Essential Learning
Penetrating Neck Trauma

- **How should the airway be managed in penetrating neck trauma?**
  - No universally accepted guidelines
  - Early airway management is important as the airway can become rapidly compromised by edema or expanding hematoma.
  - Intubation should be done with most comfortable technique (DL, VL, or fiber optic)
  - Blood in the airway and/or edema can obscure views for both VL and fiberoptic intubations.
  - Be prepared for a surgical airway (up to 13% of RSI progress to a surgical airway).
  - If the patient is hemodynamically unstable and the airway is not immediately compromised, consider resuscitating the patient first and/or deferring to OR intubation.
  - Of note, any cervical collars placed by EMS should be fully removed to examine the neck in patients who present with penetrating trauma.

- **What are the steps in performing a cricothyrotomy**?
  - Equipment: sterile prep, #10 or #11 blade scalpel, Cric kit (if available), 6-0 ETT or tracheostomy tube (#4 Shiley)
  - Prep (if time permits): don sterile gloves/mask/gown, prep neck, mark incision site at cricothyroid membrane; if patient is conscious consider sedation or inject lidocaine with epinephrine at incision site
  - **Traditional Approach:**
    - Stabilize cricothyroid membrane with non-dominant hand
    - Use #10 or #11 blade scalpel in dominant hand to make ~4 cm midline vertical incision in skin over cricothyroid membrane (if in doubt, make it bigger)
    - Use finger or forceps to blunt dissect and identify cricothyroid membrane
    - Use scalpel to make horizontal stab incision into membrane
    - Use tracheal hook to stabilize at superior aspect of incision
    - Extend opening with curved forceps followed by Trousseau dilator
    - Pass ETT (just past deflated balloon) or tracheostomy tube into trachea and secure
  - **Rapid Approach:**
    - Vertical skin incision followed by horizontal incision through the cricothyroid membrane
    - Put finger in the hole to dilate
    - Place bougie into the trachea along finger

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        - Advance 6-0 ETT or tracheostomy tube over the bougie

- **What are the zones of the neck? (see Figure 225.2)**
    - The following should be considered for any patient with penetrating neck trauma that violates the platysma.
    - Zone I- sternal notch to cricoid
        - Can be difficult to control hemorrhage, especially to subclavian vessels
        - Includes esophagus and trachea
        - Workup includes CTA (if stable) and evaluation for tracheal/esophageal injuries
    - Zone II- cricoid to the angle of the mandible
        - Most accessible to surgical intervention
        - Includes proximal esophagus and trachea
        - Workup includes CTA (if stable) and evaluation for tracheal/esophageal injuries
    - Zone III- angle of the mandible to base of the skull
        - Difficult to access for control of vascular injuries
        - Unlikely to involve esophagus or trachea
        - Workup includes CTA (if stable)

- **How are tracheal/laryngeal injuries diagnosed and treated?**
    - Findings that suggest injury include:
        - Anatomic trajectory
        - Pain with palpation over larynx (especially with tongue movement)
        - Crepitus or subcutaneous air
    - Evaluate with laryngoscopy and/or bronchoscopy (CT may be a helpful additional study)

- **How are esophageal injuries diagnosed and treated?**
    - Findings that suggest injury include:
        - Anatomic trajectory
        - Dysphagia
        - Hematemesis
        - Subcutaneous emphysema
    - Diagnosing esophageal injuries is challenging
    - Plain films and CT have low sensitivity
    - Imaging modality should be discussed with surgical consultants, and may include swallow studies, endoscopy, and/or CT

- **What are the hard and soft signs of vascular injury?**
    - Hard signs- require immediate surgical intervention
        - Expanding hematoma
        - Pulsatile bleeding

        - Audible bruit or palpable thrill
        - Signs of distal ischemia
        - Soft signs- suggest vascular injury but do not require immediate surgical intervention
    - Soft signs- suggest vascular injury but do not require immediate surgical intervention and CTA imaging is generally appropriate.
        - Stable hematoma
        - History of significant hemorrhage at the scene
        - Reduced but palpable unilateral pulse
        - Neurologic abnormality
        - Proximity of injury to major vascular structure

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    - **References:**

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        - Image References
            - Figure 225.2 from Newton K, Claudius I. Neck. In: Marks JA, ed. *Rosen's Emergency Medicine: Concepts and Practice*. 8th ed. Philadelphia: Mosby/Elsevier; 2014:421-430.e422.

