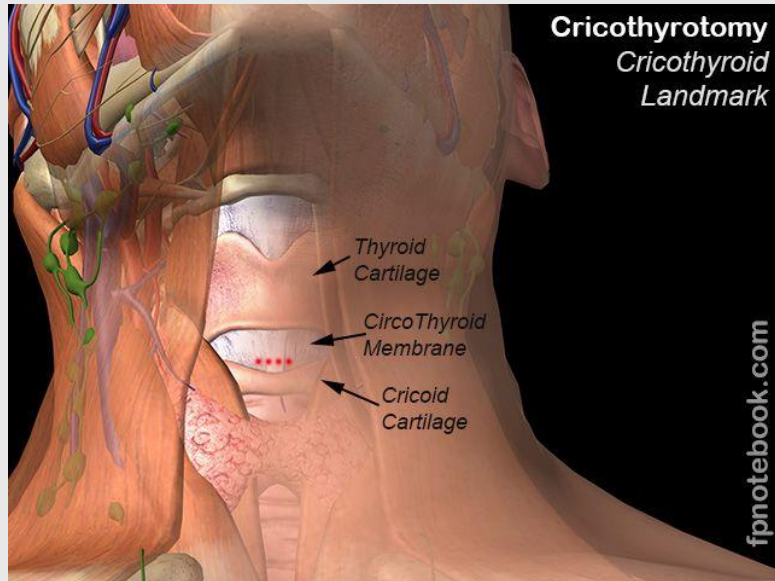


CRICOTHYROTOMY: NEEDLE, PERCUTANEOUS & BOUGIE ASSISTED

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Background



- High acuity low occurrence (HALO)
- Final step in cannot intubate cannot oxygenate (CICO) and/or cannot intubate cannot ventilate (CICV) situation
- **Mechanisms to establish an airway:**
 - 1. Needle Cricothyroidotomy:**
 - Temporary method using a large-gauge angio catheter attached to a BVM or Jet Ventilator
 - Preferred cricothyrotomy method for children < 9yo
 - 2. Percutaneous Cricothyrotomy:**
 - Scalpel/wire/dilator and airway
 - 3. Bougie Assisted Cricothyrotomy**
 - Scape/Bougie/ETT
 - 4. Tracheostomy**

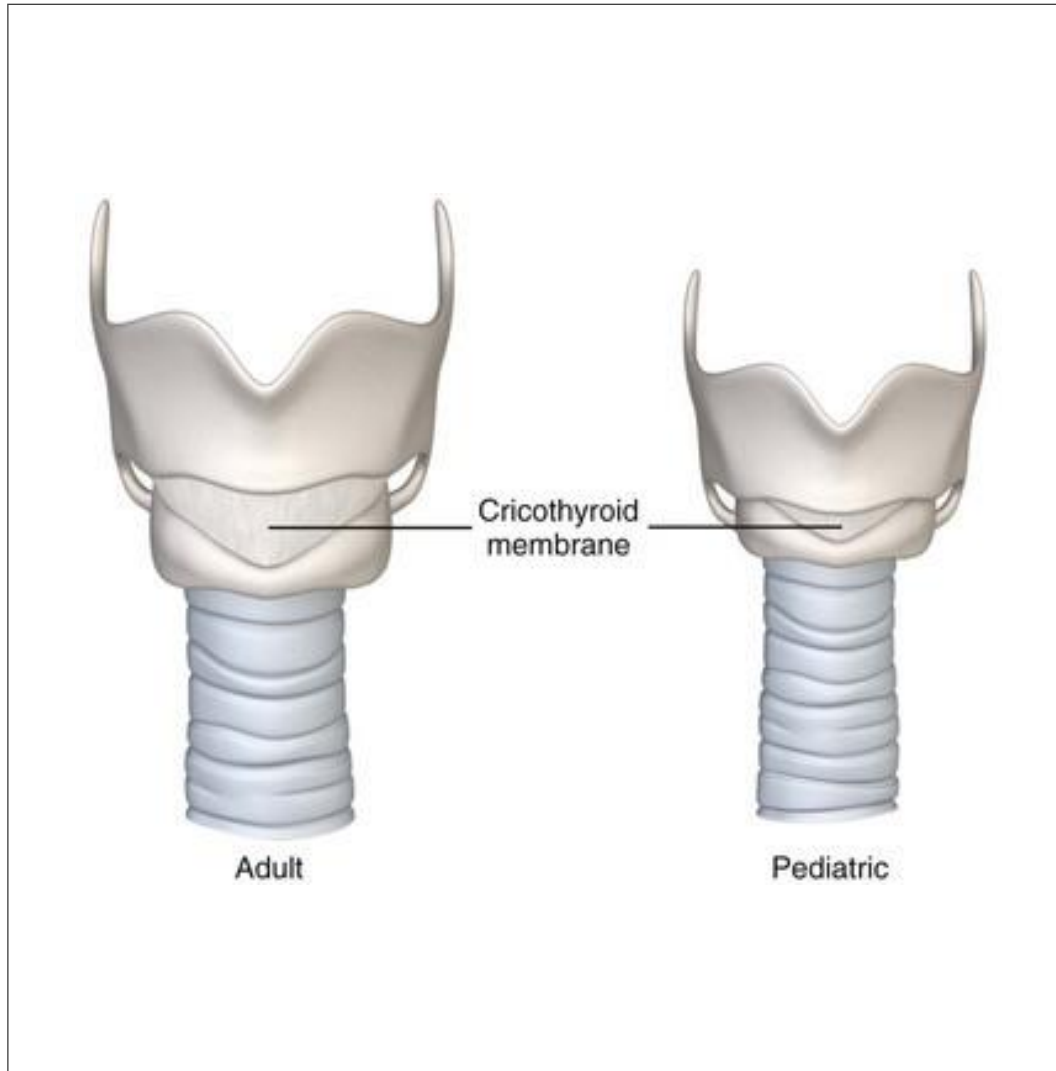
Contraindications

- **Absolute contraindications**

- Age < 8 years
 - due to the narrowest portion of a pediatric airway being the cricoid ring. As a child's tracheal diameter is smaller than adults, the development of a supraglottic stenosis will significantly impair air flow

