Airway Management

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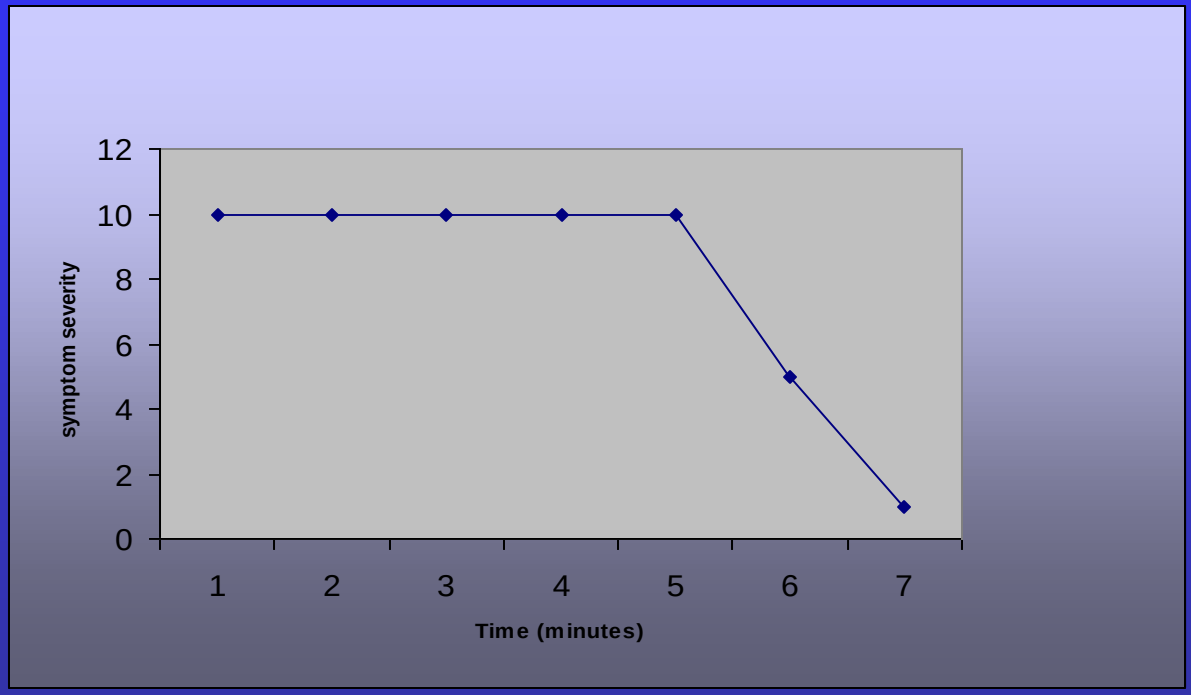
The most common cause of PREVENTABLE peri-operative death is loss of control of the airway

Clinical Signs of Airway Obstruction

- Inspiratory stridor
- Paradoxical motion of the chest wall
- Use of accessory muscles of respiration
- Tachypnea
- tachycardia
- Flaring of the ala nasae
- Sweating
- Cardiac arrhythmia
- Hypoxia (a very late sign)

In an adult at rest, the signs of airway obstruction will NOT be present unless the airway is < 3 mm

Time Course of Airway Obstruction



Treatment of Airway Obstruction

- Open Mouth – Suction Patient – Maintain axial traction on the cervical spine if patient is a Trauma Victim
- Mask Oxygen

Chin Lift

- Head stabilized
- Fingers placed under chin to lift mandible an pull tongue forward

