

McGill



ER Procedures For Non-ER Docs

Manage the Airway
Place a Chest Tube
Get Into the Circulation

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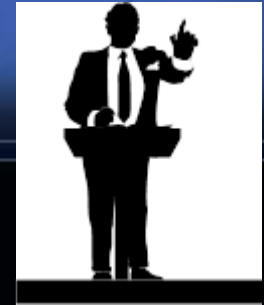


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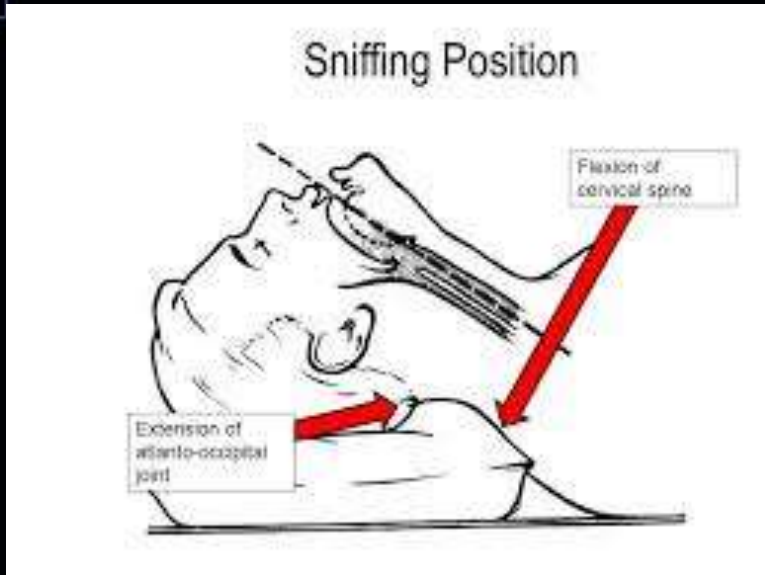
Objectives



- Manage the airway
 - proper positioning
 - tricks of the trade
 - surgical airway
- Chest tube placement
 - avoid common pitfalls
- Gaining access to the circulation
 - venous cutdown
 - IO
- Wound repair using glue

Airway Management

Basic Principle



Cricothyroidotomy

Definition