- **Relative contraindications**

- Inability to identify landmarks due to significant injury to the larynx, thyroid cartilage, or cricoid cartilage
- Partial or complete transection of the distal trachea
- Age 8 to 12 (varying age cutoffs without definitive expert consensus)
- Fracture or transection of larynx
- Bleeding disorders, This is



Complications

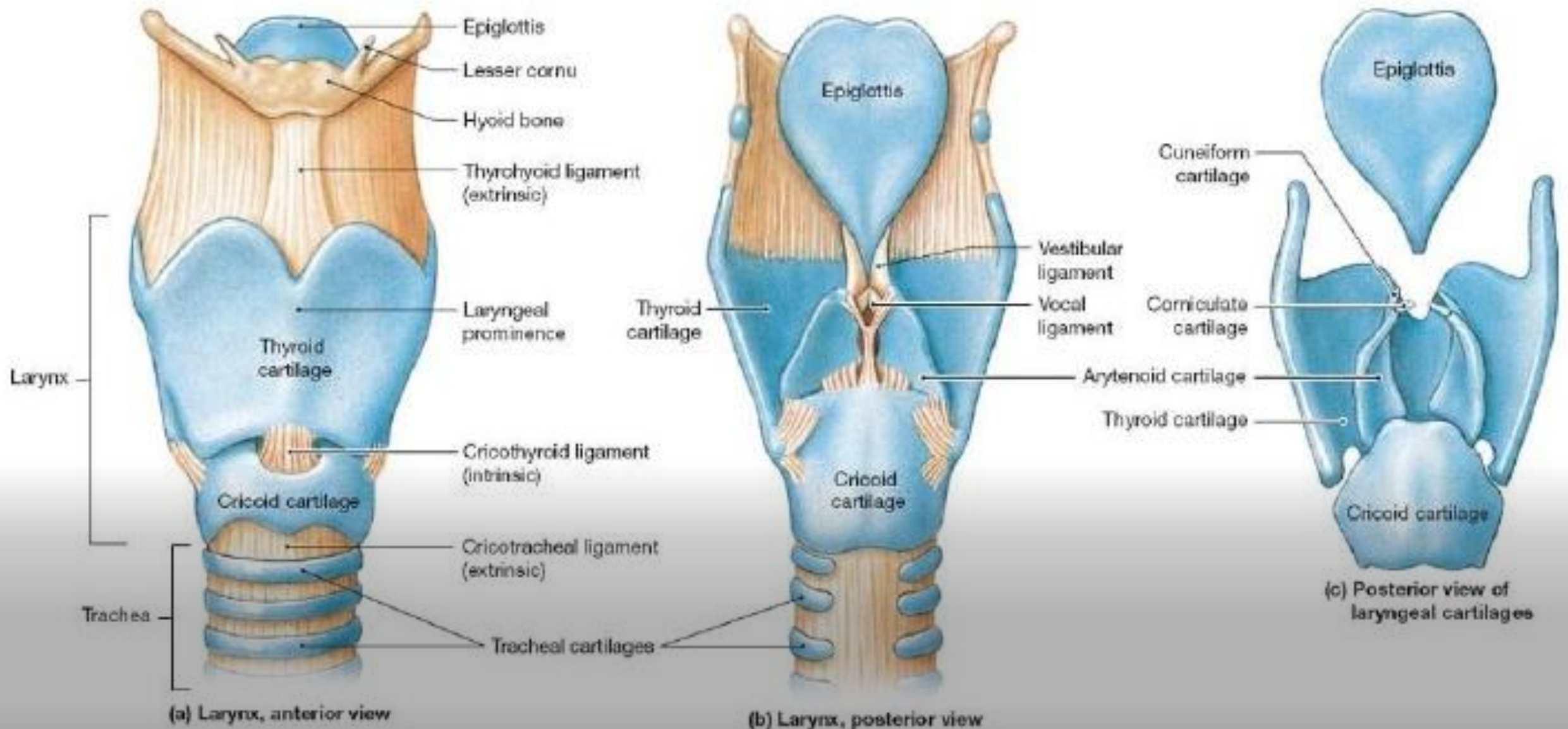
Early:

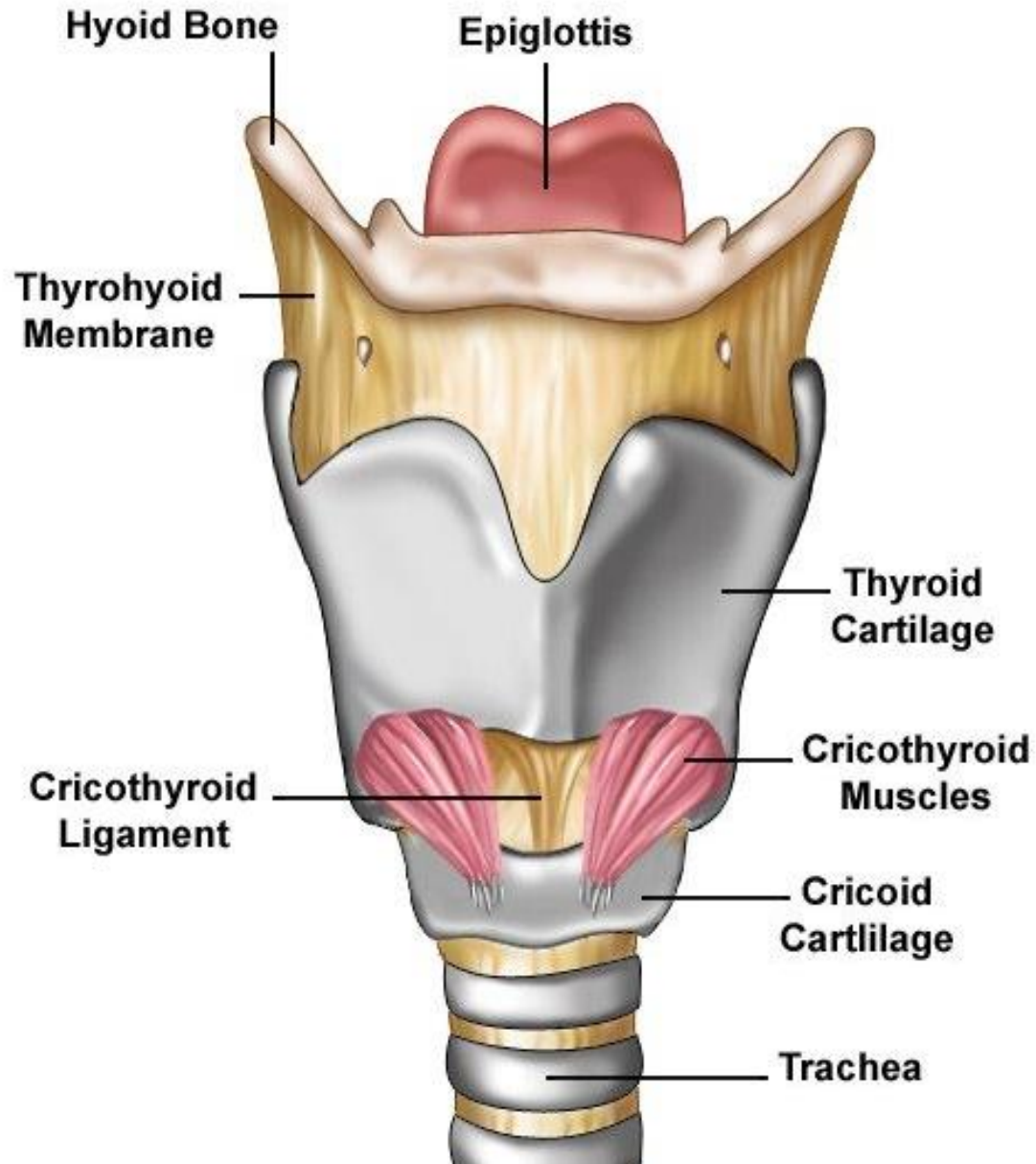
- recognized immediately or within hours after cricothyrotomy, include the following:
 - Bleeding, sometimes uncontrollable
 - Insertion of tube into neck tissues rather than trachea, typically immediately recognized by absence of breath sounds on lung auscultation and remediated by reinsertion of tube into trachea
 - Injury to or perforation of the posterior aspect of the trachea
 - Larynx, vocal cord, or thyroid injury

Late complications:

- recognized weeks or months after cricothyrotomy, include the following:
 - Progressive airway obstruction due to subglottic stenosis and stomal granulation tissue
 - Voice changes, which are chronic but may resolve with time
 - Wound infection

