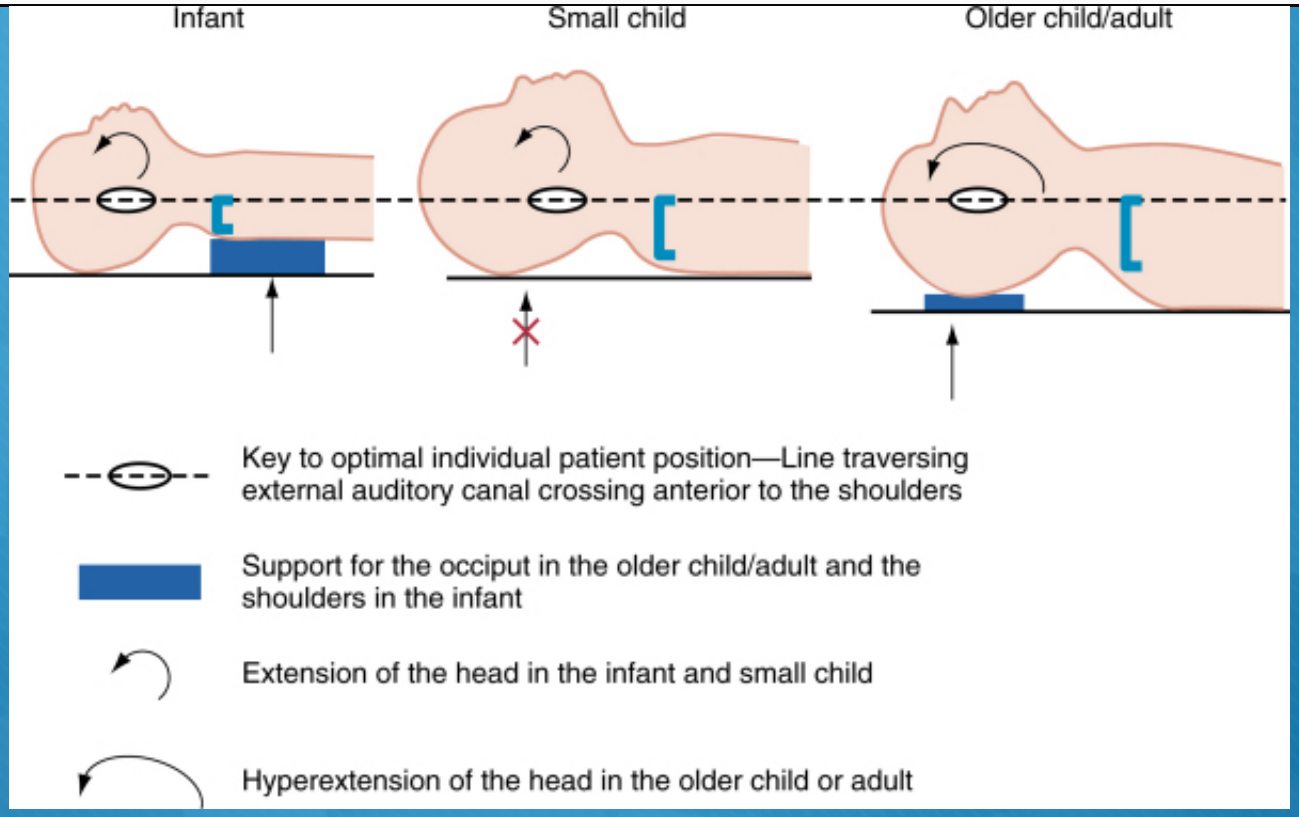
Pediatric Airway Issues

- Less Experience and Training with Pediatrics
- One size DOES NOT fit all
- Anatomy and Physiology is different than an adult
- Smaller airways = little room for error

Upper Airway Differences

- Obligate nasal breathers
- Tongue larger
- Larger occiput
- Work of breathing in a crying child increases 32 fold!


Angle to
Occiput
Negative
Back to Head Offset


Infant
Small child
Older child/adult
Key to optimal individual patient position—Line traversing external auditory canal crossing anterior to the shoulders
Support for the occiput in the older child/adult and the shoulders in the infant
Extension of the head in the infant and small child
Hyperextension of the head in the older child or adult