- Establishment of an opening to the airway at the level of the cricothyroid membrane



Cricothyroidotomy

- Indications:

Inability to intubate the trachea

is the primary indication for creating a surgical airway !!!

i.e. Oral / nasal endotracheal intubation contraindicated / impossible

Cricothyroidotomy

Contraindications

- Age
- Pre-existing laryngeal pathology
- Inexperience
- Anatomic distortion
- Coagulopathy



“The hardest part of doing a cricothyroidotomy is picking up the knife.” – Peter Rosen



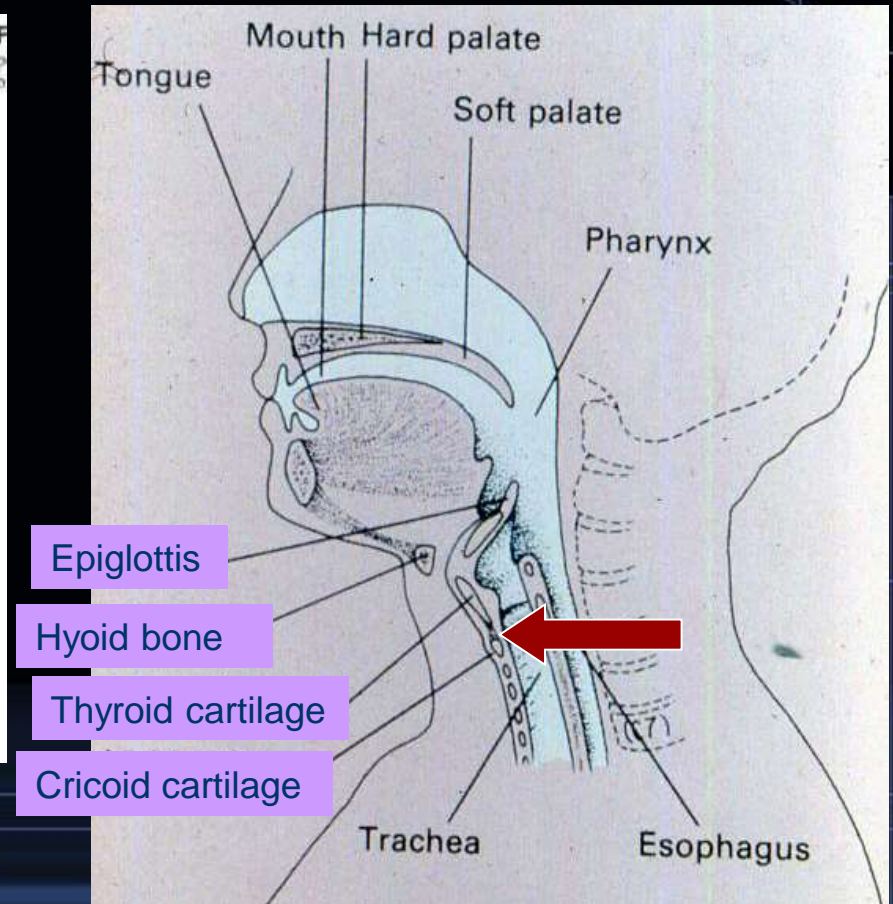
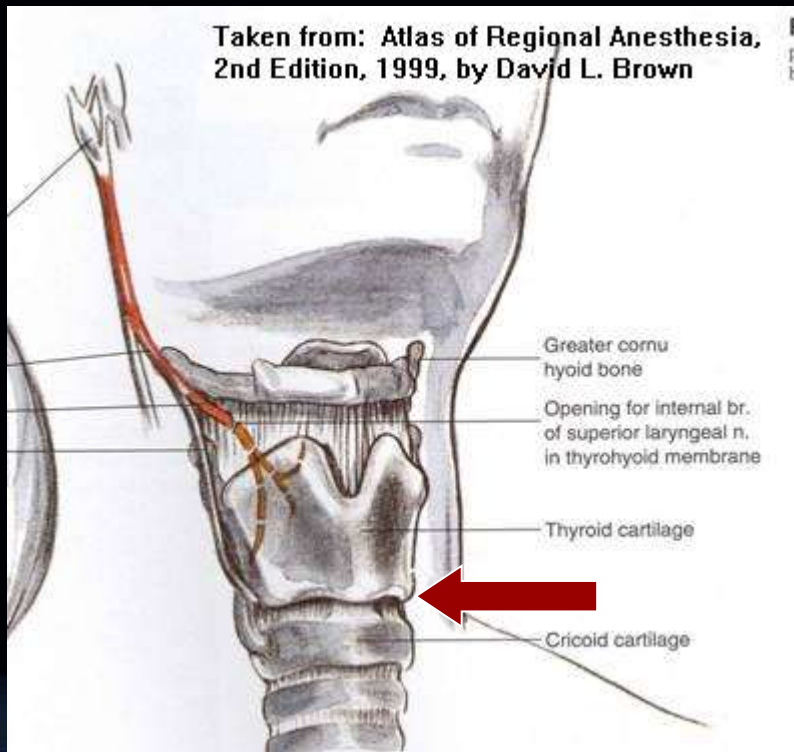
Cricothyroidotomy