ANATOMY REVIEW

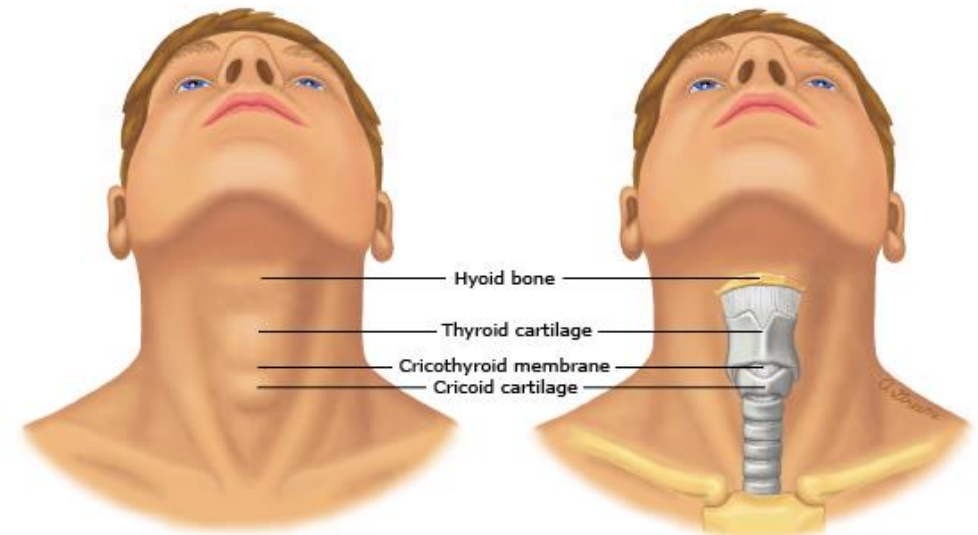
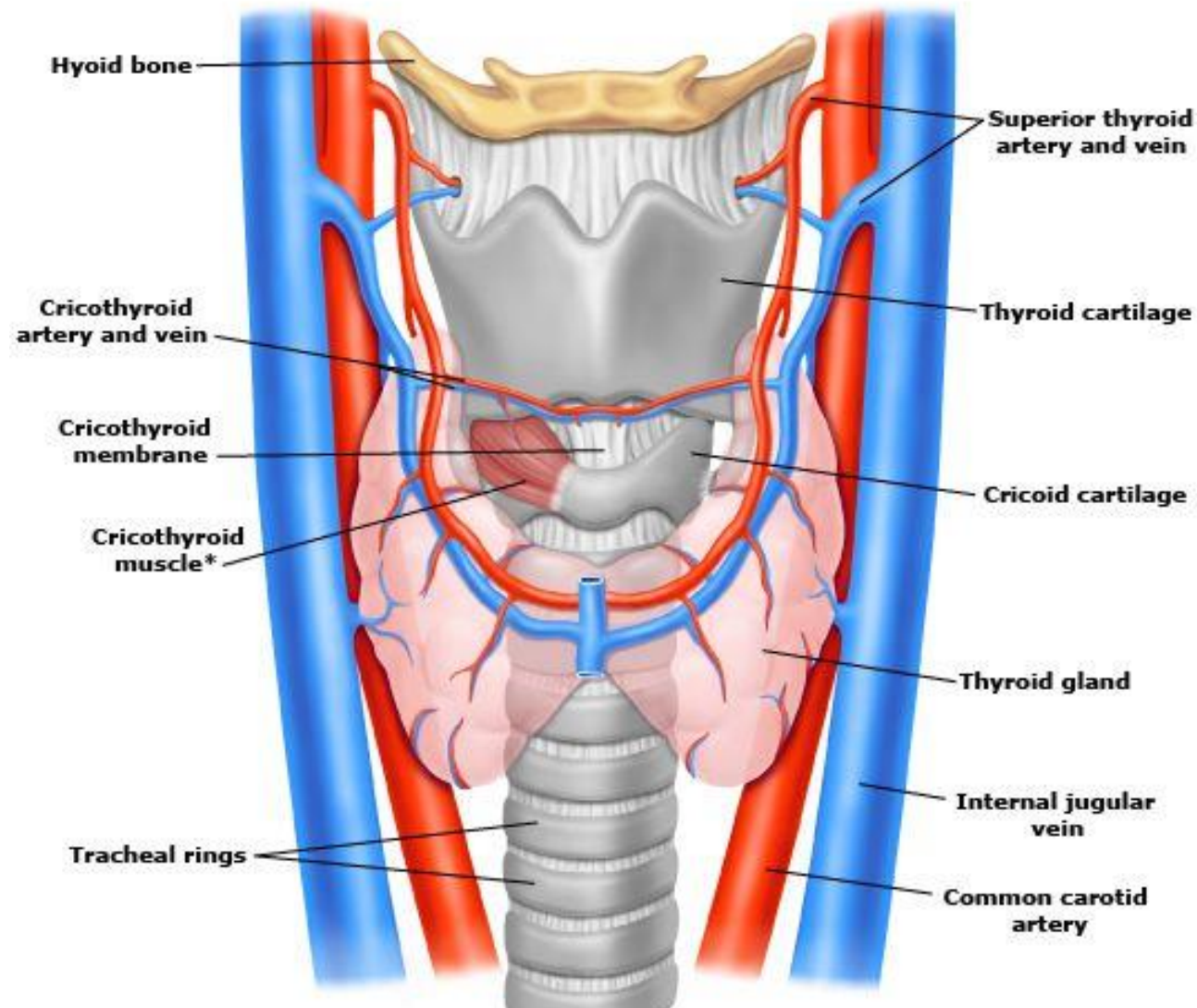




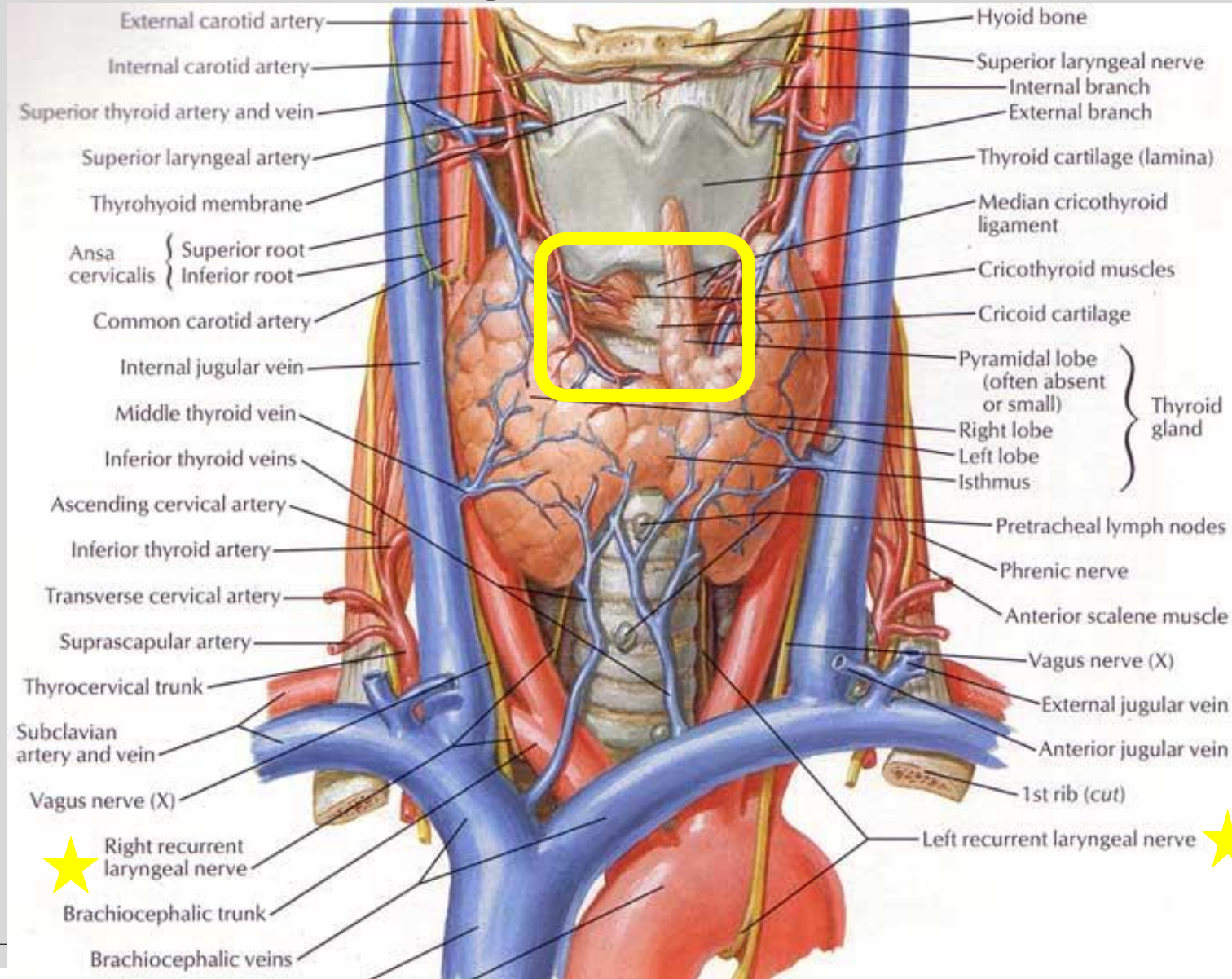
Anterior Ligaments (Membranes)