Down's Syndrome

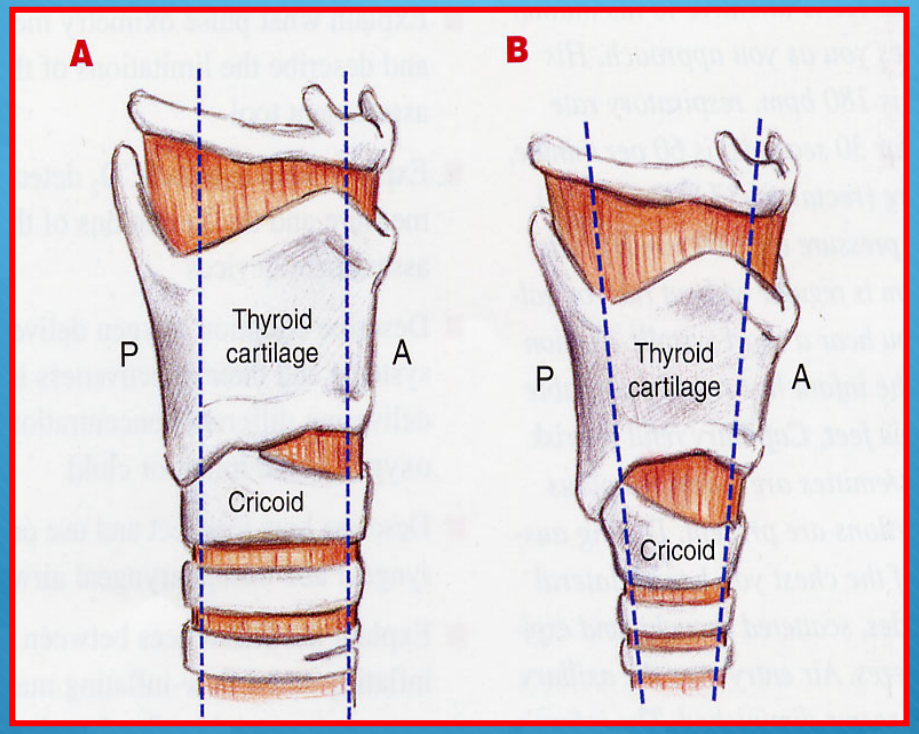
Cleft Lip & Palate

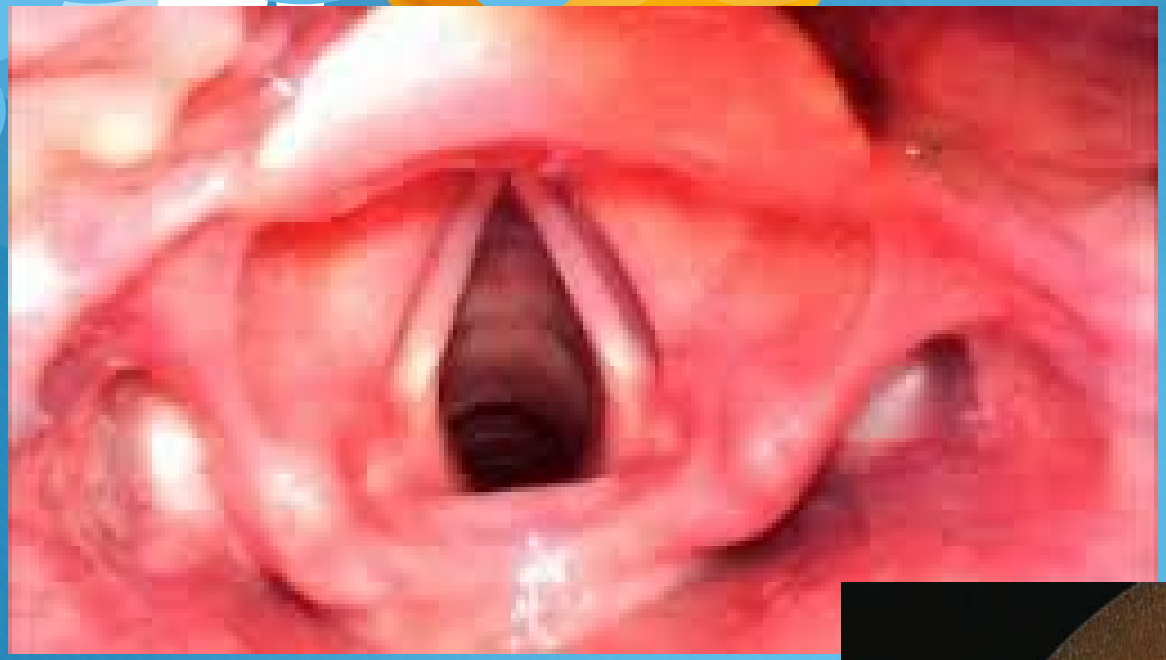
Pierre Robin's Syndrome

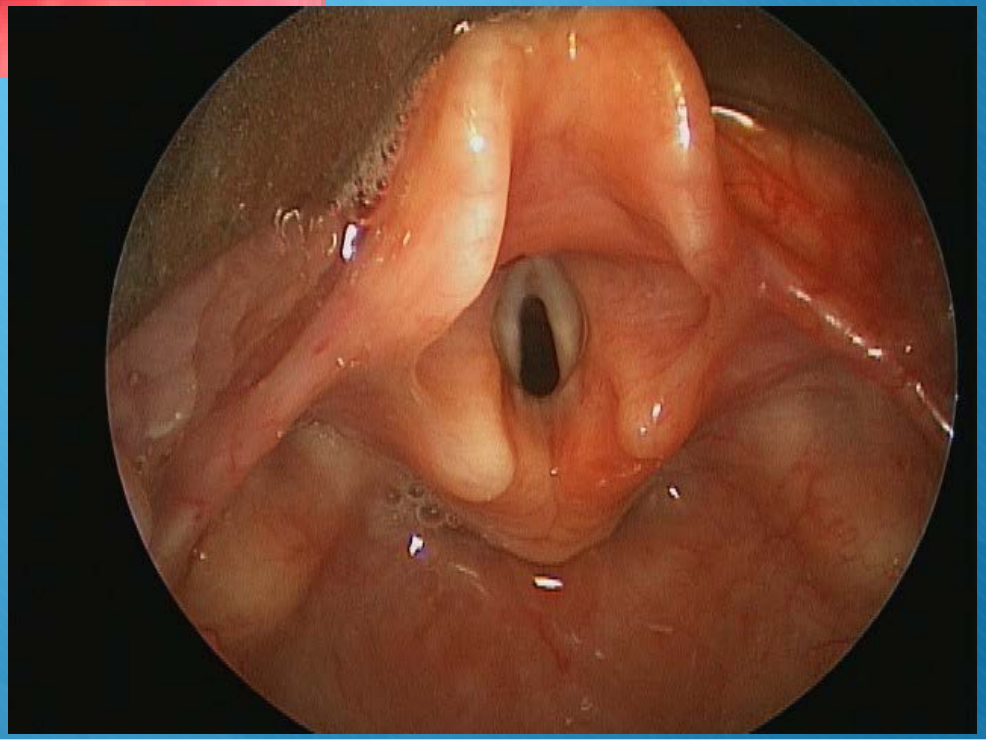
Treacher Collins Syndrome

Laryngeal Differences

- Larynx more superior and anterior in neck
- Epiglottis longer & floppier (omega shape)
- Angled vocal cords
- Funneled shaped larynx-narrowest part of pediatric airway is cricoid cartilage