Anatomy



Cricothyroidotomy

Anatomy

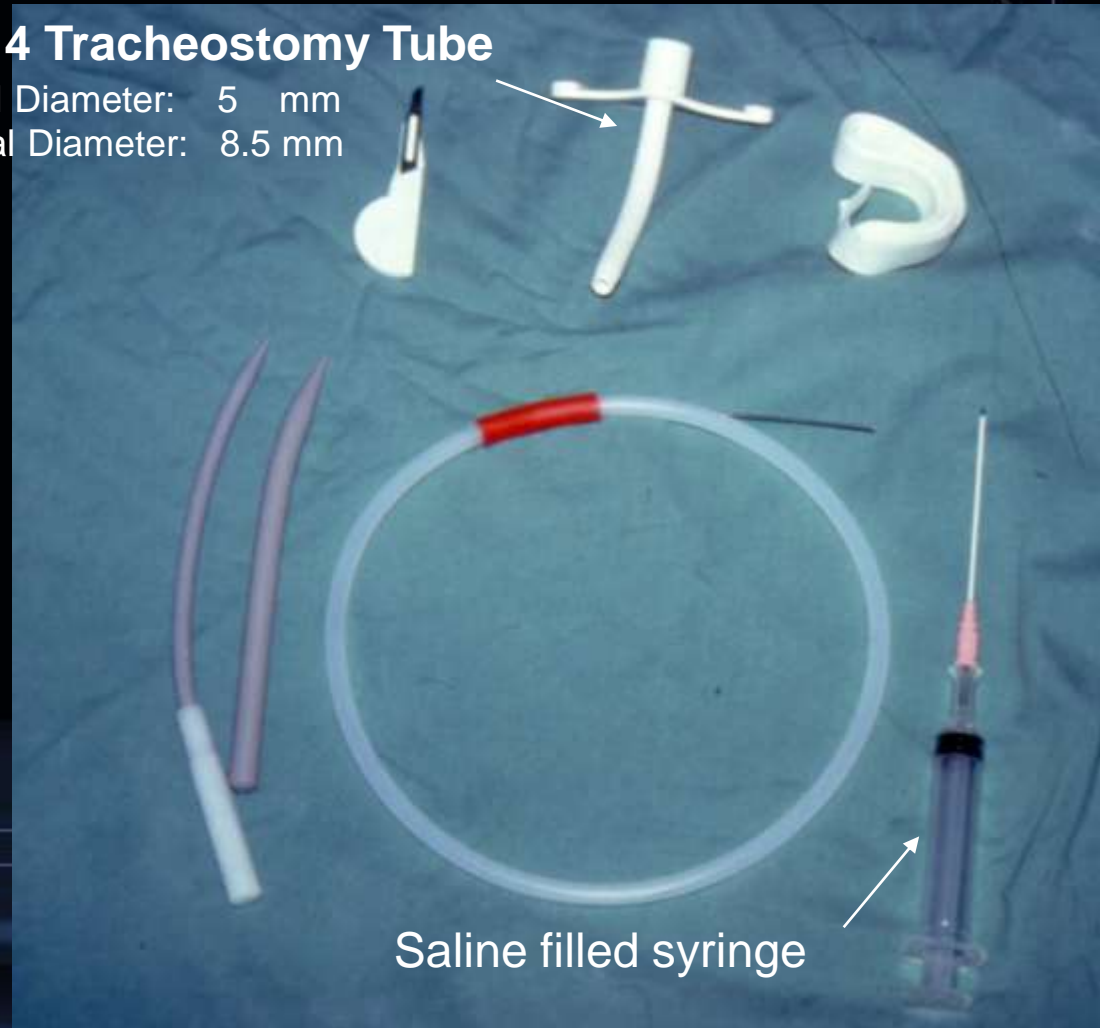


Cricothyroidotomy Tools

Shiley 4 Tracheostomy Tube

Internal Diameter: 5 mm
External Diameter: 8.5 mm

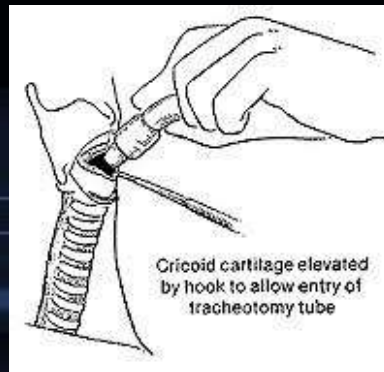
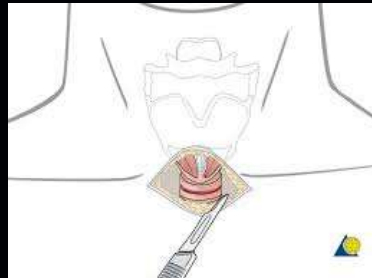
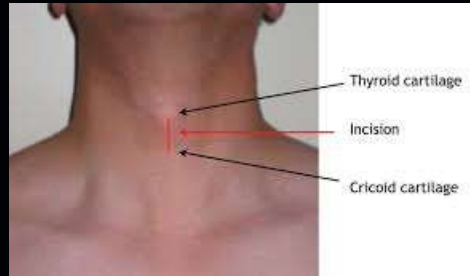
Be Prepared !



Cricothyroidotomy

The Procedure

- Position
- Prep
- Identify
- Cut
- Identify
- Cut
- Insert
- Confirm



Cricothyroidotomy Complications

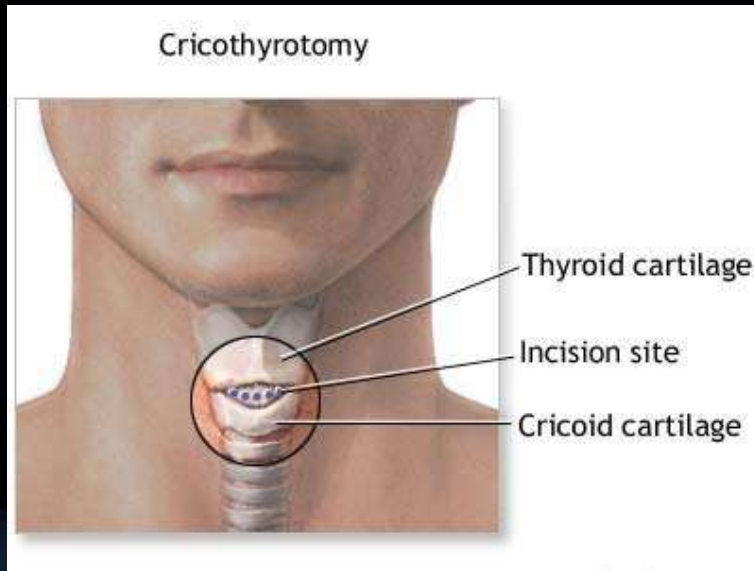
<u>Total</u>	6.1 – 8.6 %
• Subglottic stenosis	1.4
• Voice change	1.4
• Local hemorrhage	2.7
• Wound infection	
• Misplaced tube	
• Pneumo-thorax / mediastinum	
• Esophageal injury	
• Subcutaneous emphysema	
• Mediastinal infection	



Needle Cricothyroidotomy

Be Prepared !

Why ???