- Thyrohyoid Membrane
 - Attaches the larynx/thyroid cartilage to the hyoid bone
- Cricothyroid Membrane
 - Attaches the cricoid and thyroid cartilages
 - About 1 cm longitudinally and 2 to 3 cm transversely
 - Site for cricothyroidotomy
 - Site for a transtracheal block
 - Area around is rich with blood vessels (superior thyroid arteries and the relatively uncommon variant thyroidea arteries).

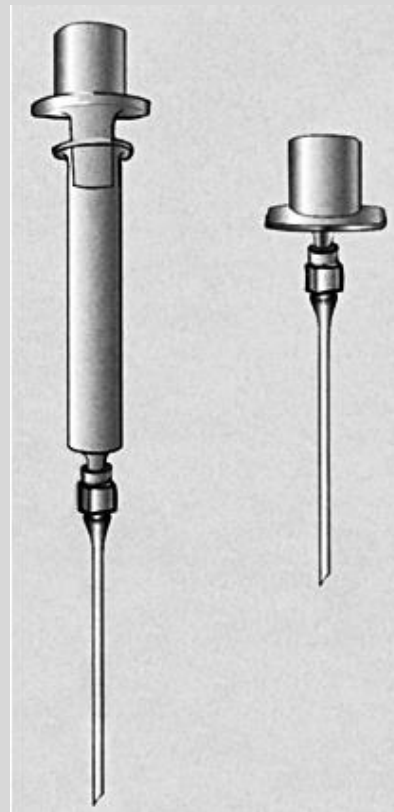
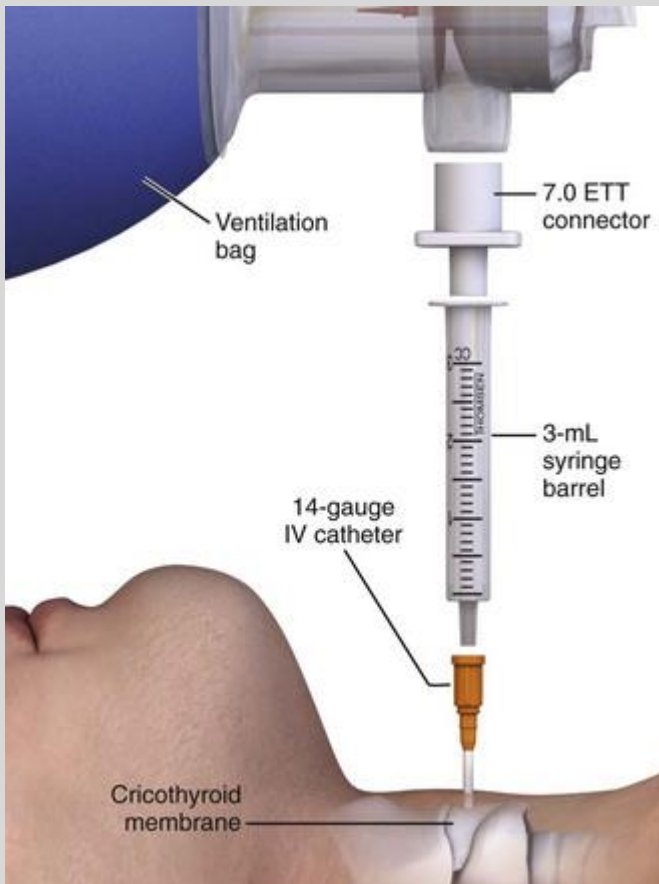
TARGET =
CRICOTHYROID
MEMBRANE



Just can't forget about all the rest...