A
P
Thyroid cartilage
A
Cricoid
B
P
Thyroid cartilage
A
Cricoid

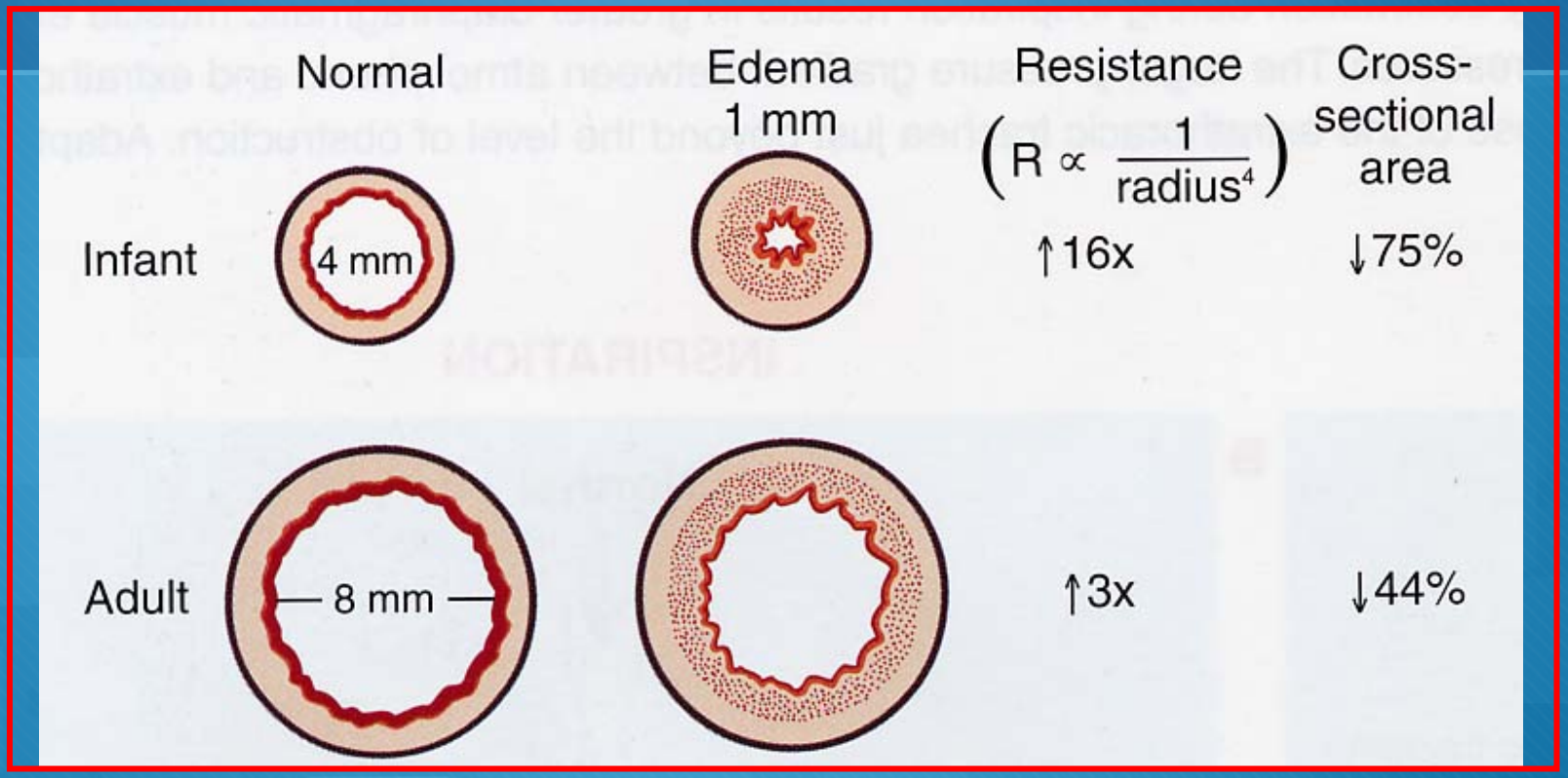




Lower Airway Differences

- Infants use diaphragm during inspiration.
- Muscles not as developed
- Highly susceptible to hypoxia
- Smaller tidal volume, double metabolic oxygen demand
- Smaller functional residual capacity

Resistance



If radius is halved, resistance increases 16 x

Preparing for Airway Issues

S: Suction

Catheters (6 - 16 french) and Yankauer (2 sizes)

O: Oxygen

Nasal cannula, oxygen flow, masks & appropriate bag

Tidal Volume = 5mL/kg (10 kg = 50 mL of air)