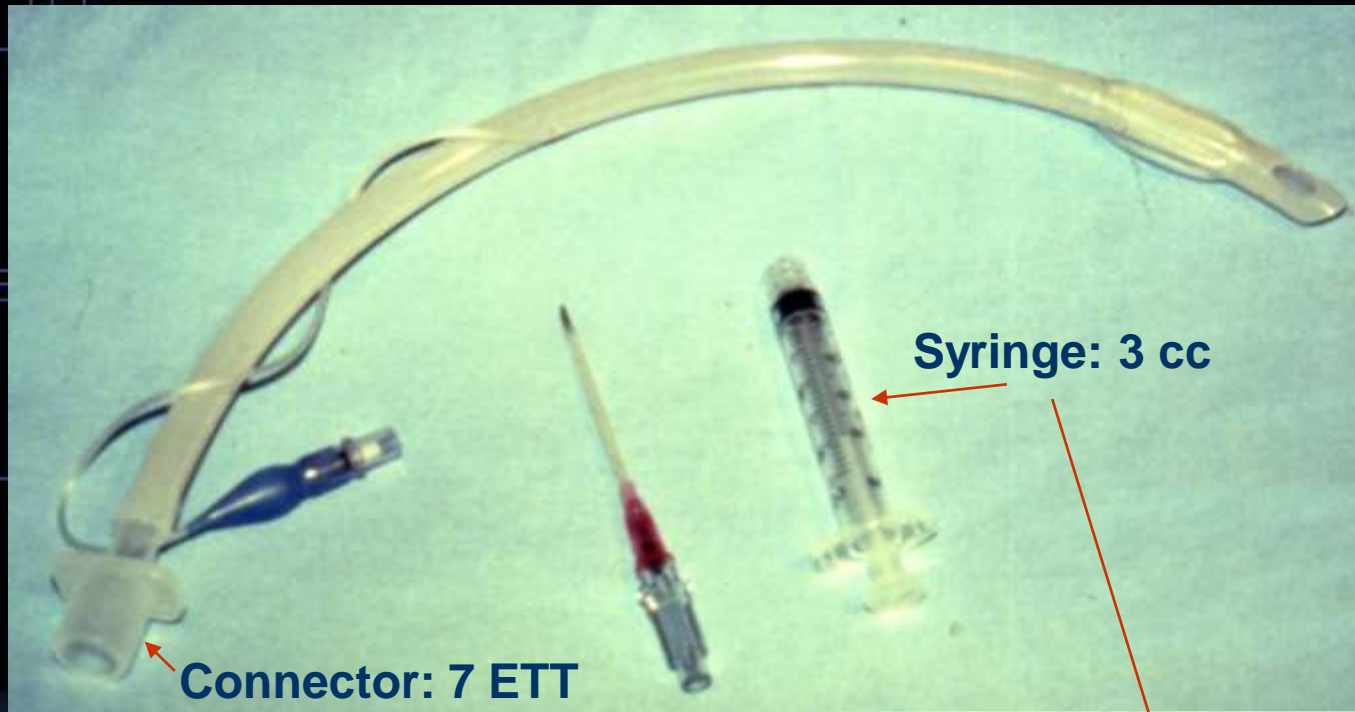


<https://youtu.be/aPiQA2XKkcs>

Needle Cricothyroidotomy

Tools

Be Prepared !



Oxygen:
15 L / min
40 – 50 Psi



Needle Cricothyroidotomy Tools

One second on

Four seconds off

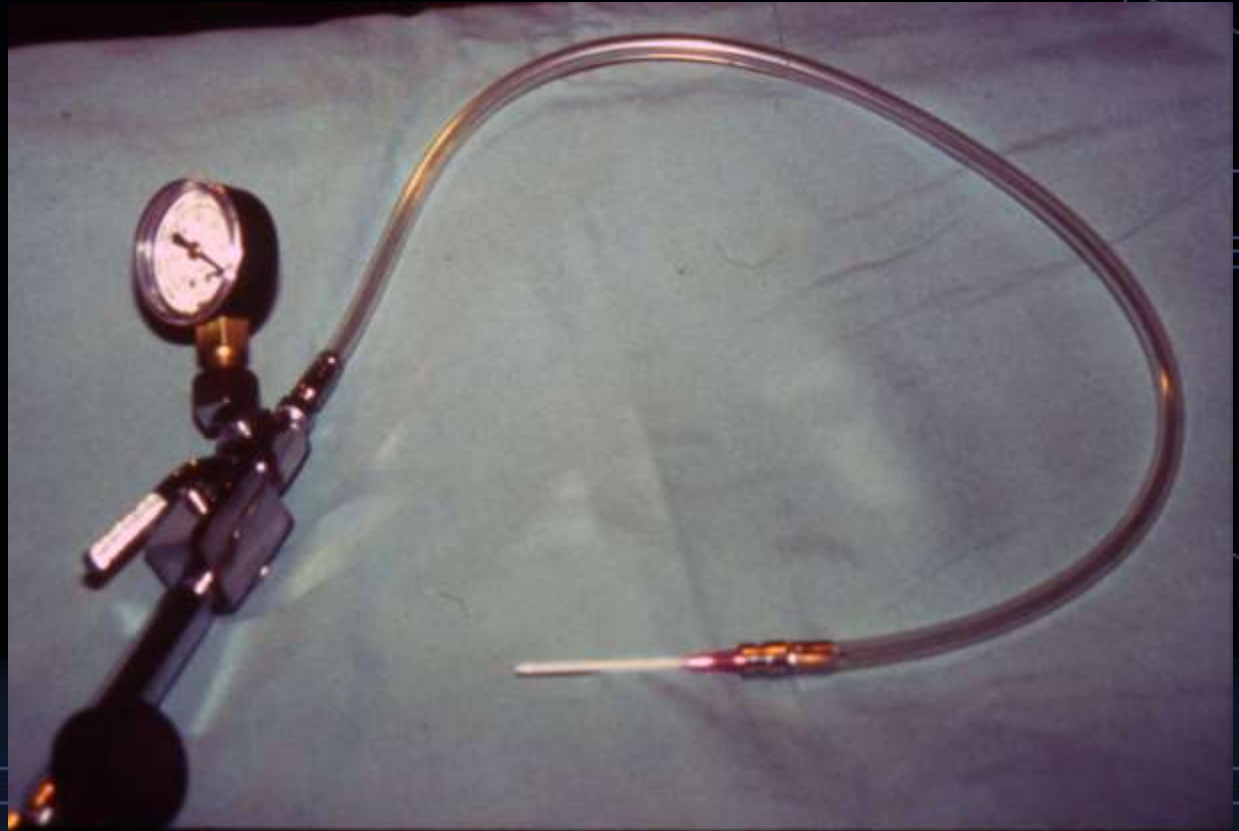
Alternative:

Ctn O₂ 6 L / min 14 -16 *

Ctn O₂ 15 L / min 18 **

* Cat study

** 4.6 – 12.3 kg



Cricothyroidotomy Kits

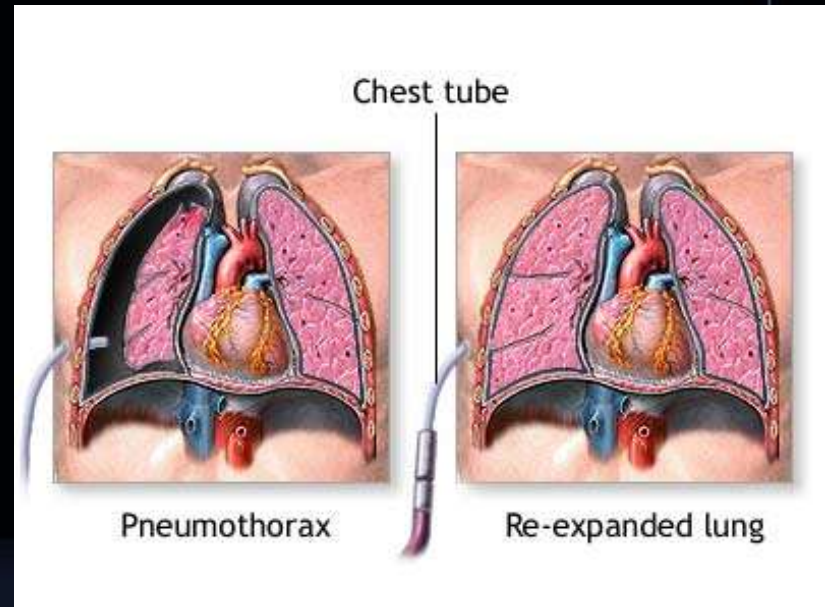


Chest Tubes



Indications:

- Pneumothorax
- Hemothorax
- Empyema
- Pleural effusion
- Chylothorax
- On a ventilator
- Going to surgery / transport
- “Sucking” chest wound
- Tension
- Bilateral
- Increasing



Chest Tubes

Contraindications:

- Need for immediate open thoracostomy
- Massive hemothorax
 \geq 1000 ml
- Clotting disorder
- Multiple pleural adhesions / scarring



- Bleeding
 - rapid
 - \geq 300 ml 1st hr
 - continued
 - \geq 200 ml / hr (3 hrs)
 - increasing
- Persistent hemothorax
- Large air leak
- Bronchial / esophageal / diaphragmatic injury

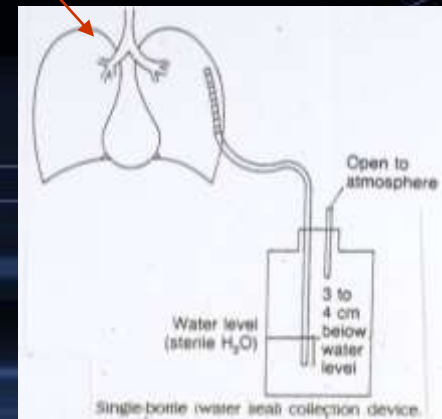
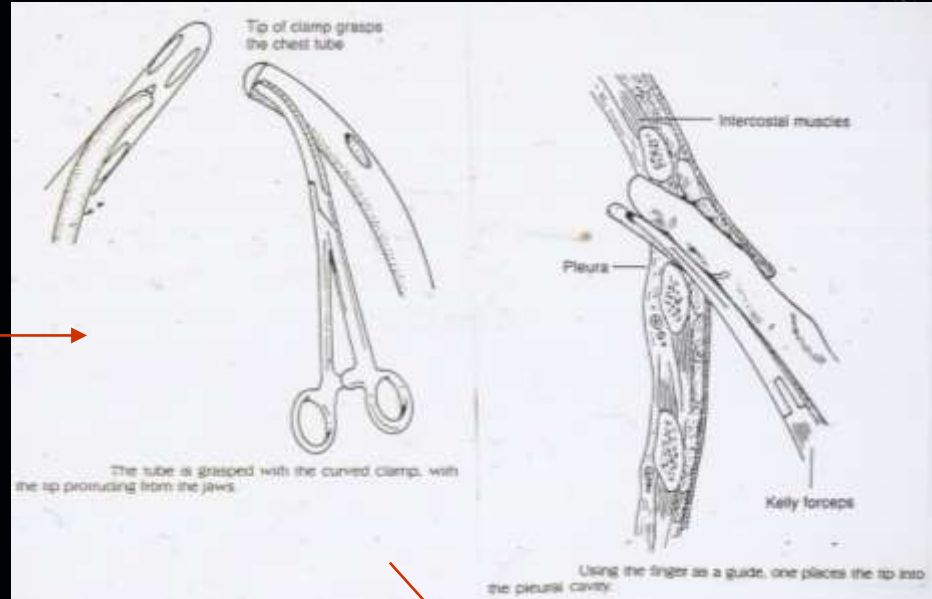
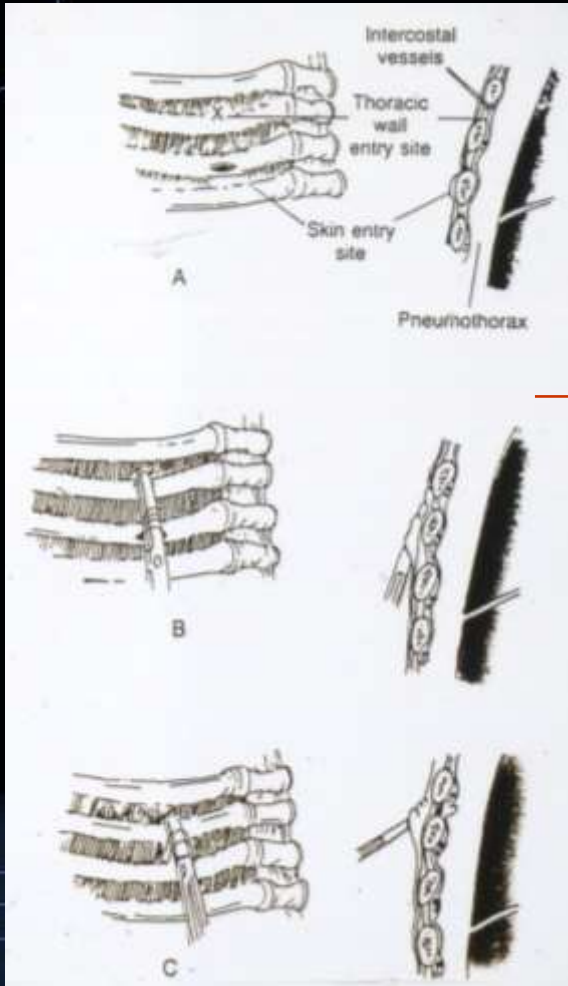
Chest Tubes

