

Needle Cricothyrotomy Locate and Placement

MWLC EMSS 10-2024

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Objectives

ALS OBJECTIVES

Review the design and use of needle cricothyrotomy equipment.

BLS OBJECTIVES

Review physiology of both the adult and pediatric airway.

Review normal and abnormal airway assessment findings.

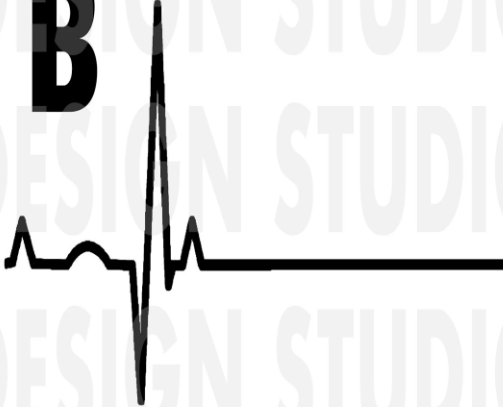
Discuss the value of serial capnography assessment evaluations.

Identify triggers for airway intervention.

Demonstrate BLS airway procedures.

Causes	Treatment
ACS/HF	Suctioning
Asthma COPD	Airway: OP/NPA,ET,
Choking FBAO	Albuterol/ipratropium
Infection	Levophed
PE	Epinephrine
MSK	IVF
Pneumothorax	Midazolam
	NTG

I CAN'T BREATHE
I CAN'T BREATH
I CAN'T BREAT
I CAN'T BREA
I CAN'T BRE
I CAN'T BR
I CAN'T B
I CAN'T

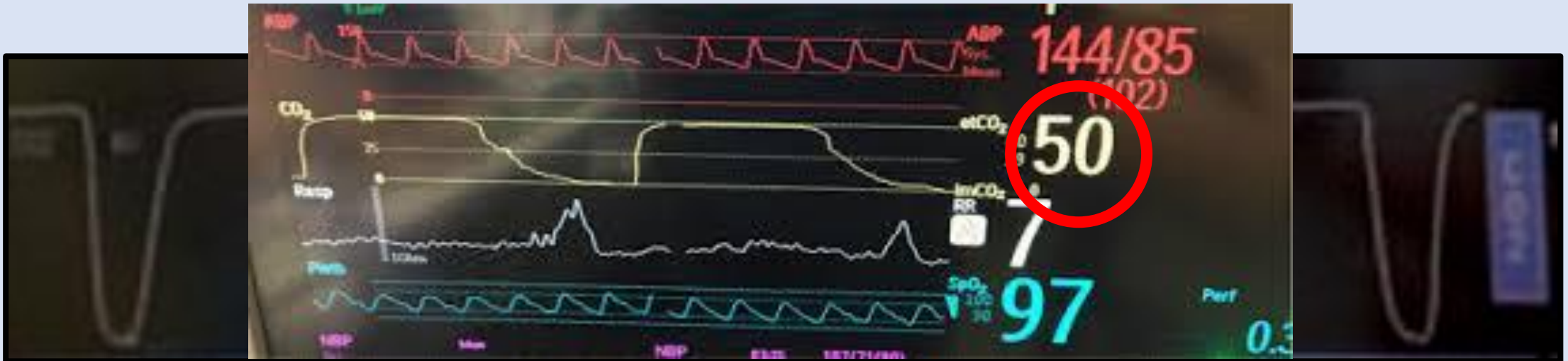


How is respiratory FAILURE different?

Respiratory FAILURE is:

Hypoxia despite O₂

Hypercarbia (↑ ETCO₂)