A: Airway

Sized ETT, OPA/NPA, stylets, laryngoscopes

P: Pharmacology

RSI meds

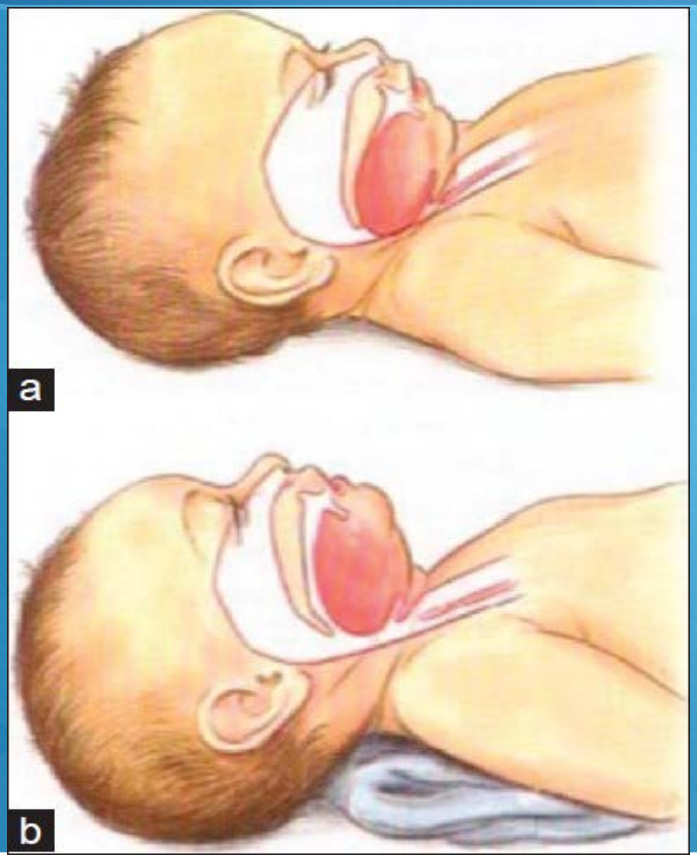
ME: Monitoring equipment

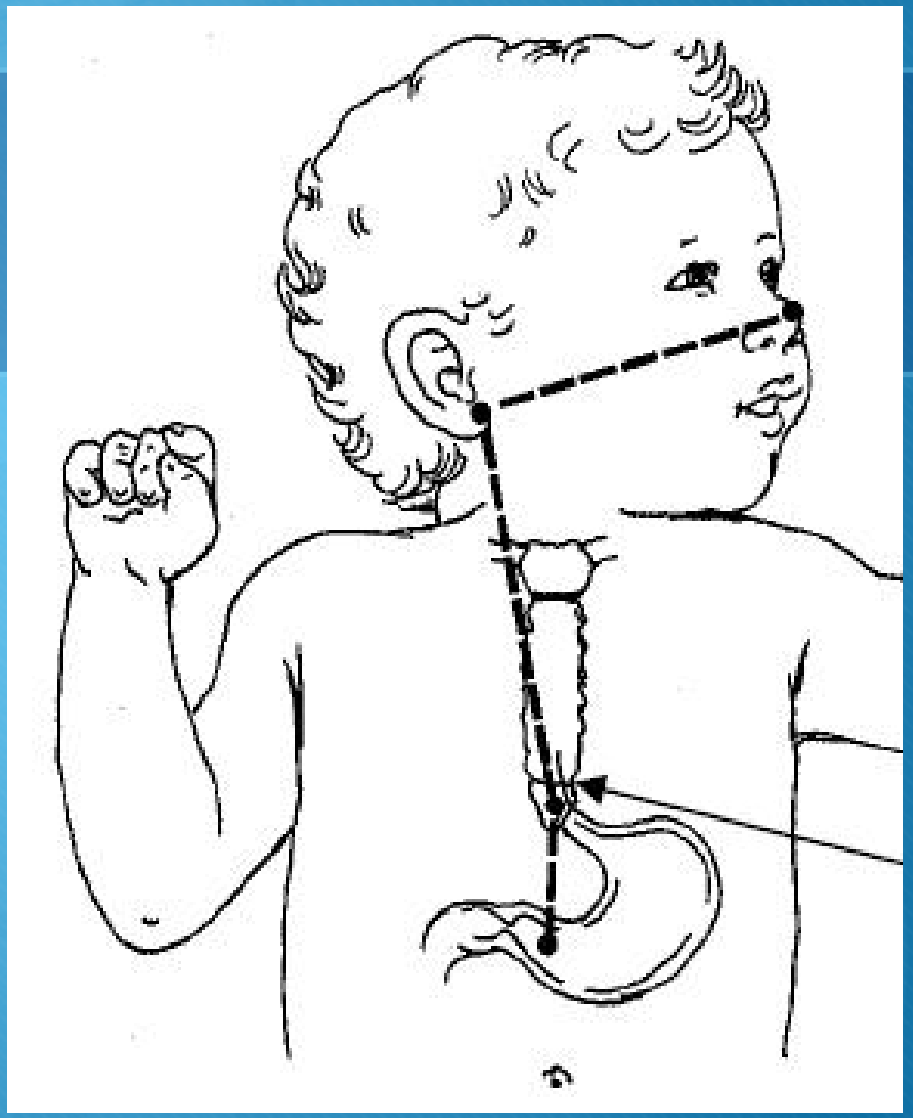
EtCO2 detector, stethescope, monitors

A Word On Intubation

- Focus on good VENTILATION AND OXYGENATION
- PRACTICE PRACTICE PRACTICE
- POSITION POSITION POSITION
- NG/OG Tube in place