Procedure

- Apical route rarely used
- Oxygen, IV, EKG, O₂ sat monitor
- Pt semi-erect
30 – 60°
- Chest tube size:
trauma 36 – 42 Fr
pneumo 18 – 22 Fr
- Measure tube length !



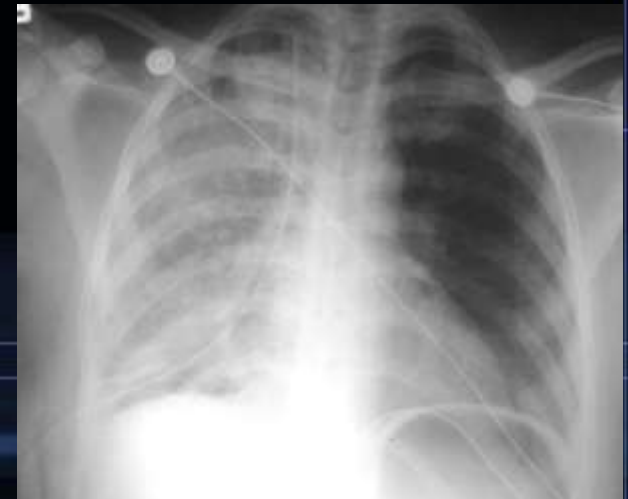
Chest Tubes Procedure



Chest Tubes

Complications

- Lacerated intercostal artery
- Non-functioning tube
- Slippage
- Crossing mediastinum
- In soft tissue of neck
- Lung laceration
- Pain
- Re-expansion pulmonary edema
- Infection



Needle Thoracentesis

Indications

- Rapid deterioration
- Tension pneumothorax

No air or no relief.....

Pericardial tamponade
Myocardial contusion / infarct
Air embolus

Complications:

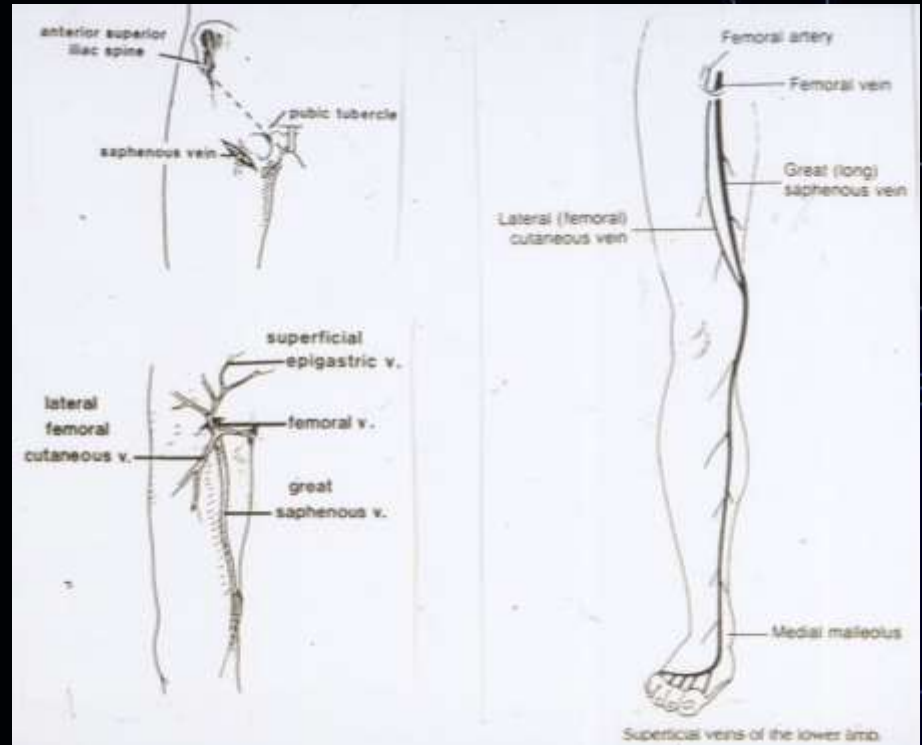
infection
hemorrhage
pneumo / hemo thorax