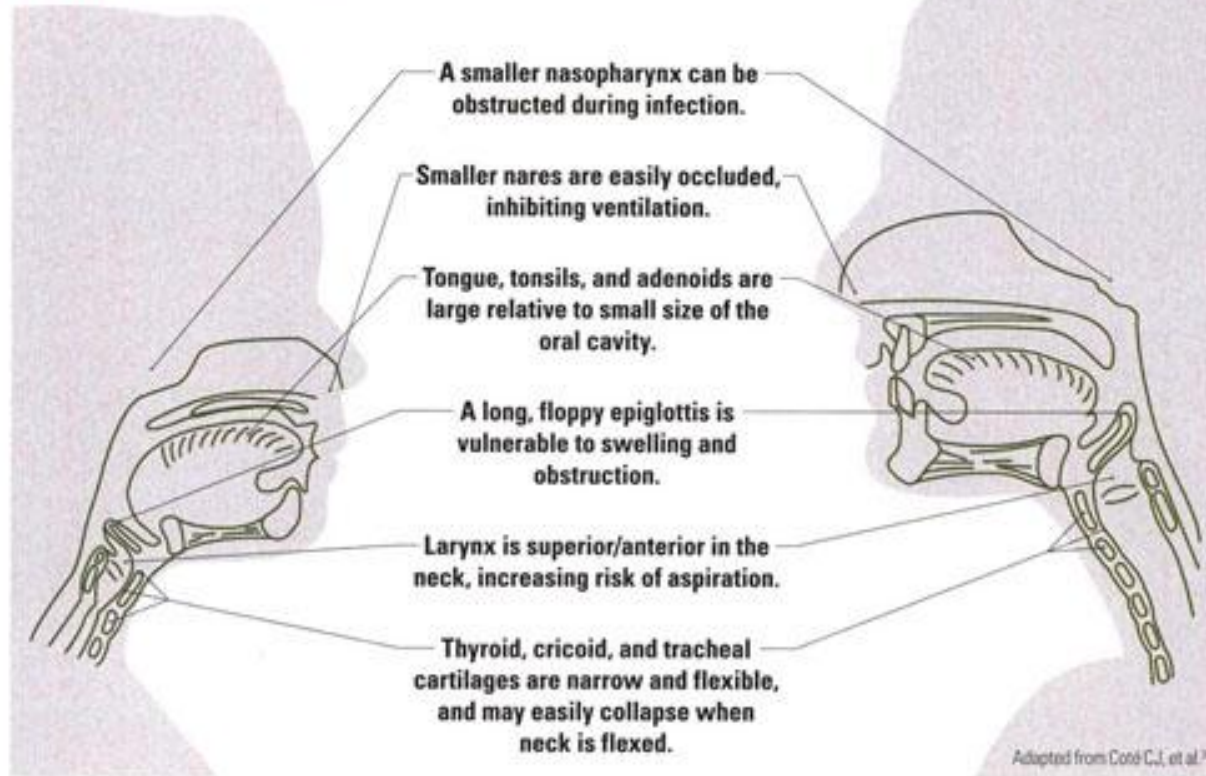


Anatomic differences

Pediatric

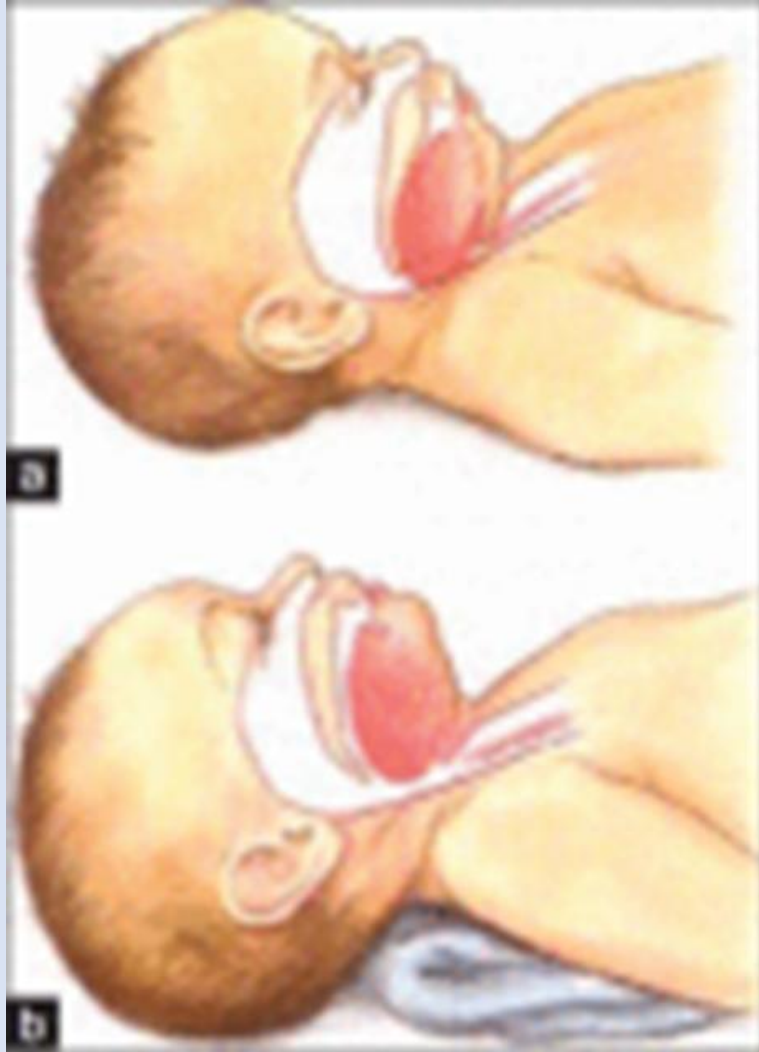
- Funnel shape larynx
- Subglottis is the narrowest part
- Large tongue & head
- Small mandible
- Larynx is high
- Epiglottis is long and stiff
- Vocal cords angled

FIGURE PEDIATRIC VS ADULT AIRWAY



Adult

- Larynx is cylindrical
- Glottic opening is narrowest point



Positioning is crucial

- A) Note the large occiput which causes flexion > tongue obstructs airway
- B) Obstruction relieved by placing towel under shoulders allowing extension of the head > opening airway