NG/OG TUBE

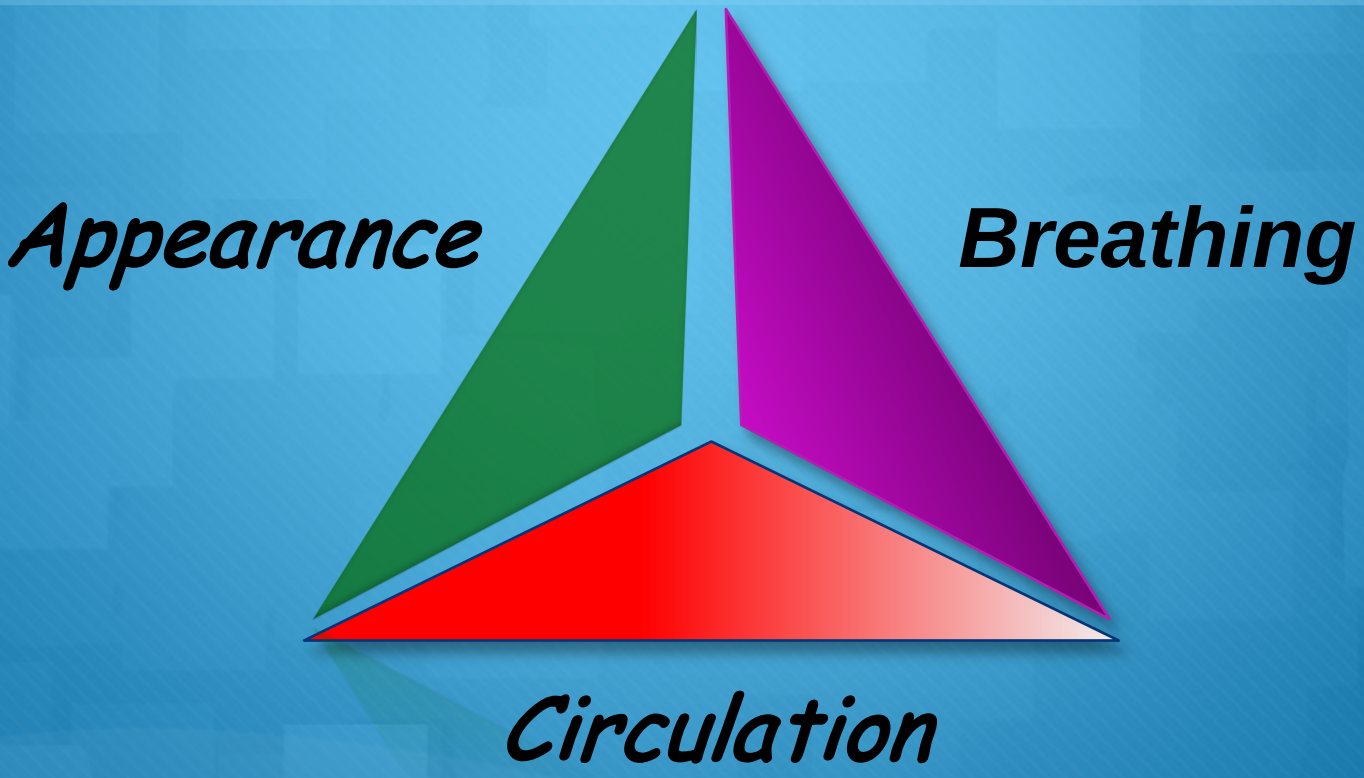




It's All About…

- General Impression
- History
- Assessment

Pediatric Assessment Triangle



Respiratory Distress

- alert, irritable, anxious
- stridor (inspiratory)
- audible wheezing
- respiratory rate faster than normal for age
- intercostal retractions
- nasal flaring
- neck muscle use
- central cyanosis that resolves with O2 administration
- mild tachycardia
- able to maintain sitting position (older kids)

Respiratory Failure

- increased respiratory effort at sternal notch
- marked use of accessory muscles
- retractions, head bobbing, grunting
- sleepy, intermittently combative, or agitated
- central cyanosis
- marked tachycardia
- poor peripheral perfusion
- decreased muscle tone

Respiratory Arrest

- unresponsive to voice or touch
- absent or shallow chest wall motion
- respiratory rate < 10 breaths per minute
- absent breath sounds
- weak to absent pulses
- ***bradycardia*** or asystole
- limp muscle tone

Case Study #1

- Dispatch: 3 month old male with difficulty breathing
- Pediatric Assessment Triangle
  - Appearance: agitated, eyes wide open, sitting up in mom's arms, weak cry
  - Breathing: gasping, irregular
  - Circulation: unremarkable on initial exam

Case Study #1 - ABCs

- Breathing 20-40 x per minute irregular – inspiratory gasp
- O2 sats 92% - room air
- Brachial pulse is 140, strong and regular
- Cap Refill – 2 seconds

Case Study #1 - History

- Mom was burping child after breastfeeding. Suddenly heard a gasp and the infant began breathing “funny”
- Mom states that if she puts him down his breathing gets worse and turns blue

Case Study # 1 – SAMPLE

- S: High pitched inspiratory gasp
- A: none
- M: vitamin D
- P: 5 weeks premature, no complications at birth, immunized appropriately
- L: breastfed normally 10 minutes ago. 4 wet diapers in past 8 hours
- E: Breastfeeding – burping prior to onset

Case Study # 1 - Physical

- HEENT: No swelling, cyanosis or drooling, No tracheal deviation
- CV: Cap refill normal, no mottling, heart tones normal, afebrile
- Resp: lungs (B) equal, clear. Inspiratory stridor/gasping, worse when laying down
- M/S: moving all extremities, good tone.