Venous Cutdowns

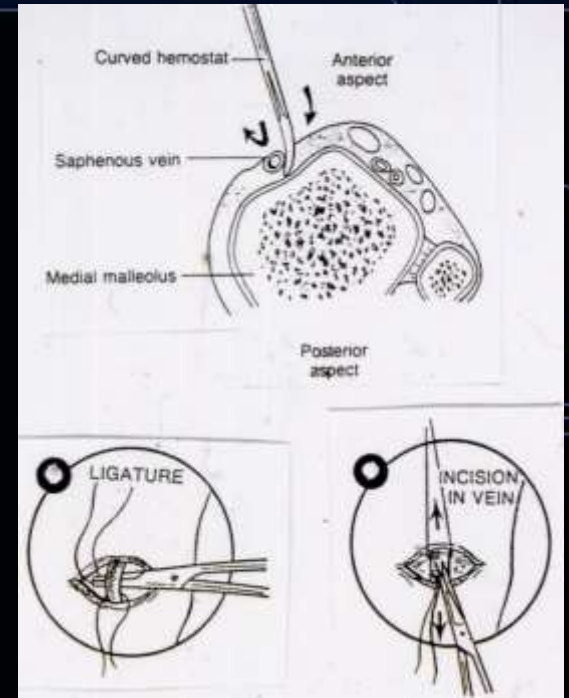
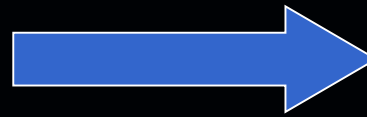
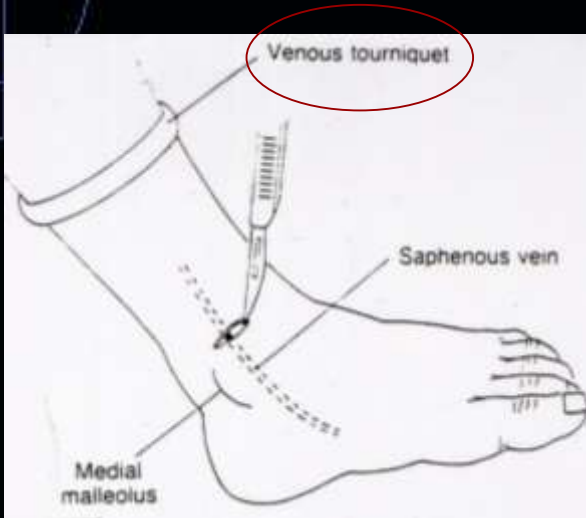
- Shock
- No other access
- Site:
distal saphenous vein

- Contraindications
 - previous use of vein
 - phlebitis
 - cellulitis
 - trauma to the leg



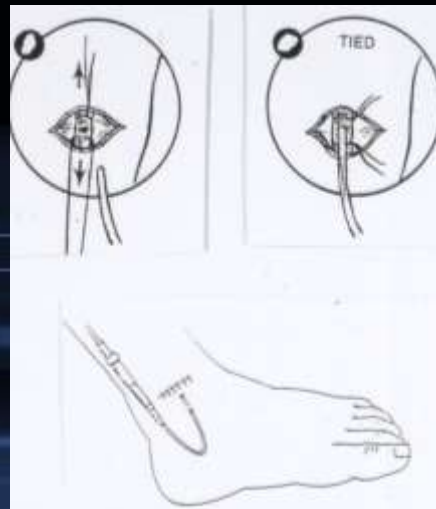
Medial & superior to the medial malleolus