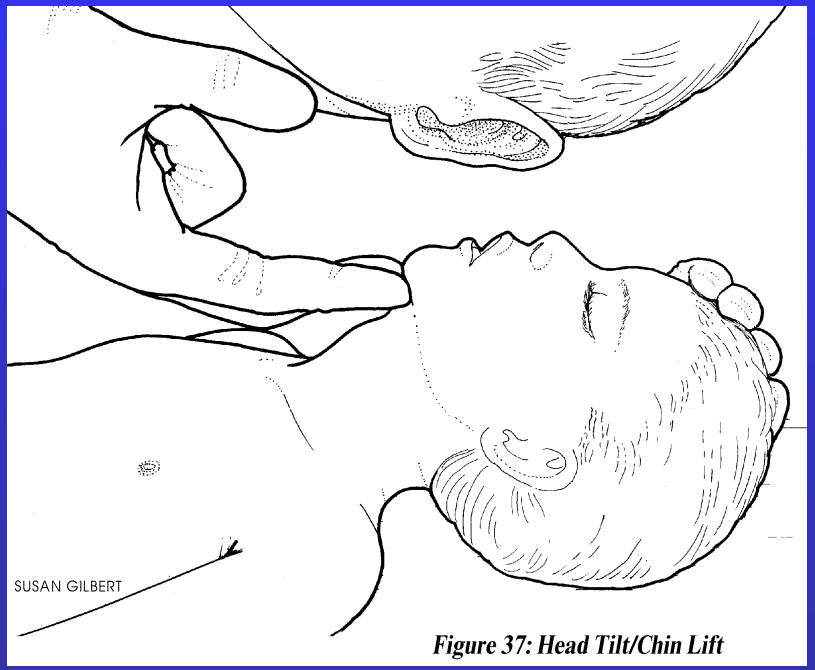


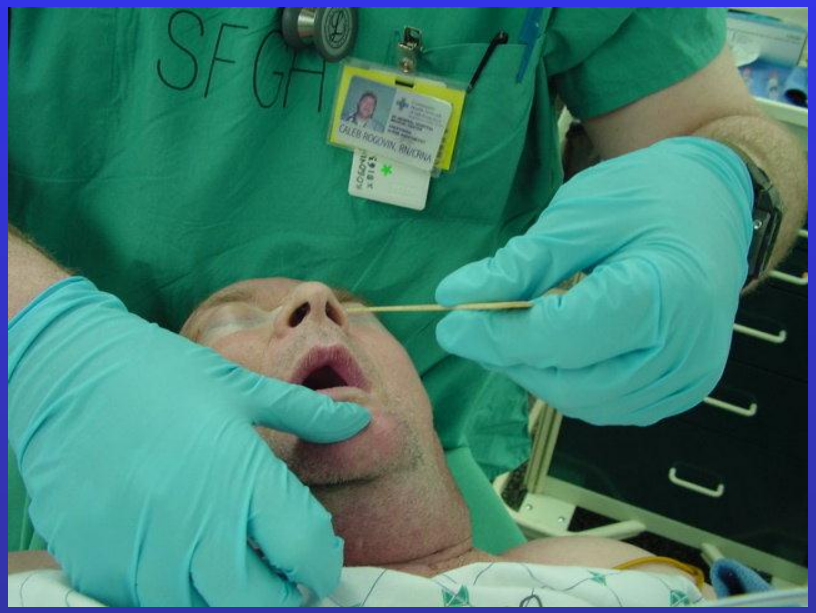
Figure 37: Head Tilt/Chin Lift

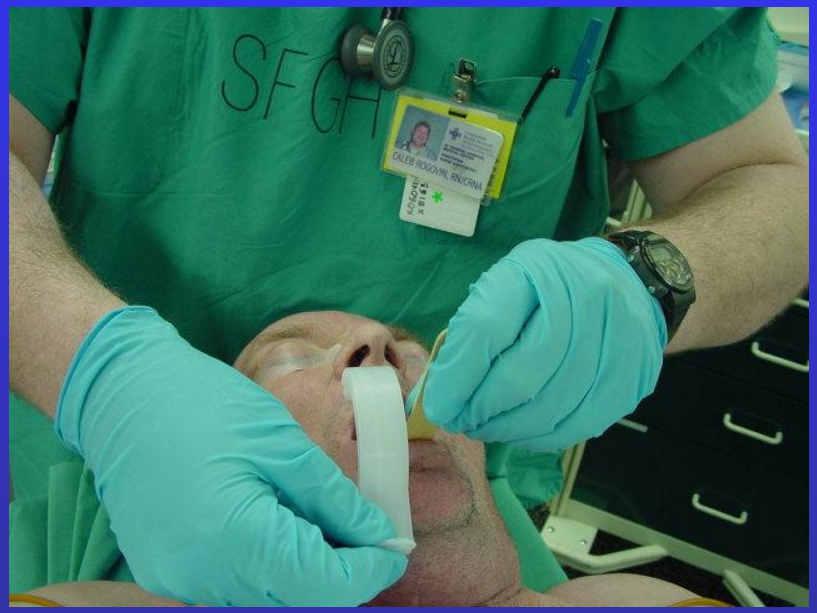
http://www.cpem.org/html/giflist.html

Jaw Thrust

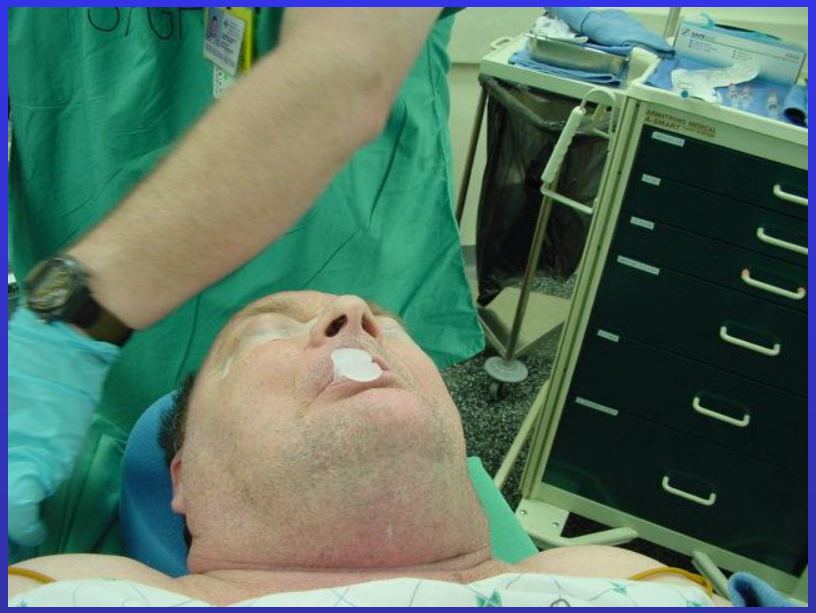
- Stabilize the head
- Place each long finger under the angle of the mandible and lift
- I find this to be a more effective maneuver than the chin lift in most patients