Needle Cricothyrotomy

Re-Introducing the Needle
Cricothyrotomy

Only to be used as a rescue airway

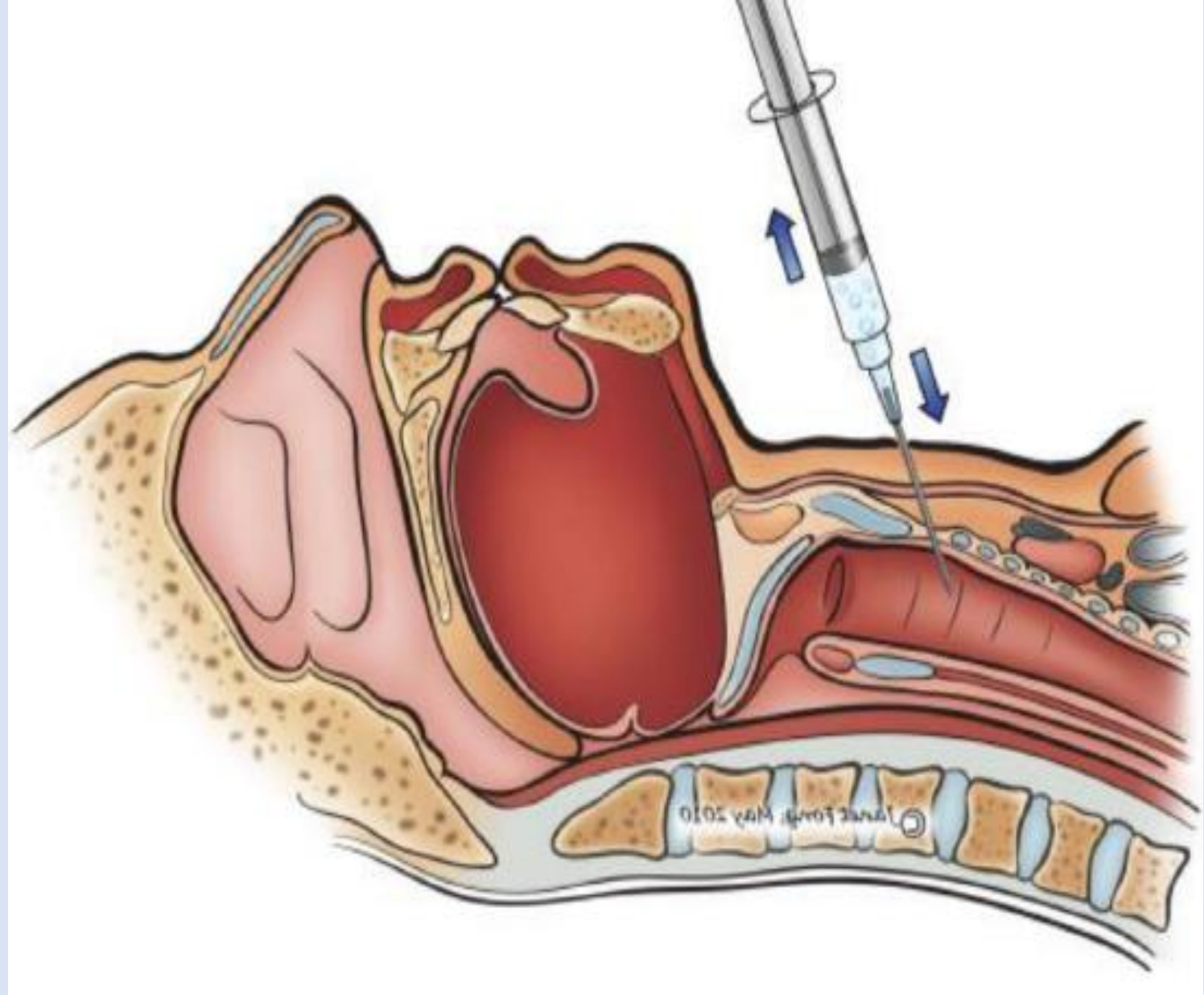
Short term use no more than 30
minutes

Once placed transport to the closest
ED

To be used for

Adults

Pediatrics



Needle Cricothyrotomy

INDICATIONS

Cannot Intubate
Cannot insert l Gel
Cannot ventilate



Very small children false placement is common
excessive bleeding

Contraindications

Inability to identify landmarks
Tracheal transection or severe trauma

When used as a rescue airway no absolute contraindications



Does not allow for good elimination of CO₂

CO₂ accumulates rapidly (expect this)

Requires one person to monitor
CONSTANTLY

Ineffective tidal volume w/ size of needle

Temporary relief 30-40 min

Does not protect airway from aspiration

Unable to suction through
IT IS INVASIVE

Is to be used as only a LAST RESORT

Hypercapnia



AKA

Ventilating through a 10 G needle into the trachea will allow a small volume of O₂ to pass to the lungs

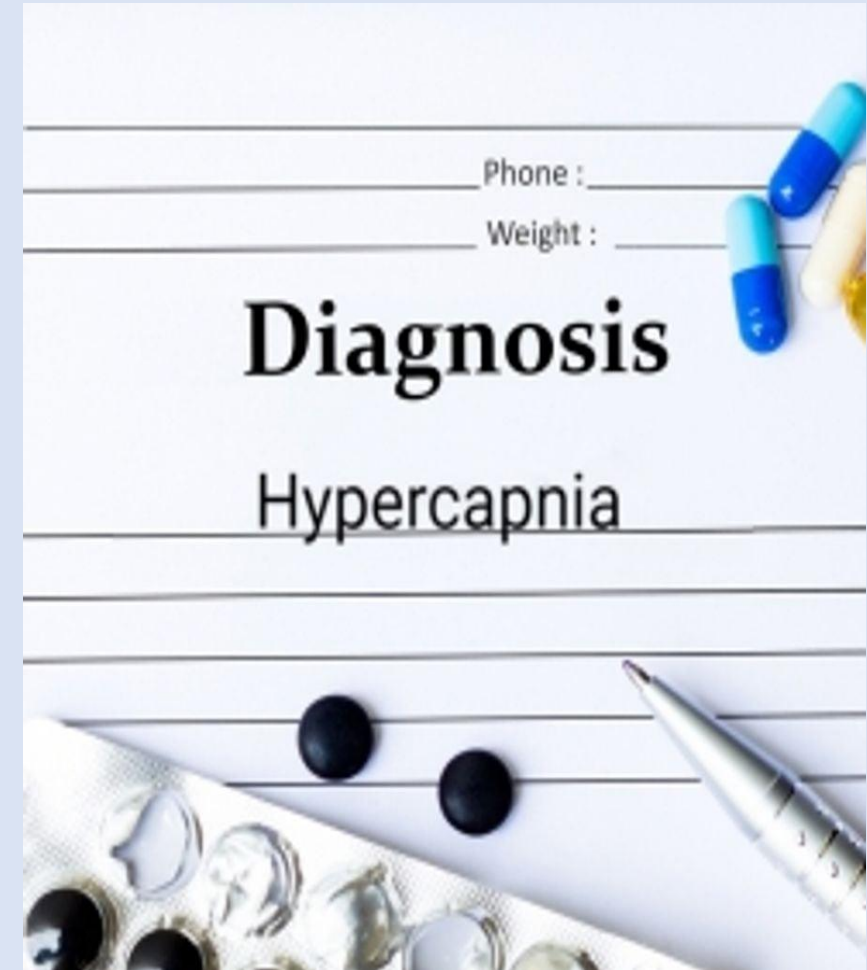
Difficult to exhale through a 10G needle

This causes an increase in CO₂ = elevated capnography number

TREND THESE NUMBERS

Which definition of hypercapnia is correct?
(click when ready to advance)

1. Beginning of rapid, deep breathing
2. Presence of slow, shallow breathing
3. Decreased oxygen level in the blood
4. Increased carbon dioxide in the body