Needle and Bougie Assisted Cricothyrotomy Equipment



Equipment Needed for Bougie-Assisted Cricothyrotomy



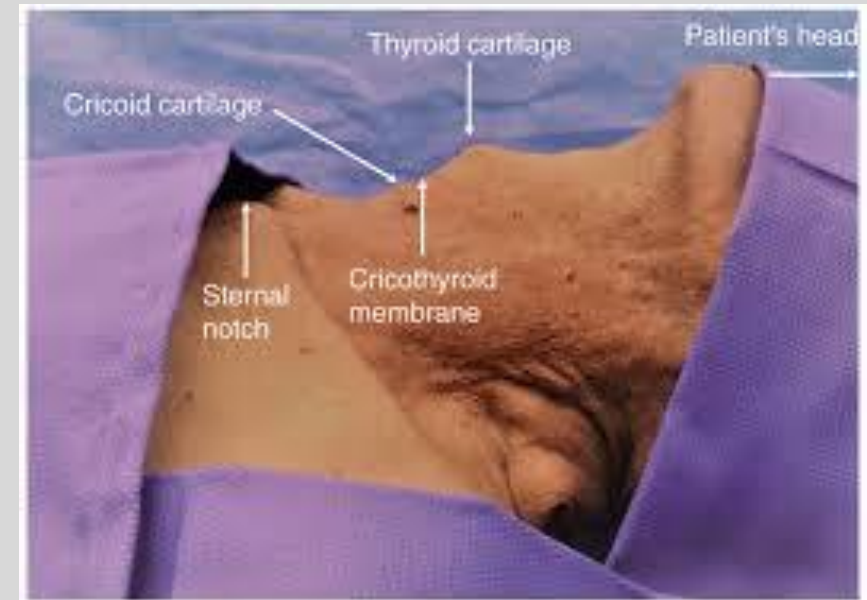
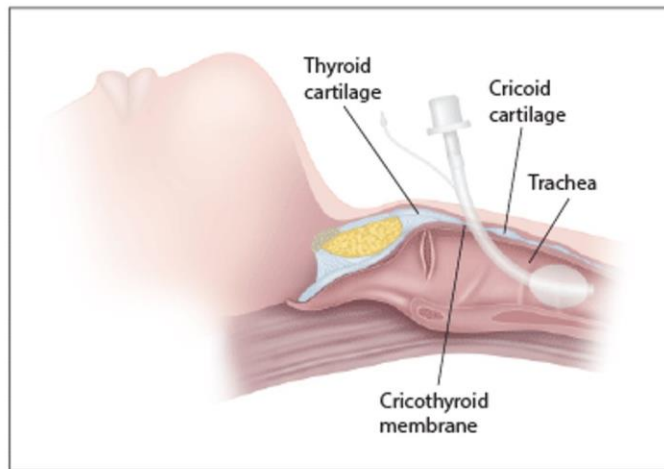
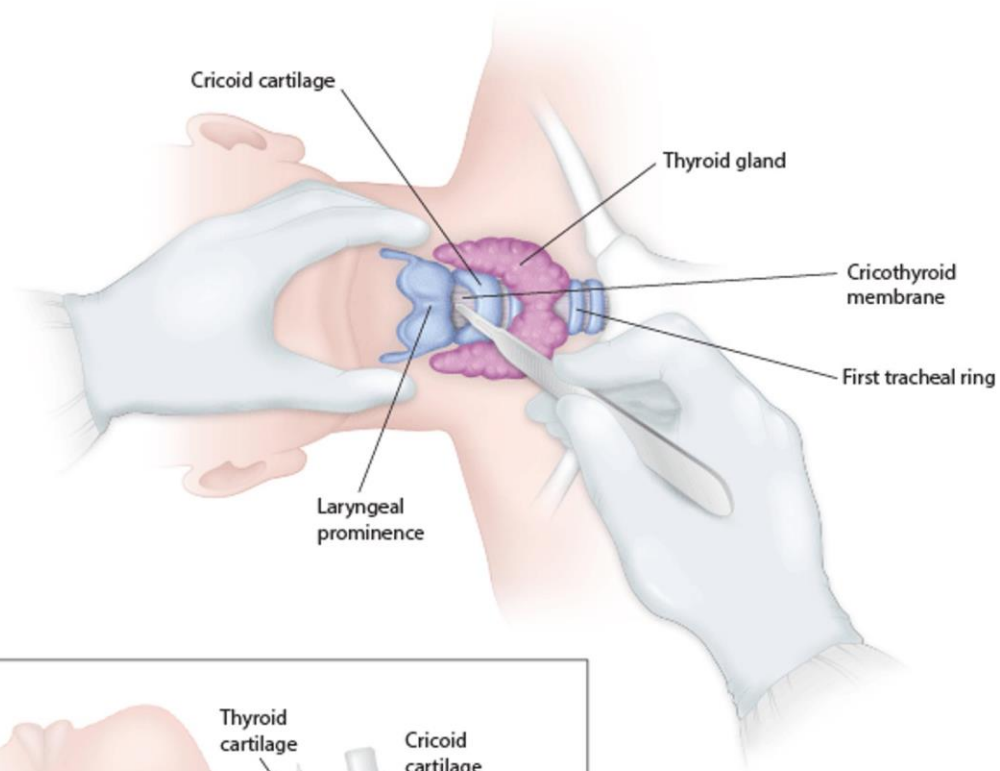
10 Blade Scalpel