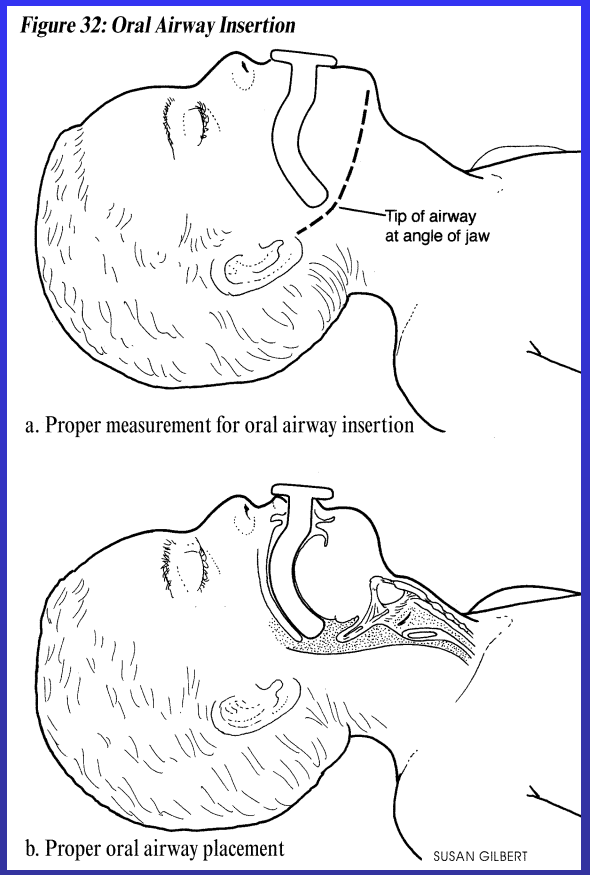
Oral Airway





Oral Airway





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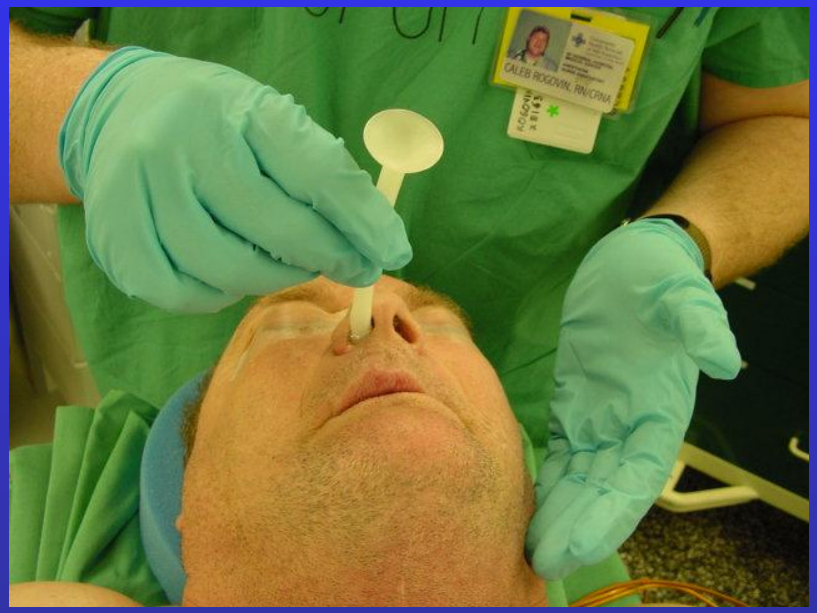
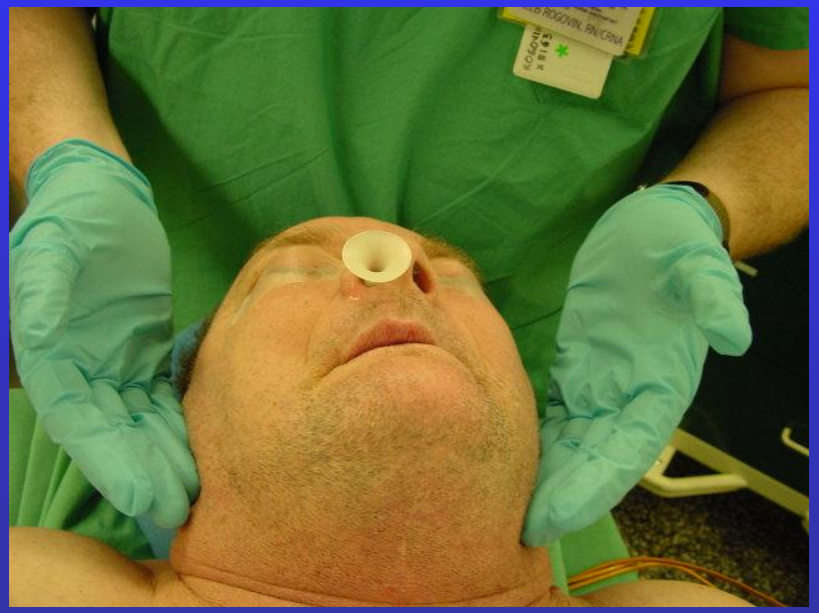
Nasal Airway