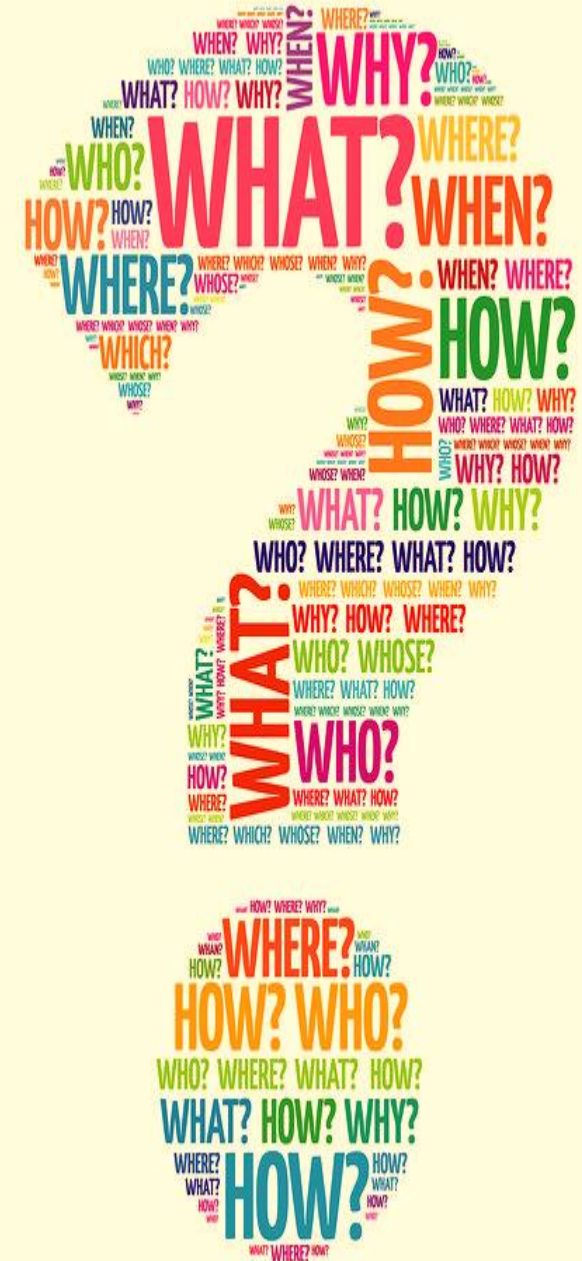


Questions to ask yourself

Could you attempt manual maneuvers for opening upper airway?

Could you attempt direct visualization?

A needle cric is truly the last resort?



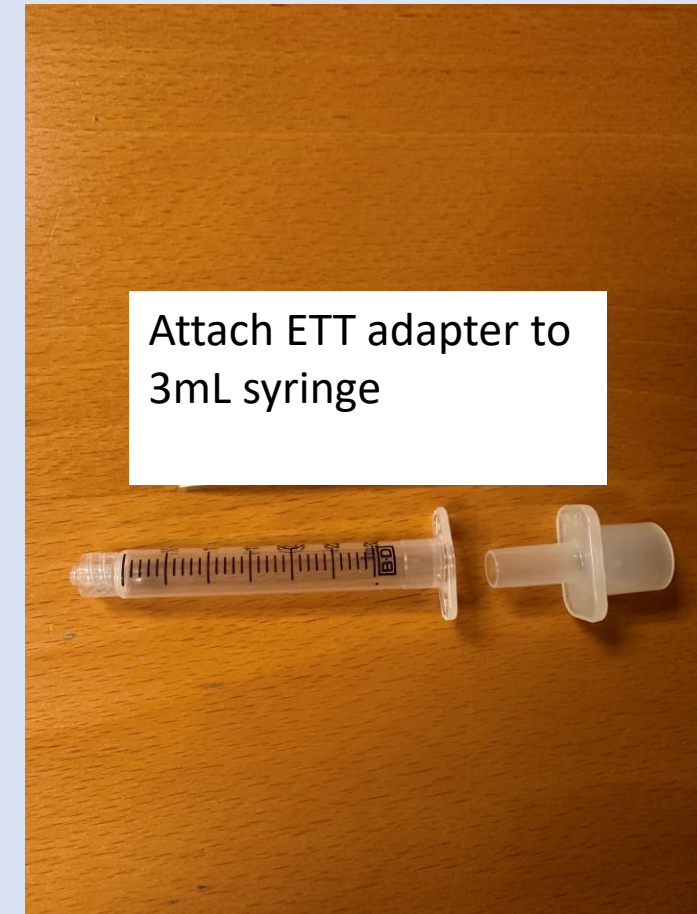
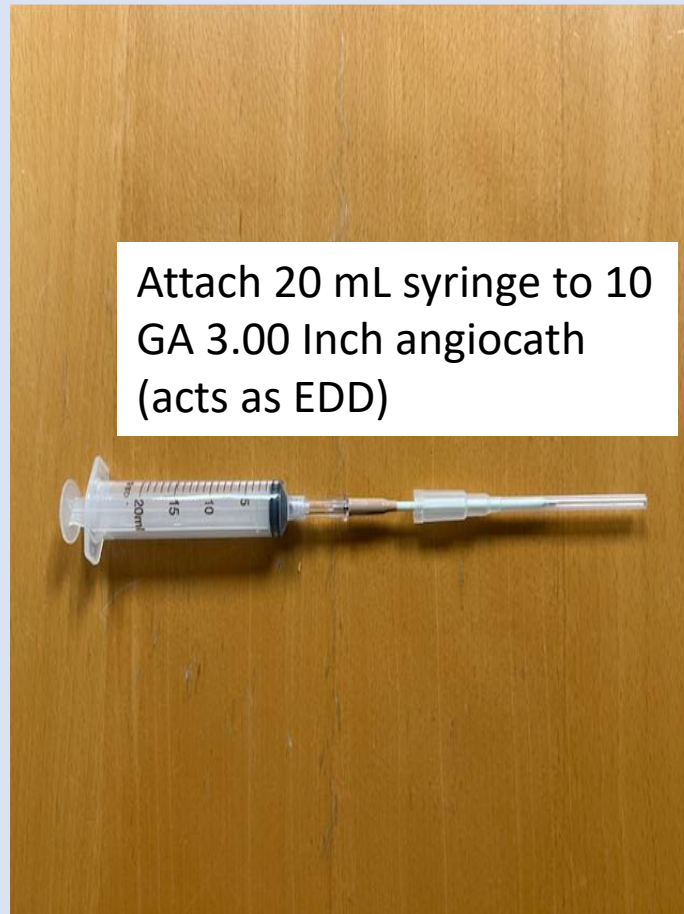
MWLC EMSS Needle Cricothyrotomy Kit