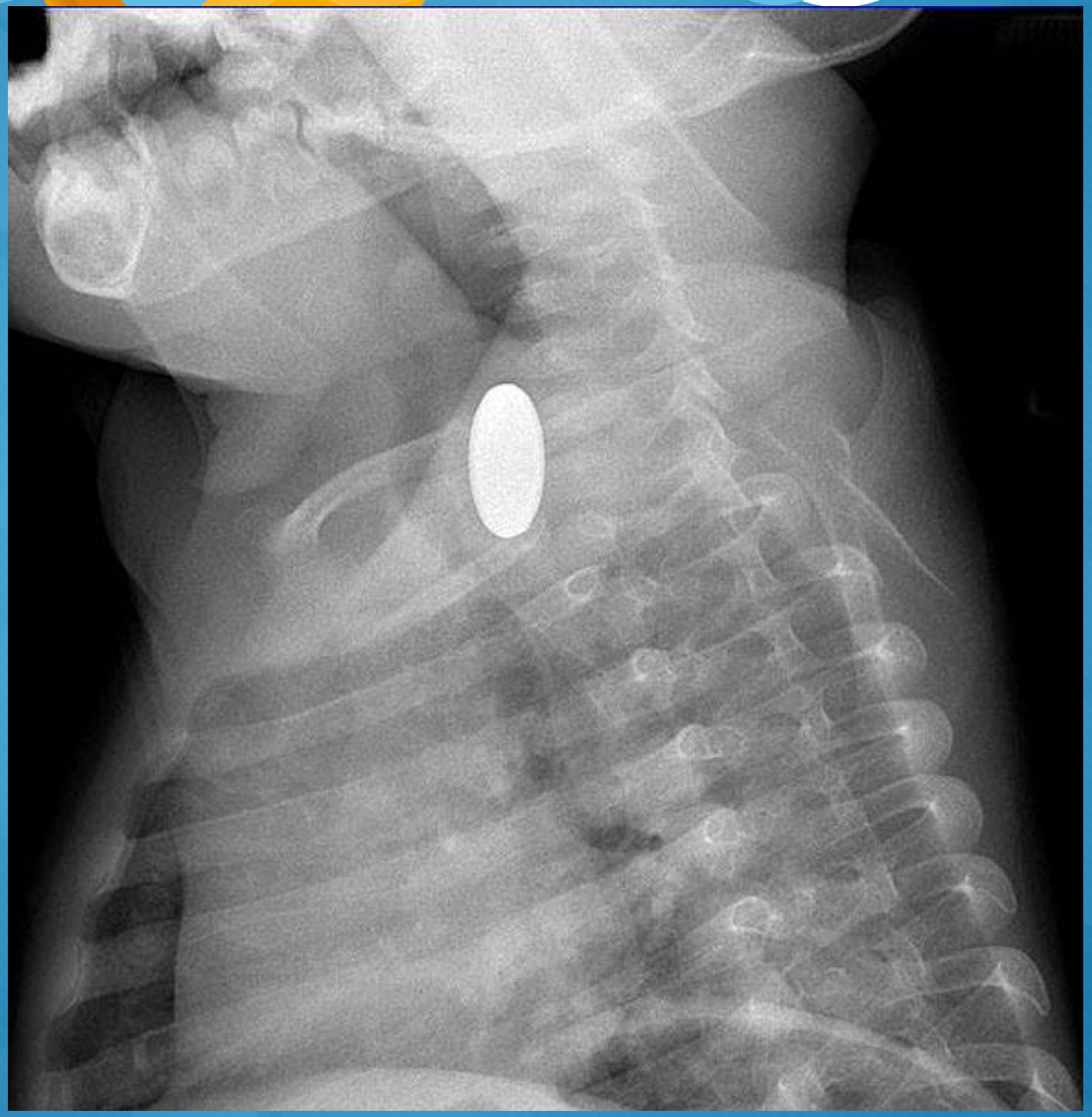
Case Study #1 - Treatment

Respiratory Distress

- POSITION, POSITION, POSITION
- Direct laryngoscopy – nothing noted
- Blow by oxygen
- Monitor heart rate (watch for bradycardia)
- Rapid Transport

Differential Diagnoses

- Foreign body airway obstruction
- Esophageal mass
- Trachael/laryngael malacia
- Infectious process
- Abuse



Case Study #2

- Dispatch: 4 year old female general illness

Pediatric Assessment Triangle

Appearance:	Distressed, unable to talk
Breathing:	paroxysmal coughing, post-tussive vomit, high pitched noise
Circulation:	flushed

Case Study #2 - ABCs

- Breathing – difficulty due to coughing, circumoral cyanosis with coughing spells
- O2 Sats decrease to 80% during coughing
- Brachial pulse is 120, strong and regular
- Cap Refill – 2 seconds

Case Study #2 - History

- Coughing, sneezing, runny nose x 3 days. Worsening cough keeping her up at night. She does not seem able to “catch her breath”
- Others in house with cough and runny nose
- 100.2 fever yesterday but none today

Case Study # 2 – SAMPLE

- S: Pain with breathing, coughing, runny nose
- A: amoxicillin
- M: albuterol MDI
- P: Reactive Airway Disease, recent outpatient visit for URI, immunized on delayed schedule
- L: Dinner x 4 hours ago
- E: Sleeping and woke up in a coughing fit.

Case Study # 2 - Physical

- HEENT: runny nose, coughing
- CV: Cap refill normal, flushed, diaphoretic, afebrile, no edema, strong pulses
- Resp: Paroxysmal coughing fits with circumoral cyanosis, breath sounds – diffuse rhonchi
- M/S: moving all extremities, good tone.

Case Study #2 - Treatment

Respiratory Distress borders on failure

- Put a surgical mask on providers (BSI)
- Oxygen (humidified)
- Monitor heart rate (watch for bradycardia)
- Prepare to ventilate if worsens
- Rapid Transport

Diagnosis

Pertussis (AKA) Whooping Cough

- Highly communicable
- Increased rate due to decreased vaccinations
- Very Young and Old more prone to respiratory distress
- Get your Tdap

Case Study #3

- Dispatch: 20 month old male with difficulty breathing

Pediatr Triangle

Appearance:	Sleepy, fatigued
Breathing:	High pitched cough, stridor, retractions
Circulation:	No cyanosis or mottling

Case Study #3 - ABCs

- Breathing 40 x per minute –stridor worse with crying, high pitched cough
- Brachial pulse is 128, strong and regular
- Cap Refill – 2 seconds
- Sats – 92% on room air

Case Study #3 - History

- 2 days of runny nose, fever, cough
- Woke up tonight in crying, coughing and having difficulty breathing
- Older siblings with colds.
- Parents took him into steamy bathroom but did not seem to help

Case Study # 3 – SAMPLE

- S: cough, runny nose, fever
- A: none
- M: none
- P: Cold x 2 days, otherwise healthy & immunized
- L: Not much of an appetite today. But able to drink small amounts of juice, water. Decreased diapers.
- E: Went to bed but had difficulty sleeping

Case Study # 3 - Physical

- HEENT: Runny nose, no external airway swelling
- CV: Cap refill normal, no mottling, heart tones normal, febrile (101.4)
- Resp: wheezing & rhonchi in all lung fields, stridor both inspiratory and expiratory
- M/S: moving all extremities, good tone.

Case Study #3 - Treatment

Respiratory Distress

- Humidified oxygen as tolerated
- Monitor oxygen sats/heart rate
- Nebulized albuterol for lower airway wheezing