Nasal Airway

- Best in an obtunded patient who will not tolerate an oral airway because of stimulation of the hypopharynx



Mask Ventilation

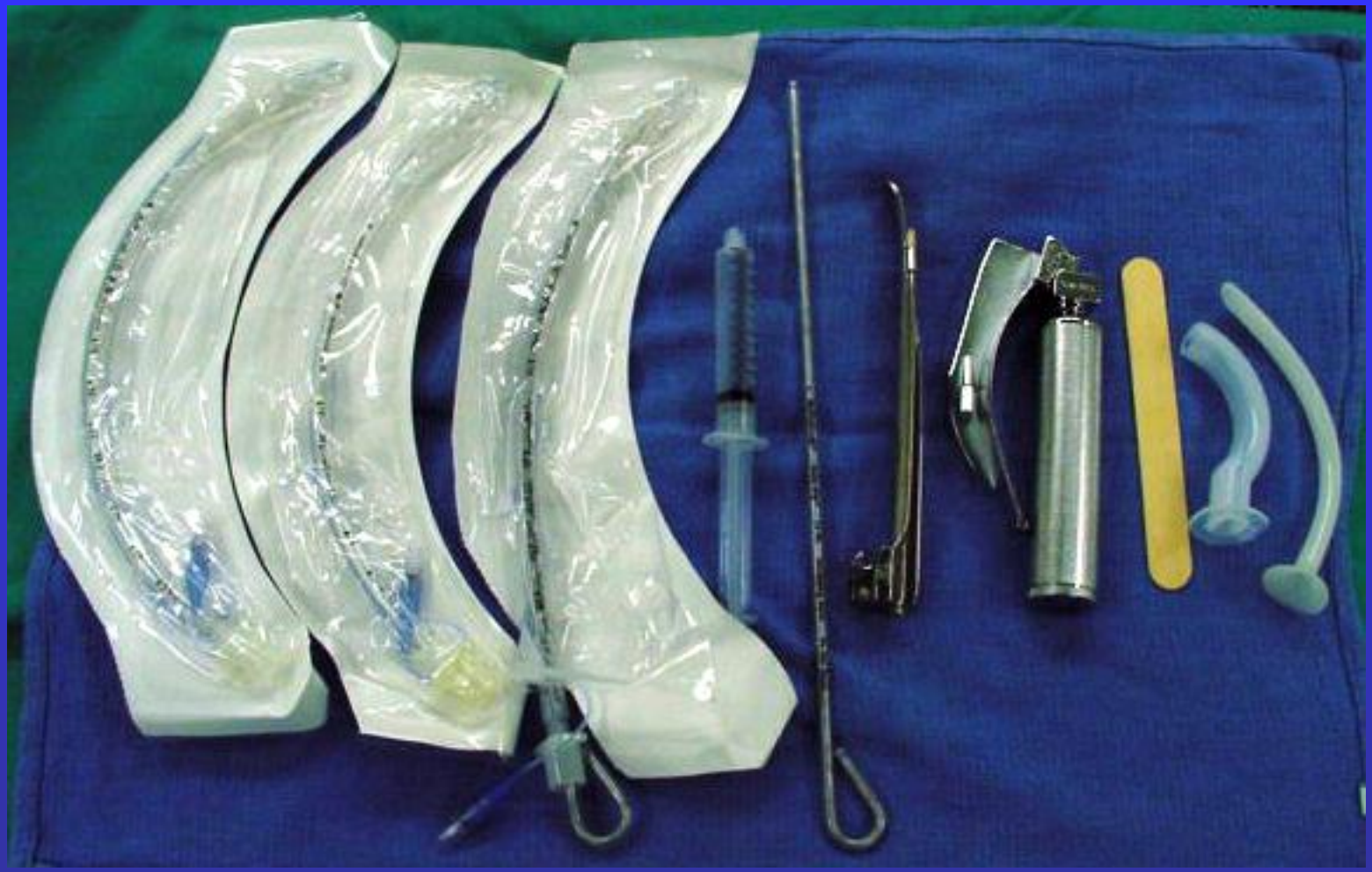
Thumb placed on top of mask
Index finger on bottom of mask
Long and ring fingers on mandible NOT
On the soft tissue below the mandible!!!