Gather equipment



Prepare equipment

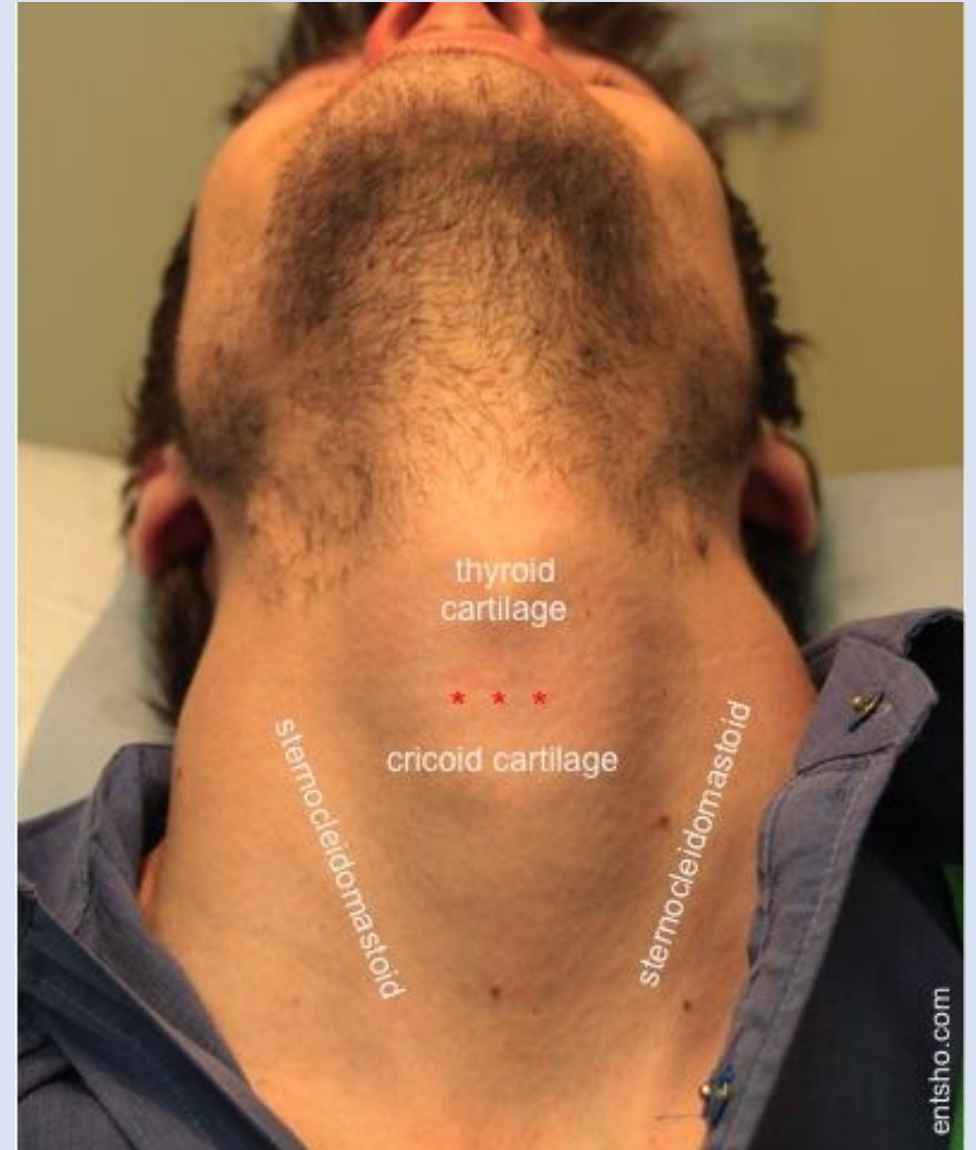


Prepare the patient

Position supine w/padding to extend neck unless contraindicated