Figure 225.2- Zones of the neck

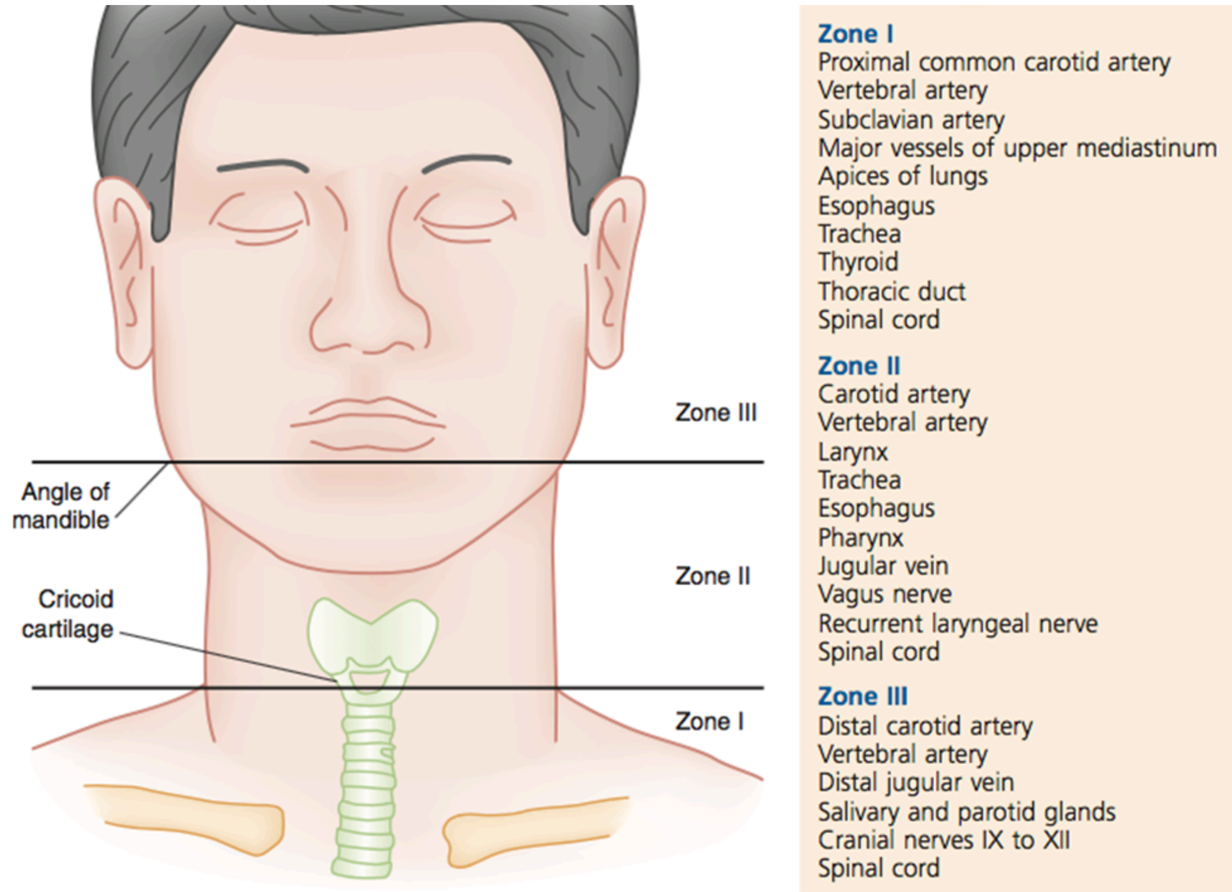

Figure 44-1. Zones of the neck.