Mask Ventilation

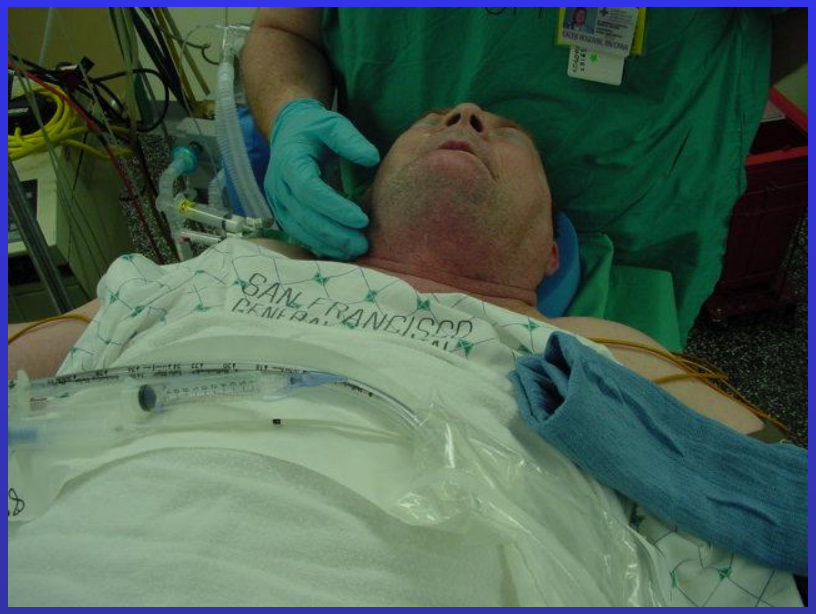
- If the patient is breathing spontaneously, assist ventilation by timing bag compression with patient inspiration
- If you are ever experiencing ventilation problems, always disconnect the ventilator and HAND VENTILATE the patient!! (obviously via the ET tube). Your hand is the best monitor!!

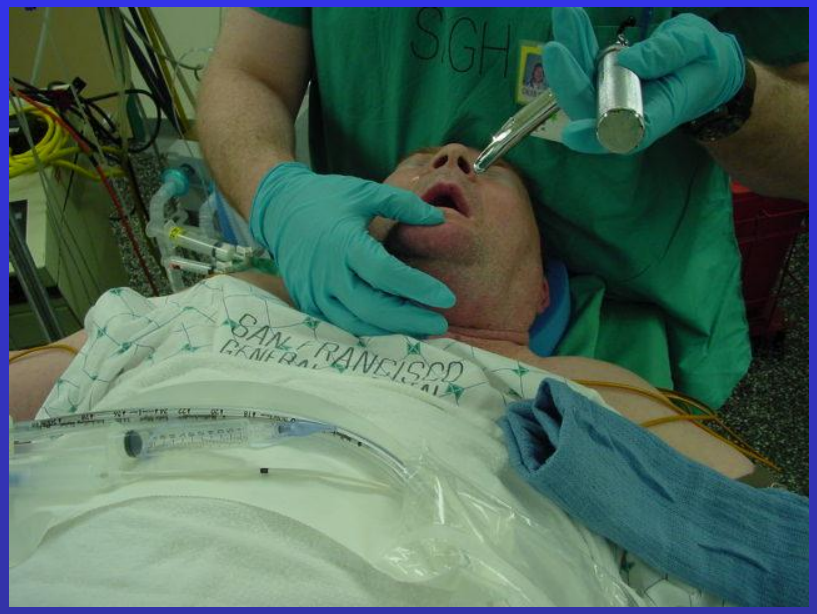
Indications for Endotracheal Intubation

- Hypoventilation
- Hypoxia
- Pulmonary Toilet
- Airway Protection
- “Semi-stable” Trauma Victim requiring mulitiple radiologic procedures (relative indication)
- “Prophylactic Intubation” – eg. A big burn