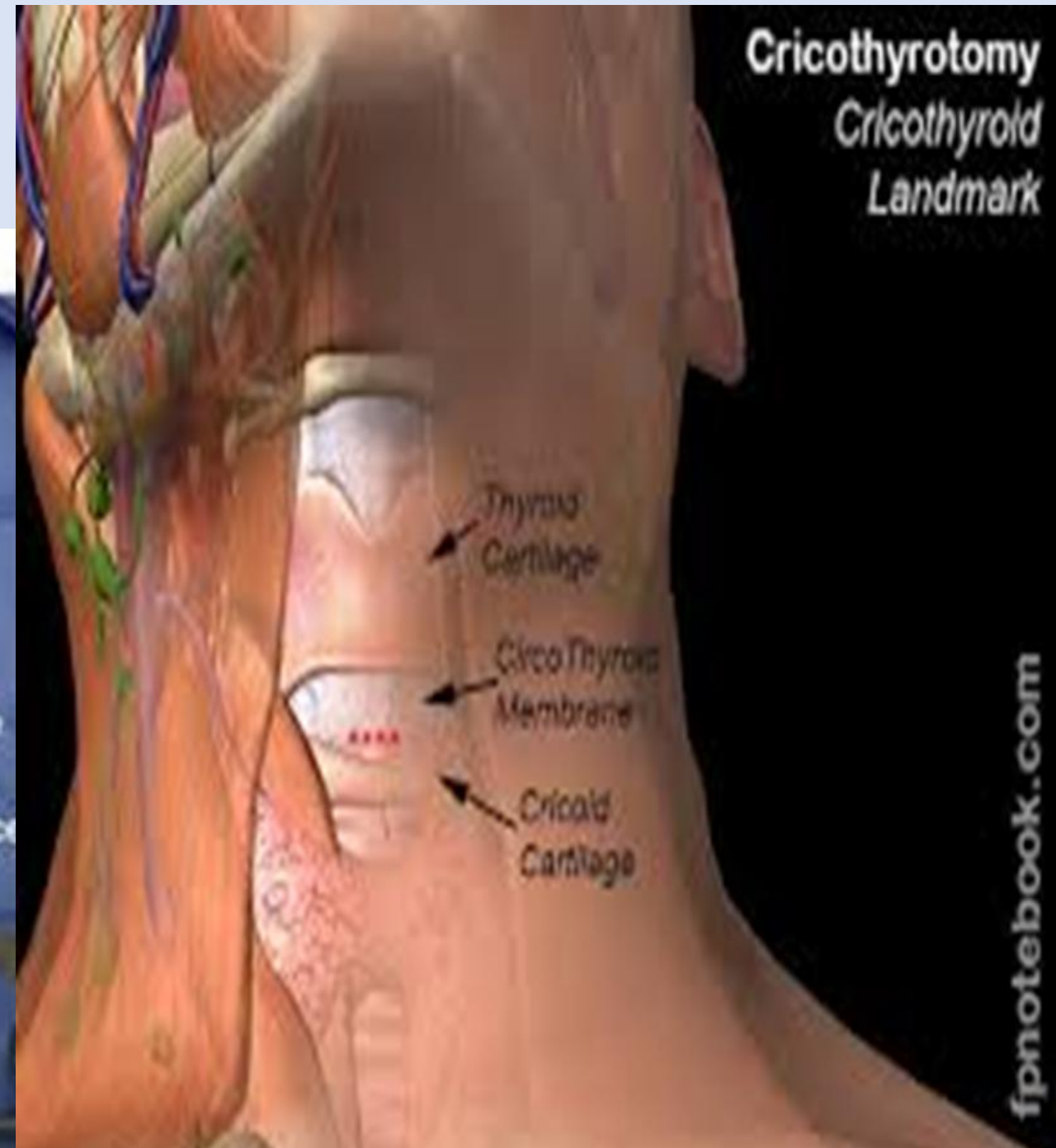
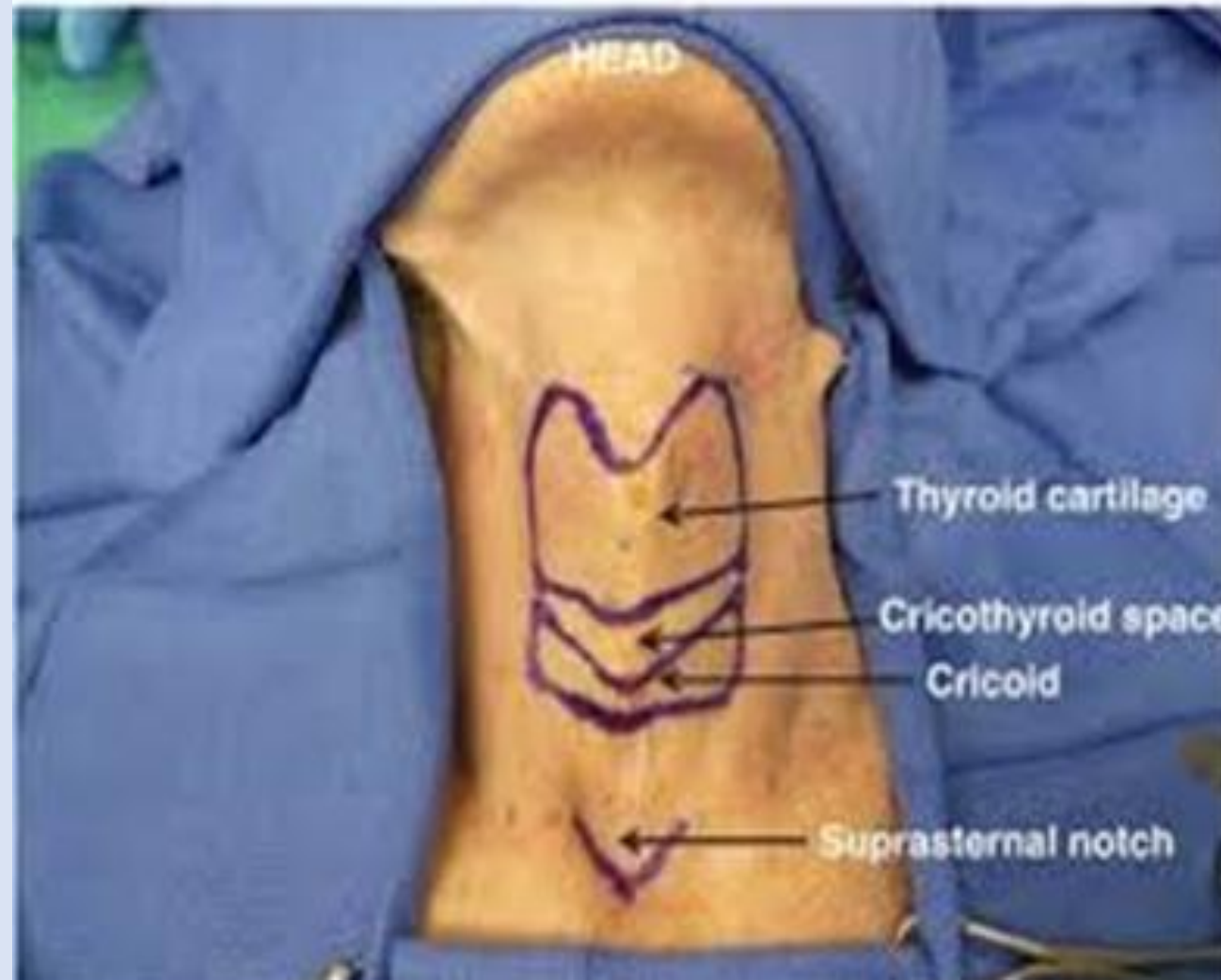
Attempt to preoxygenate for 3 min 15L BVM