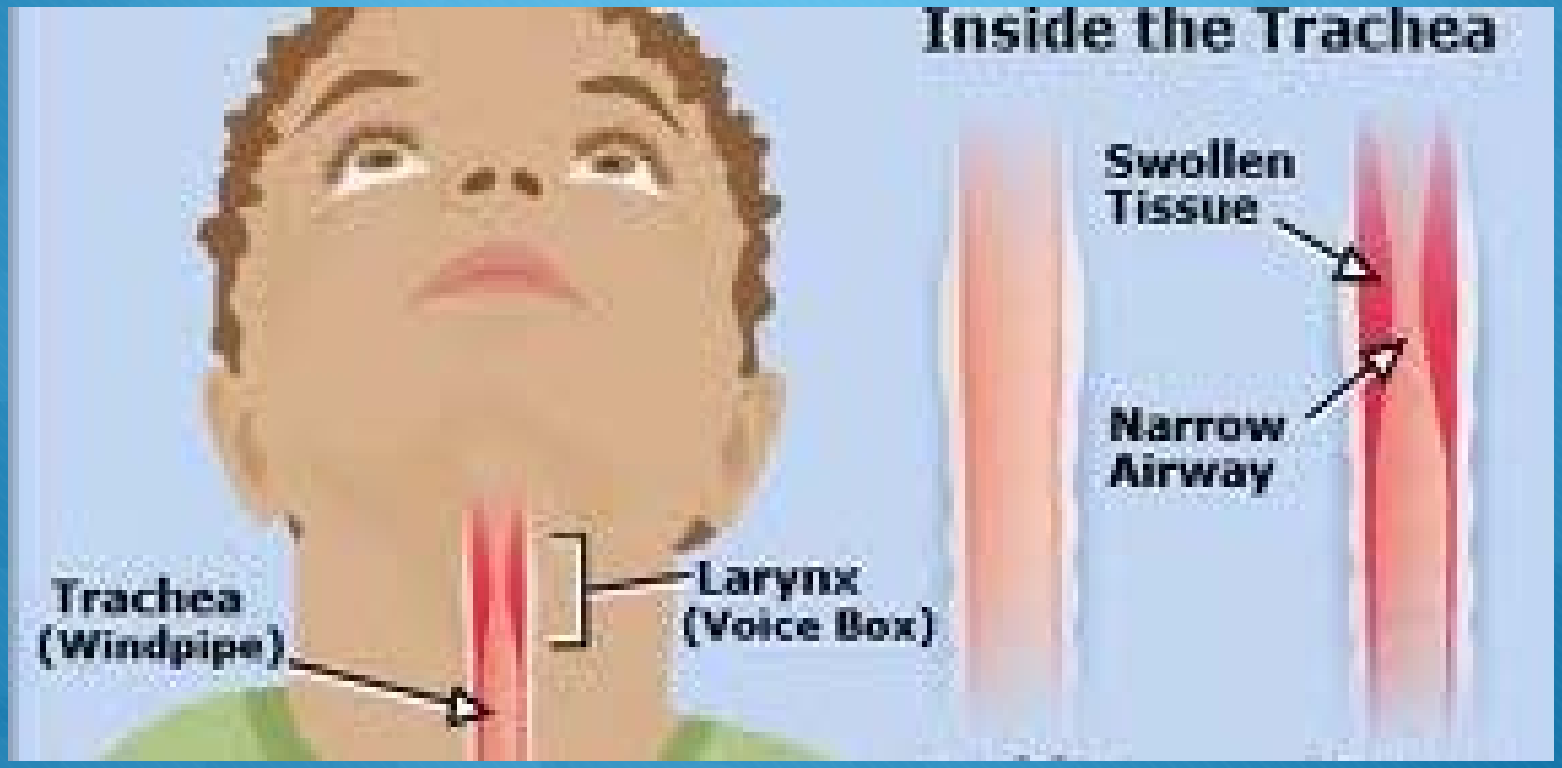
Case #3 - Progression

- Increased inspiratory and expiratory stridor
- Treatment – racemic epinephrine
- If worsens – PPV