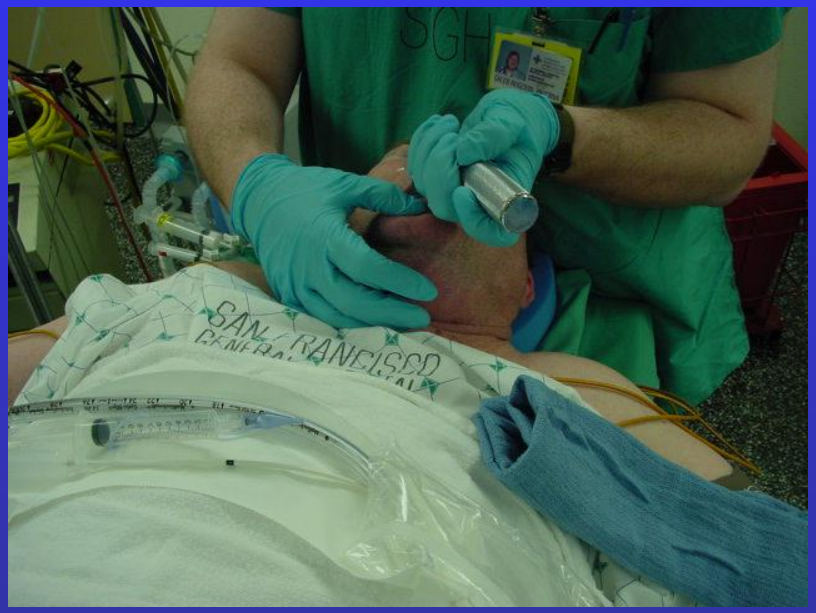


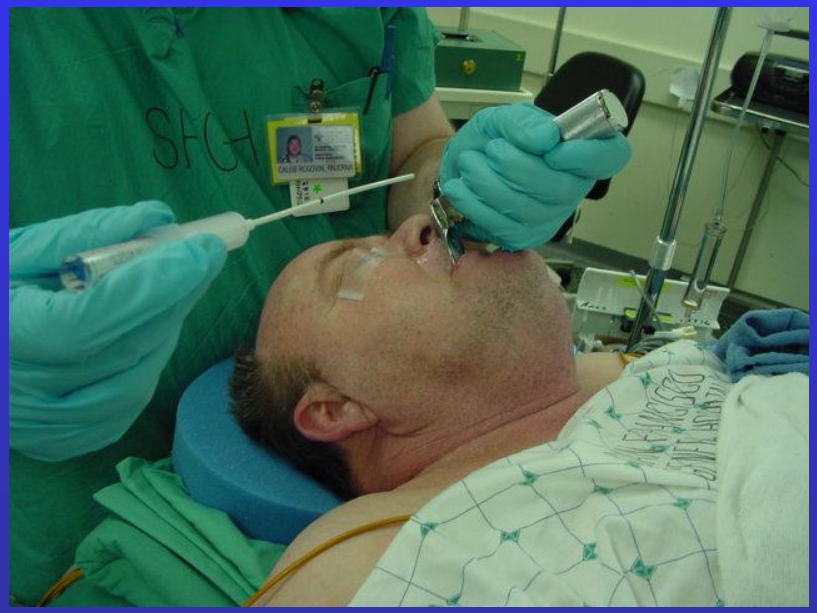
Steps for Endotracheal Intubation



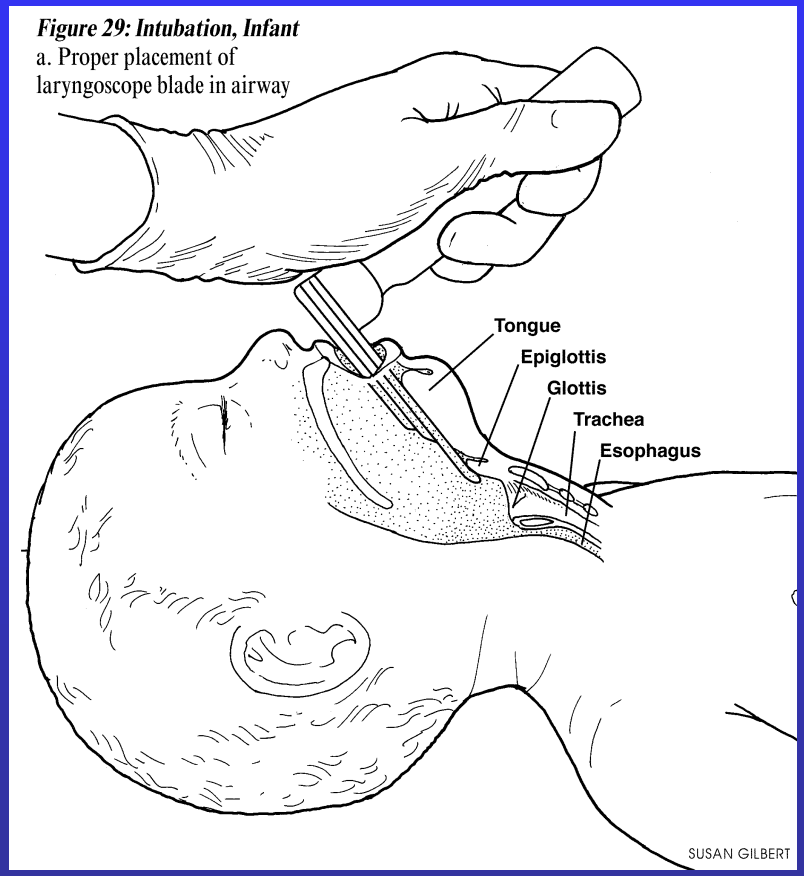


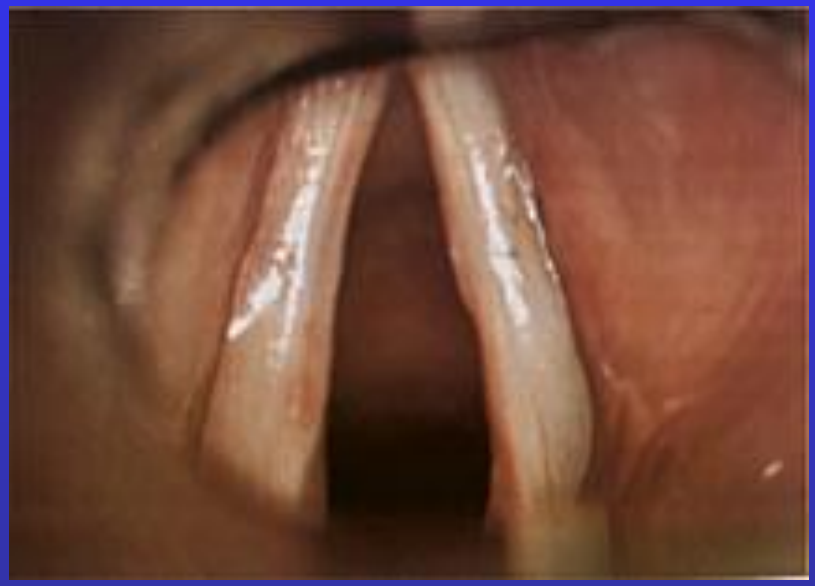