Avoid high pressure & gastric distention with BVM



Procedure #1 identify landmarks

(a)



Perform the procedure

Palpate thyroid & cricoid cartilages and prep skin

Locate anatomical landmarks

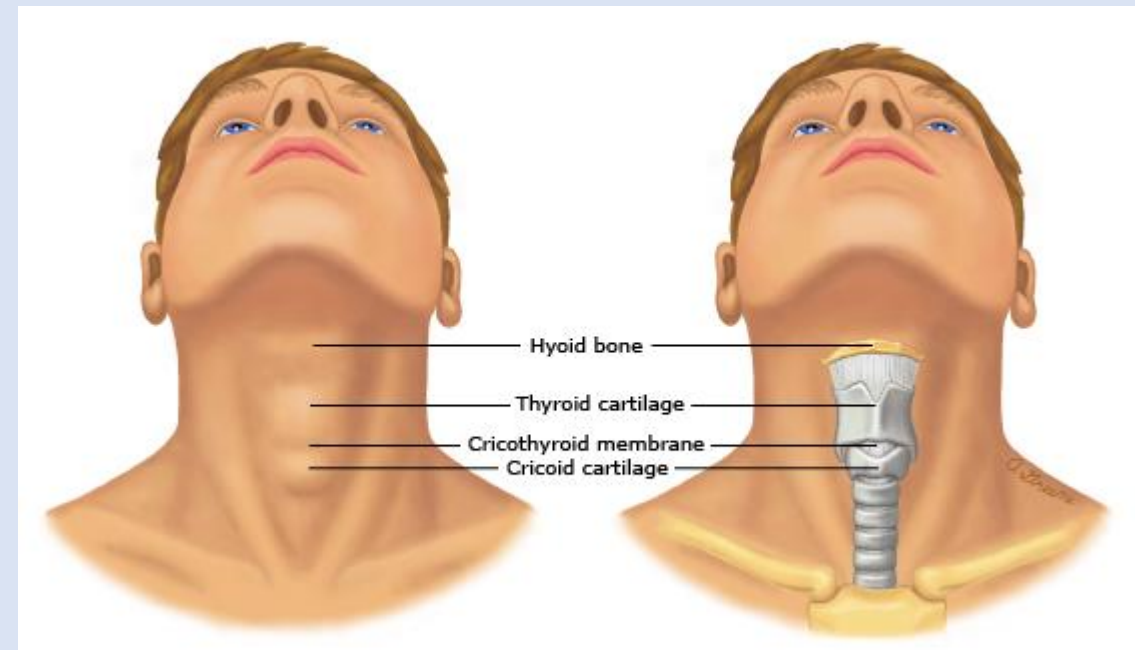
Thyroid cartilage superiorly

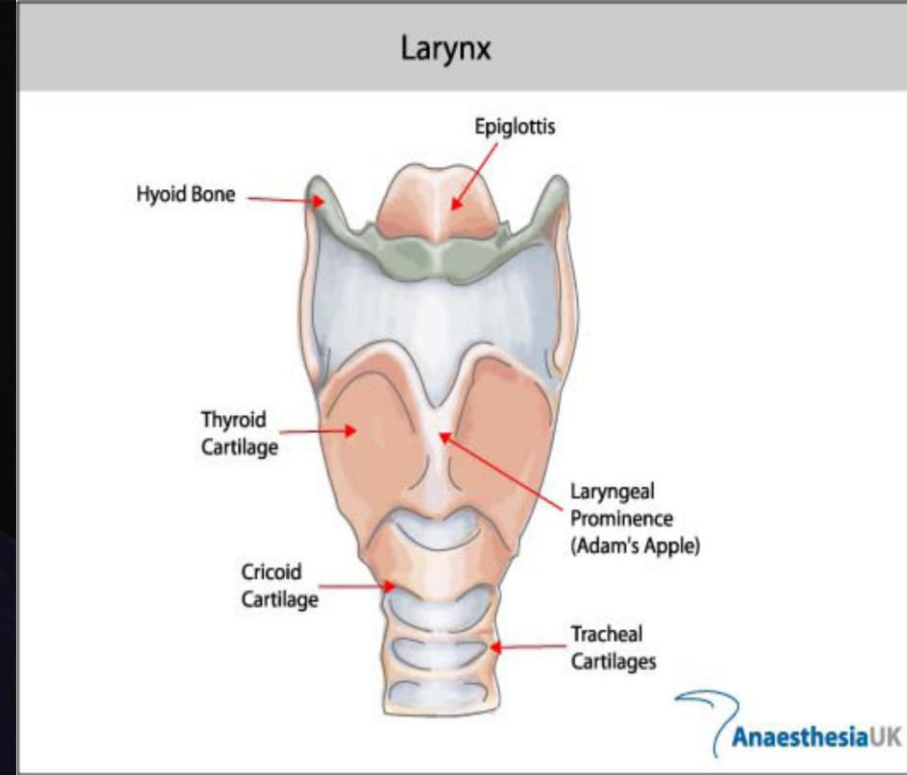
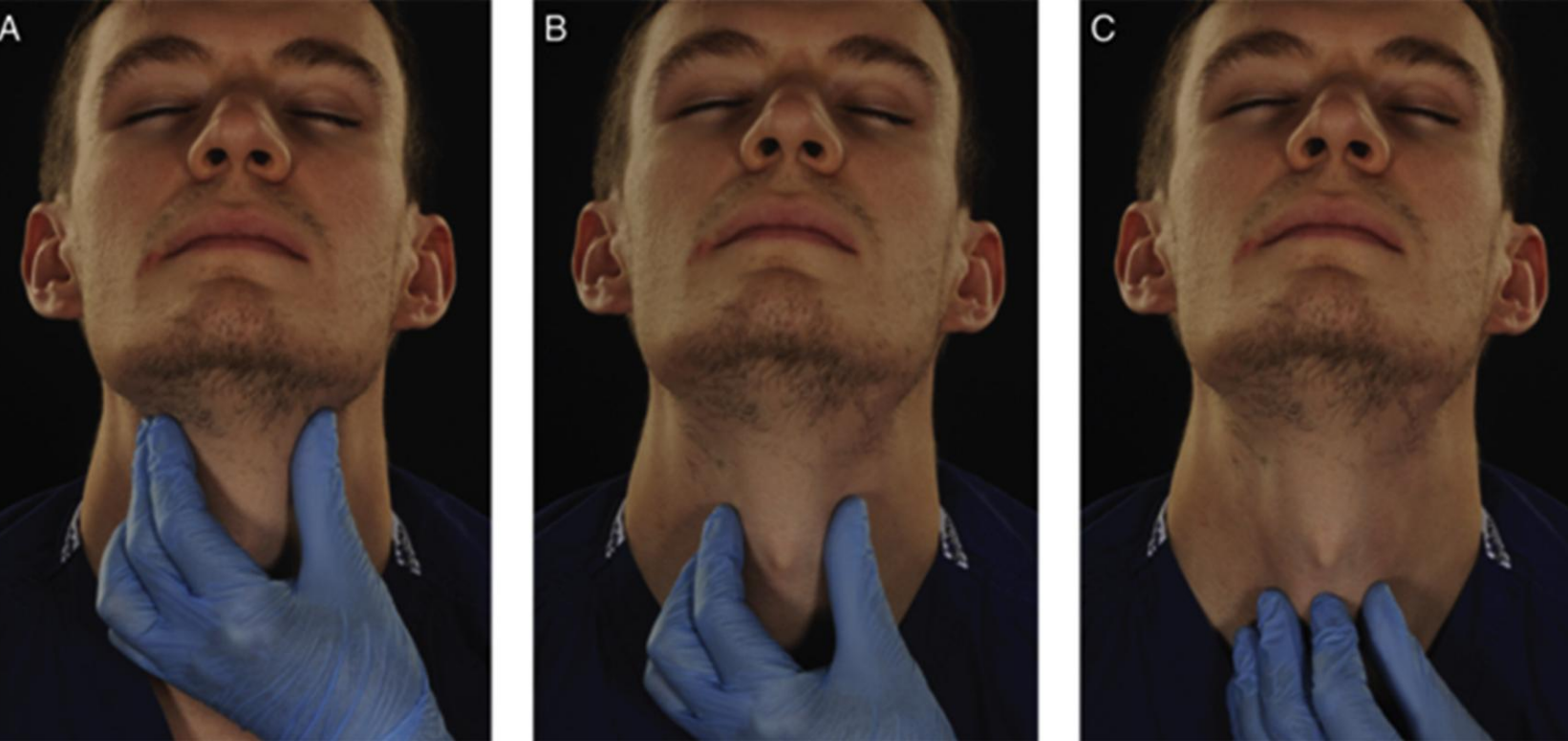
Cricoid cartilages inferiorly

Locate membrane

Right handed work from Pt's right side

Left handed work from Pt's left side





The laryngeal handshake is performed with the non-dominant hand, identifying the hyoid and thyroid cartilage, stabilizing the larynx between thumb and middle finger, and moving down the neck to palpate the Cricothyroid membrane with the index finger

Perform procedure

- Prep skin with CHG/IPA as you would IV or IO
- Insert needle through the membrane at a 90-degree angle to the skin through the midline of the membrane using firm downward pressure until a “POPPING” sensation is felt
- When resistance abruptly ceases **stop** advancing needle
- Aspirate air into the 20 mL syringe to confirm tracheal placement.

SHOULD ASPIRATE EASILY

Perform Procedure

- Angle needle tip towards chest at a 20-45 degree angle
- Hold needle and advance the catheter over the needle to its hub (like an IV)
- When catheter fully advanced, withdraw needle and place into a sharps
- Attach the 3mL syringe with ETT adapter attached to the hub of catheter
- Apply capnography to the ETT adapter
- Ventilate slowly Pediatric BVM 10/BPM
- **Allow 4 seconds for exhalation / if upper airway obstructed allow 8 seconds of exhalation**