Bougie

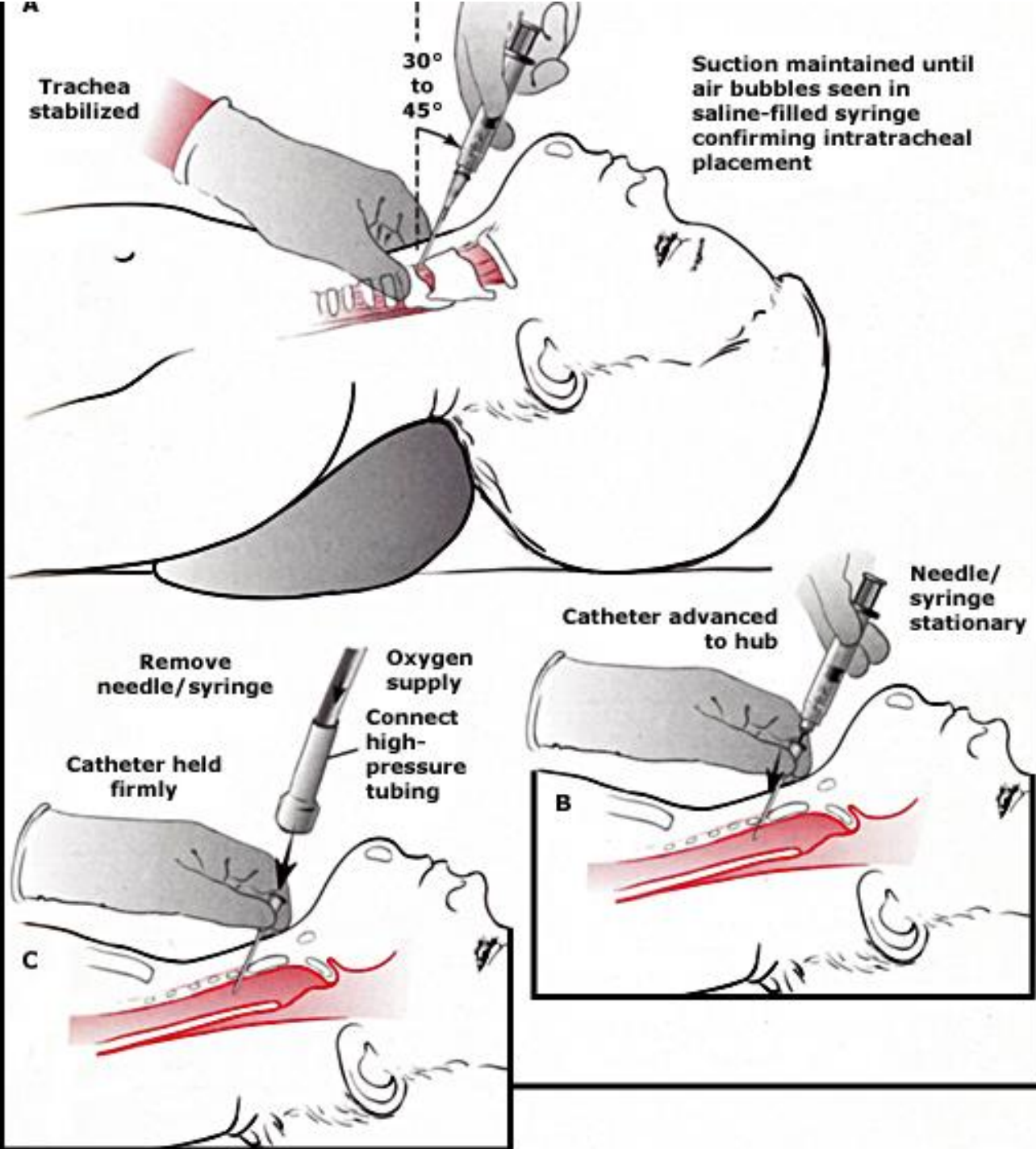


6.0 ETT



Positioning for cricothyrotomy

- Position the patient supine, and, if cervical spinal injury is not a concern, hyperextend the neck. The sniffing position is not necessary for cricothyrotomy.
- Use non dominant hand to stabilize trachea/larynx



Needle Cricothyrotomy with PTJV

- Needle cricothyrotomy through the cricothyroid membrane
- Percutaneous transtracheal jet ventilation
 - 1 second inspiration with PSI 25; 20 BPM = 285 VT or 5.7 L/min ventilation
 - Passive expiration
- For airways where surgical cricothyrotomy is difficult or as a temporary means of ventilation
 - Meant to be transitioned to more permanent airway within 72 hours
- Complications:
 - Barotrauma
 - Subcutaneous emphysema
 - PTX
 - Pneumomediastinum
 - Hypercarbia

Percutaneous Cricothyrotomy Steps

1

Identify the cricothyroid membrane.

Move your finger caudally from the laryngeal prominence (the most prominent part of the anterior thyroid cartilage) until you feel the cricothyroid membrane,

Prep and Drape

2

Inject local (if pt needs)

- Stabilize with non dominate hand (thumb and middle finger)
- Create 2-3 cm horizontal incision over cricothyroid membrane (this may be after a vertical incision)