Endotracheal Intubation

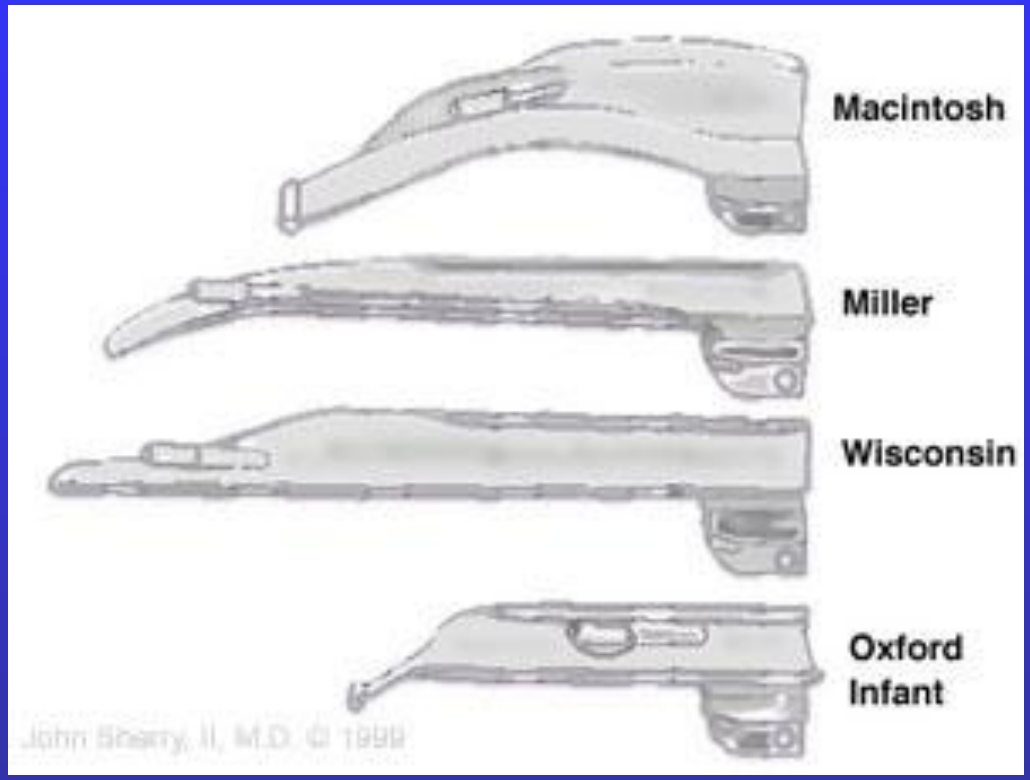




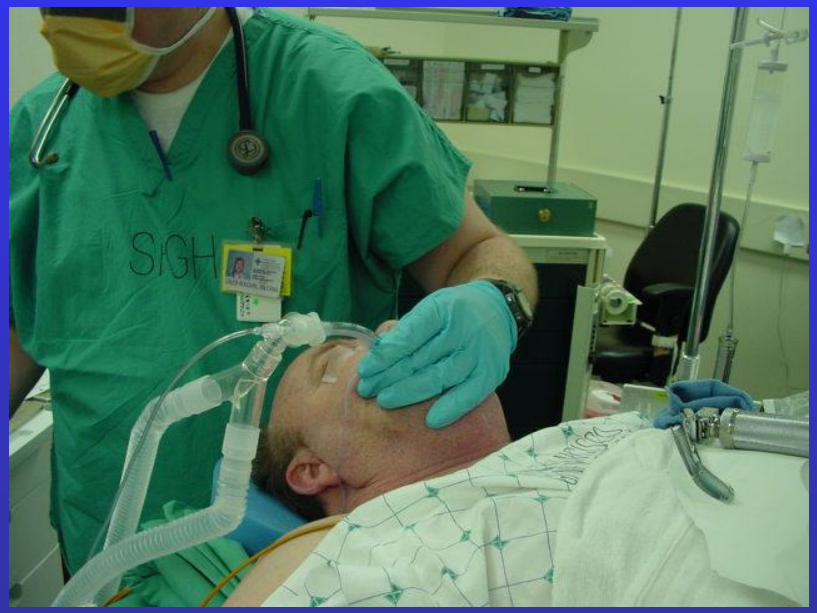
Endotracheal Intubation






Macintosh
Miller
Wisconsin