Venous Cutdowns Procedure

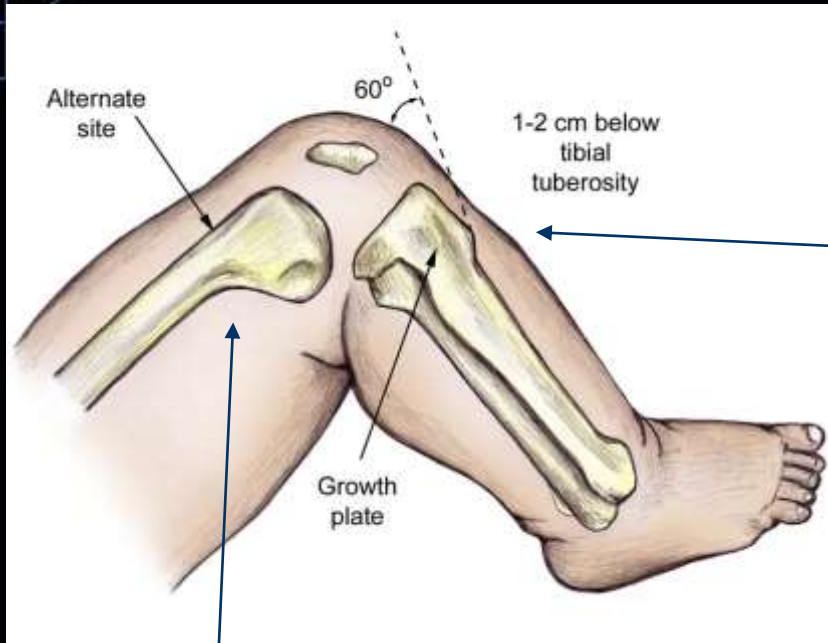


Skin incision perpendicular to the course of the vein

<u>Complications</u>	15 %
wound infection	4
phlebitis	4
embolization	



Intraosseous Infusions



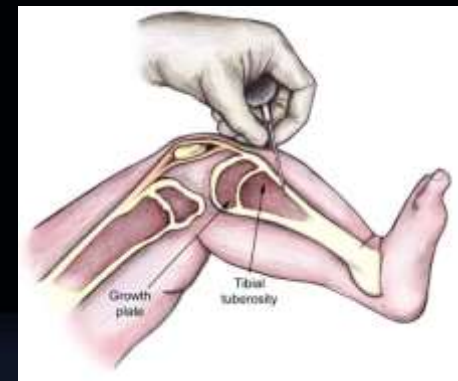
Dist femur 2 – 3 cm above epichondyles



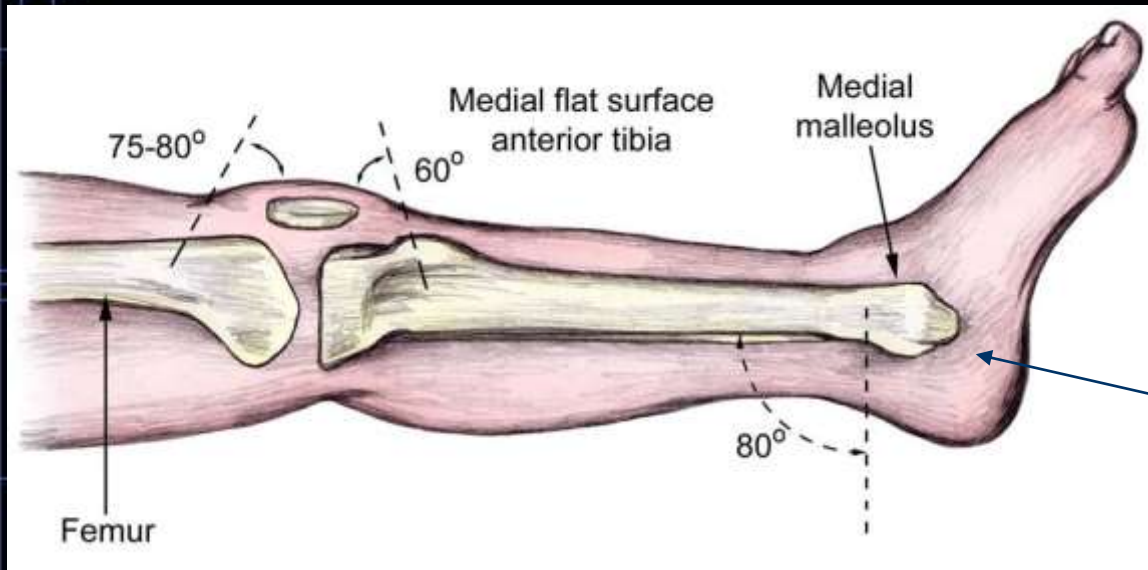
Sites

Children:

Prox tibia anteromedial surface below and medial to tibial tuberosity



Intraosseous Infusions



Sites

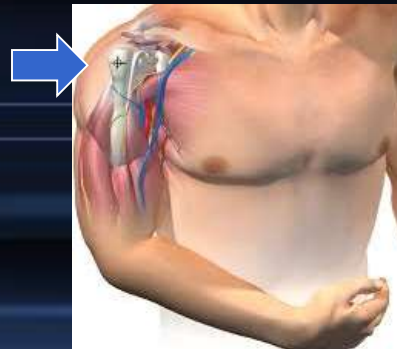
Adults:

Proximal tibia 2 cm medial and 1 cm above tibial tuberosity

Distal tibia 1 cm above superior margin of medial malleolus

Alternate Sites

Proximal humerus
Sternum



IntraOsseous (IO) Devices



F.A.S.T.1 system (Sternal)
Pyng Medical Corp

<https://youtu.be/KHXSfh2ZRDM>



Cook-type IO



Illinois sternal iliac IO needle



EZ10 IO

Tibia:
Pink=Pediatric
Yellow=Fat



Jamshidi IO needle



Bone Injection Gun (B.I.G.)
spring-loaded IO insertion device

Intraosseous Infusions

Contraindications

Fracture / previously penetrated bone

Vascular interruption (trauma, cutdown)

Cellulitis, burns, osteomyelitis (at site)

Osteogenesis imperfecta, osteopetrosis

Right to left intracardiac shunt (ie tetralogy of Fallot):
inc risk cerebral emboli

Analgesia slow, 0.5 mg/kg (max 40mg) preservative-free
2% lidocaine

Flush before and after each medication

Pressure infusion rate / resistance like a 21 gauge IV