3

Dilate

- Via scalpel 90 degrees or by using a clamp
- Dilator

4

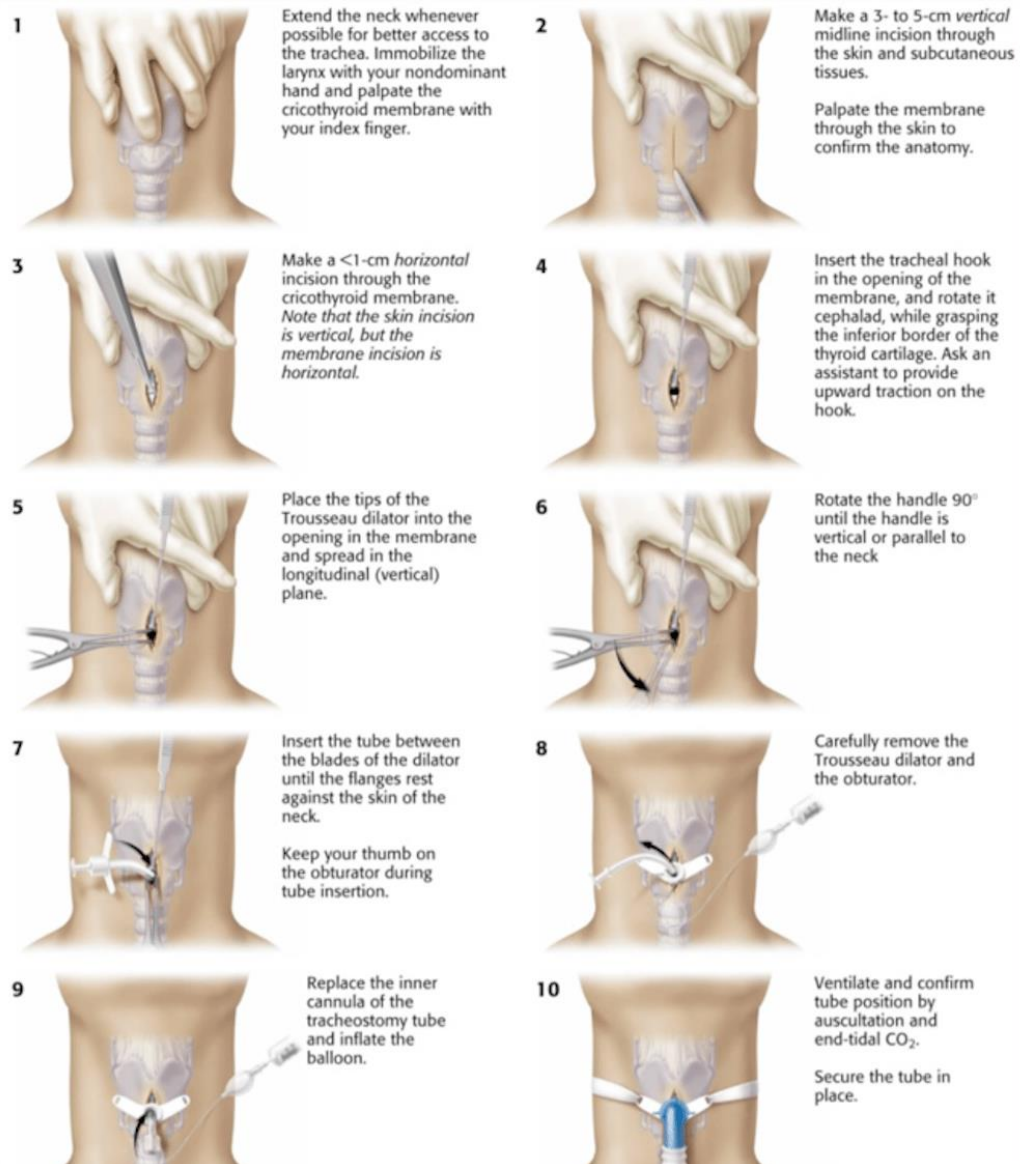
Insert ETT

- Bougie vs. Direct
- 6.0-7.0 ETT
- Trach tube

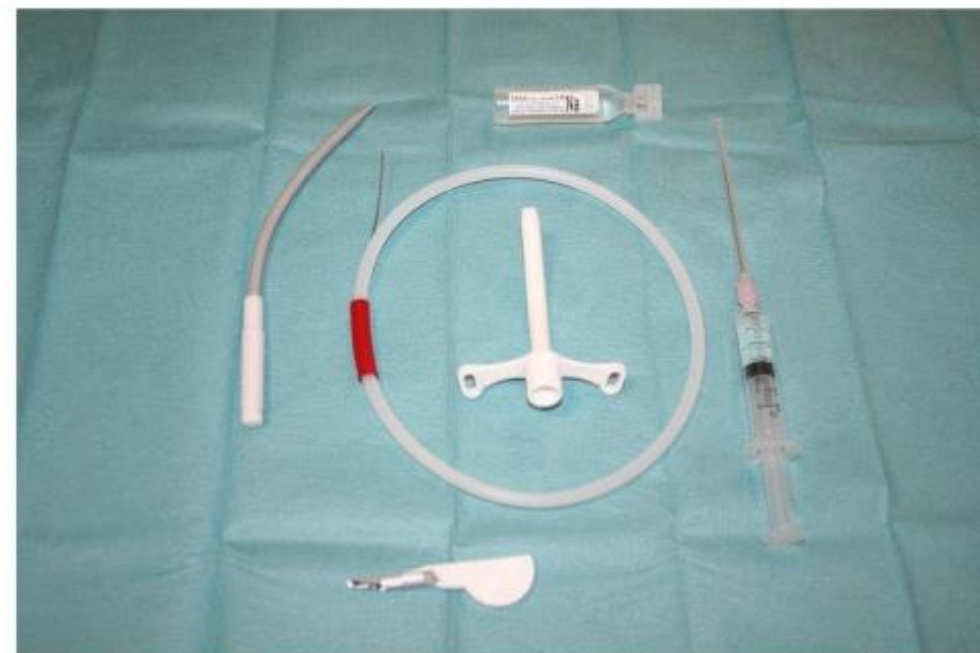
5

Inflate and secure

- Ventilate
- Assess adequacy



Cricothyroidotomy Kit



Svenriviere, [Wiki media Commons](#)

Bougie Assisted Cric

tracheostomy tube over bougie. A 5.5-mm tube may be used in smaller adults



- <https://www.youtube.com/watch?v=wVQFJR7qmrQ#action=share>