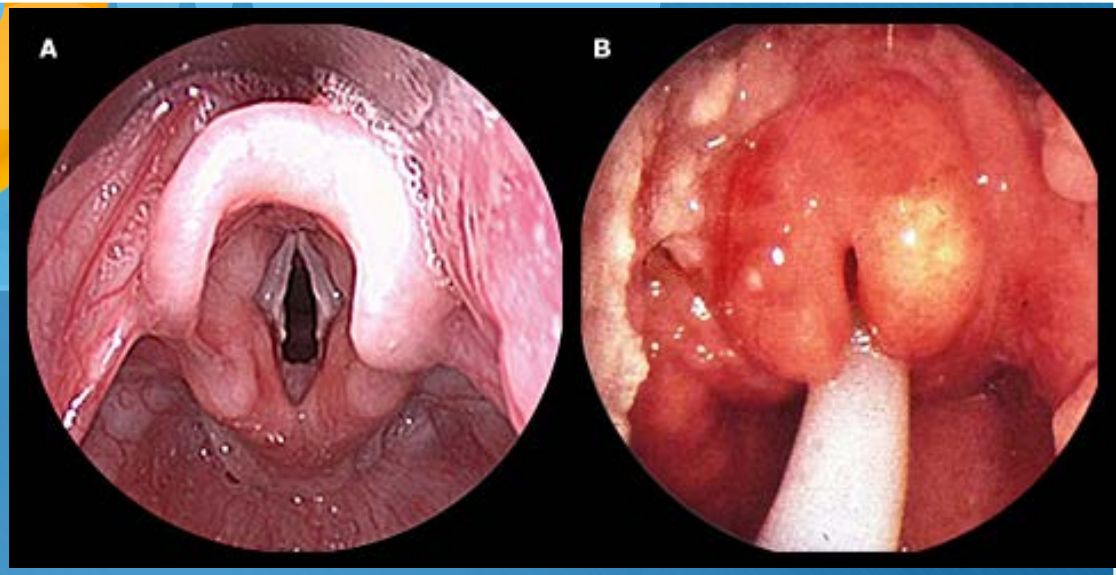
Differential Diagnoses

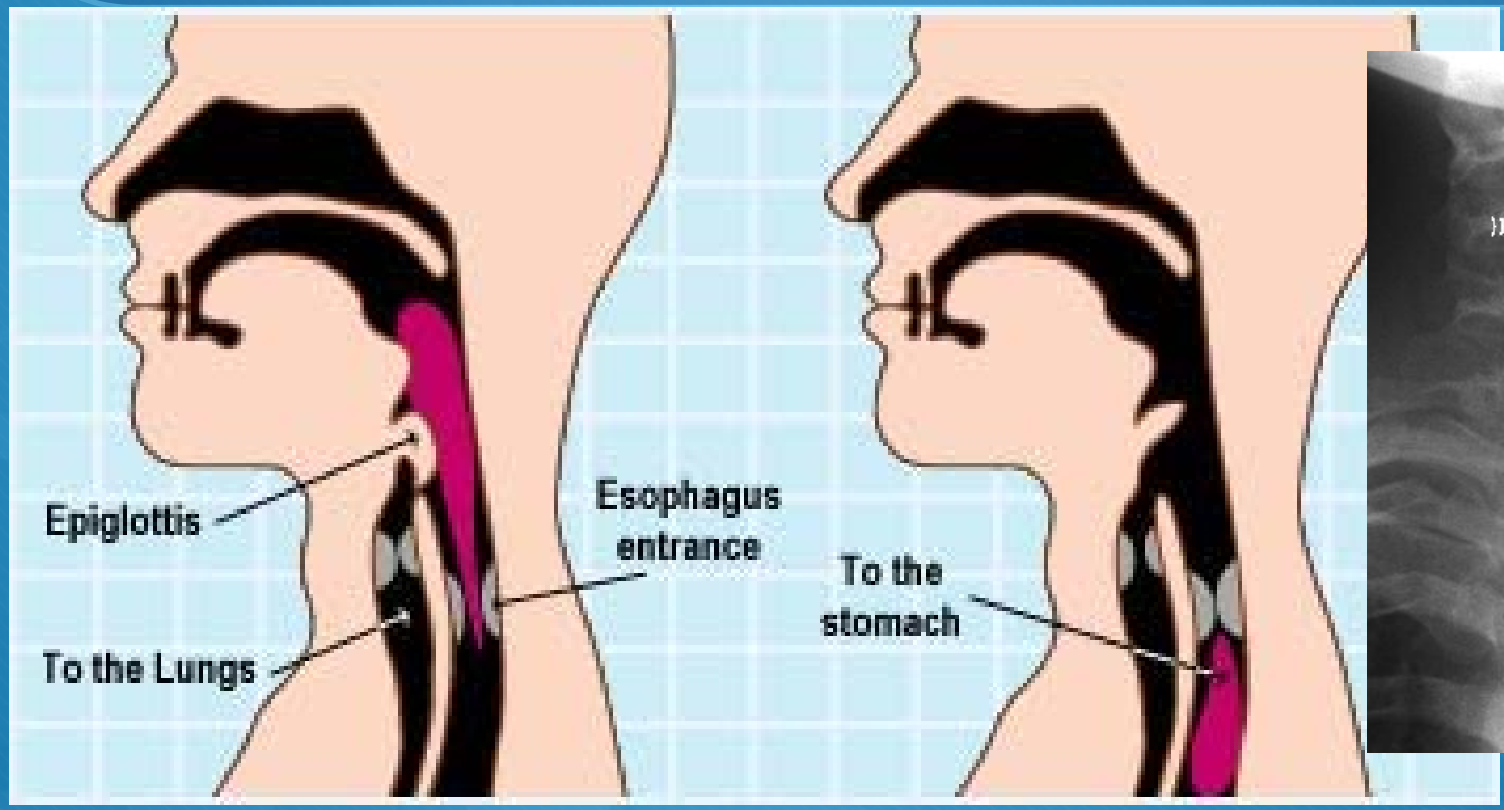
- Croup
- Epiglottis
- Upper respiratory infection
- Retropharyngeal Abscess
- Foreign body airway obstruction
- Allergic reaction

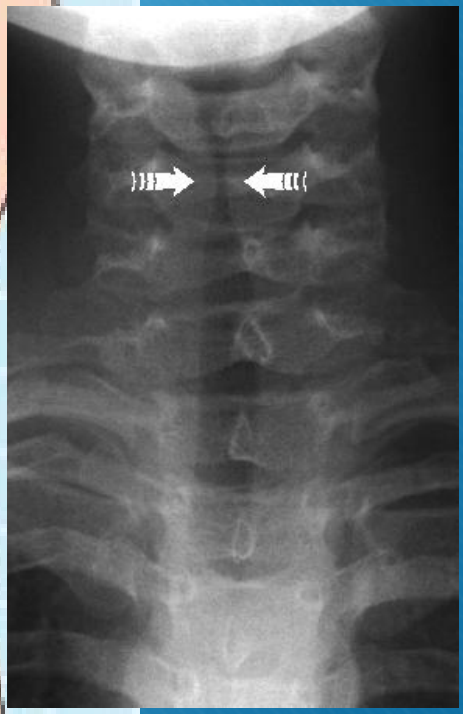
Croup


Inside the Trachea
Swollen Tissue
Narrow Airway
Trachea (Windpipe)
Larynx (Voice Box)

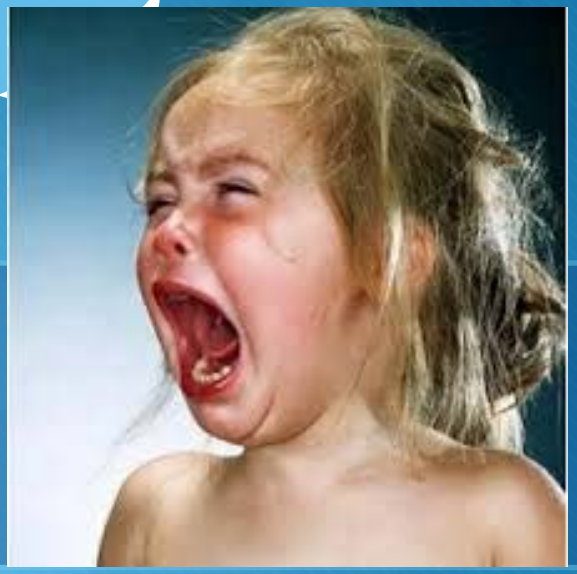
Epiglottitis







Summary



Be around kids

Learn about kids

Practice!!!!

Position & suction

Oxygenate & ventilate

AND….

RAPID TRANSPORT

KEEP
CALM
AND
DRIVE THE
BOO BOO BUS

Questions??????

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