- May need to manually compress chest to assist exhalation

• Confirm placement

- Auscultate epigastrium , both midaxillary and anterior chest x2
- Assess capnography
- Secure catheter in place using tape
- Control bleeding as needed

If incorrectly placedtroubleshoot determine error and take corrective action



Synonyms for Reassess

review

reevaluate

re-evaluate

reconsider

reappraise

- Frequently monitor EtCO₂, SpO₂, VS, & lung sounds enroute

Looking to detect:

- displacement
- complications
- condition change
- monitor insertion site for complications

Review video by clicking hyperlink below:

<https://youtu.be/u05uhVzzWPU>

Complications



Hypercarbia

Because of inadequate exhalation CO₂ accumulates and limits the long-term use of this approach

This technique can adequately oxygenate for 30 – 40 minutes

Catheter dislodgement

High pressure during ventilation and air entrapment may produce pneumothorax

Hemorrhage at the insertion site

Thyroid gland & esophagus can be perforated if needle is inserted inappropriately and or advanced to far

Subcutaneous emphysema

References

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- [Levitan, the “Laryngeal Handshake” and the “Cartilaginous Cage” – Prehospital and Retrieval Medicine – THE PHARM dedicated to the memory of Dr John Hinds \(prehospitalmed.com\)](#)
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- [Comparison of the Conventional Downward and Modified Upward Laryngeal Handshake Techniques to Identify the Cricothyroid Membrane: A Randomized, Comparative Study](#). *Anesth Analg*. 2021 Sep 13. doi: 10.1213/ANE.0000000000005744. Online ahead of print.