Oxford
Infant
John Storry, II, M.D. © 1998

Endotracheal Intubation

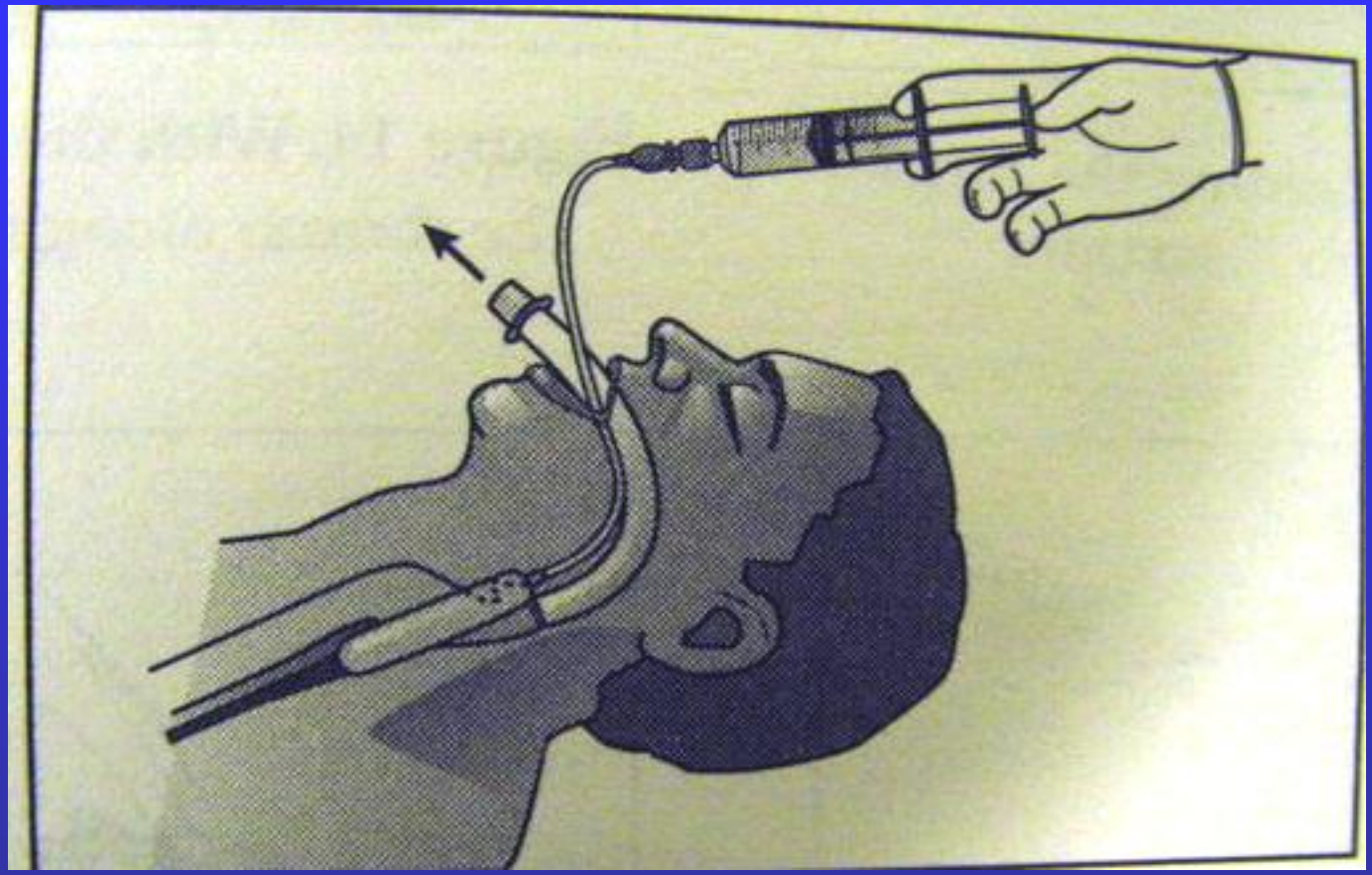


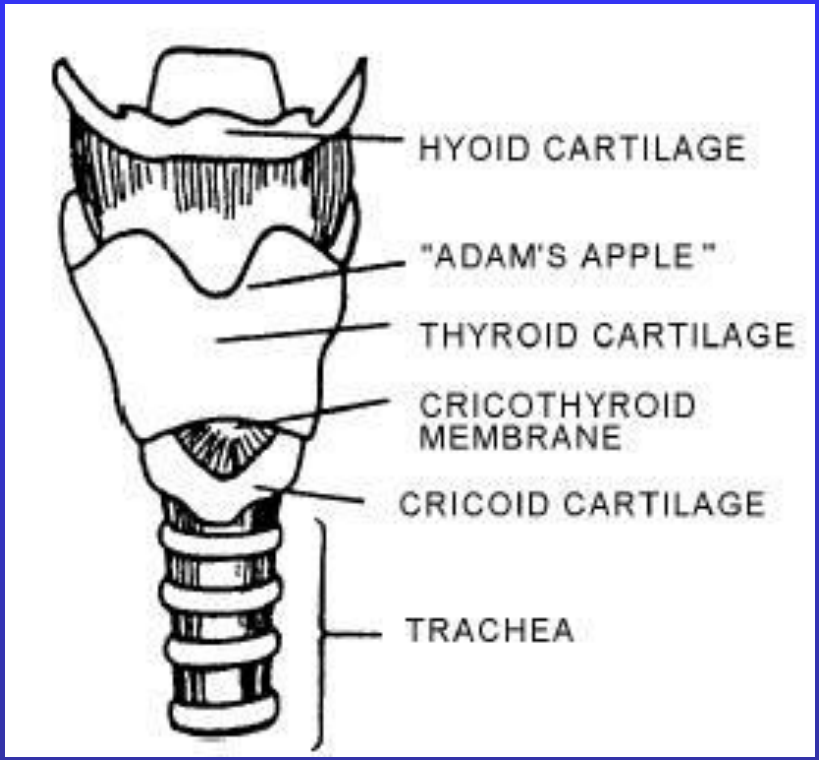
Immediately after Intubation

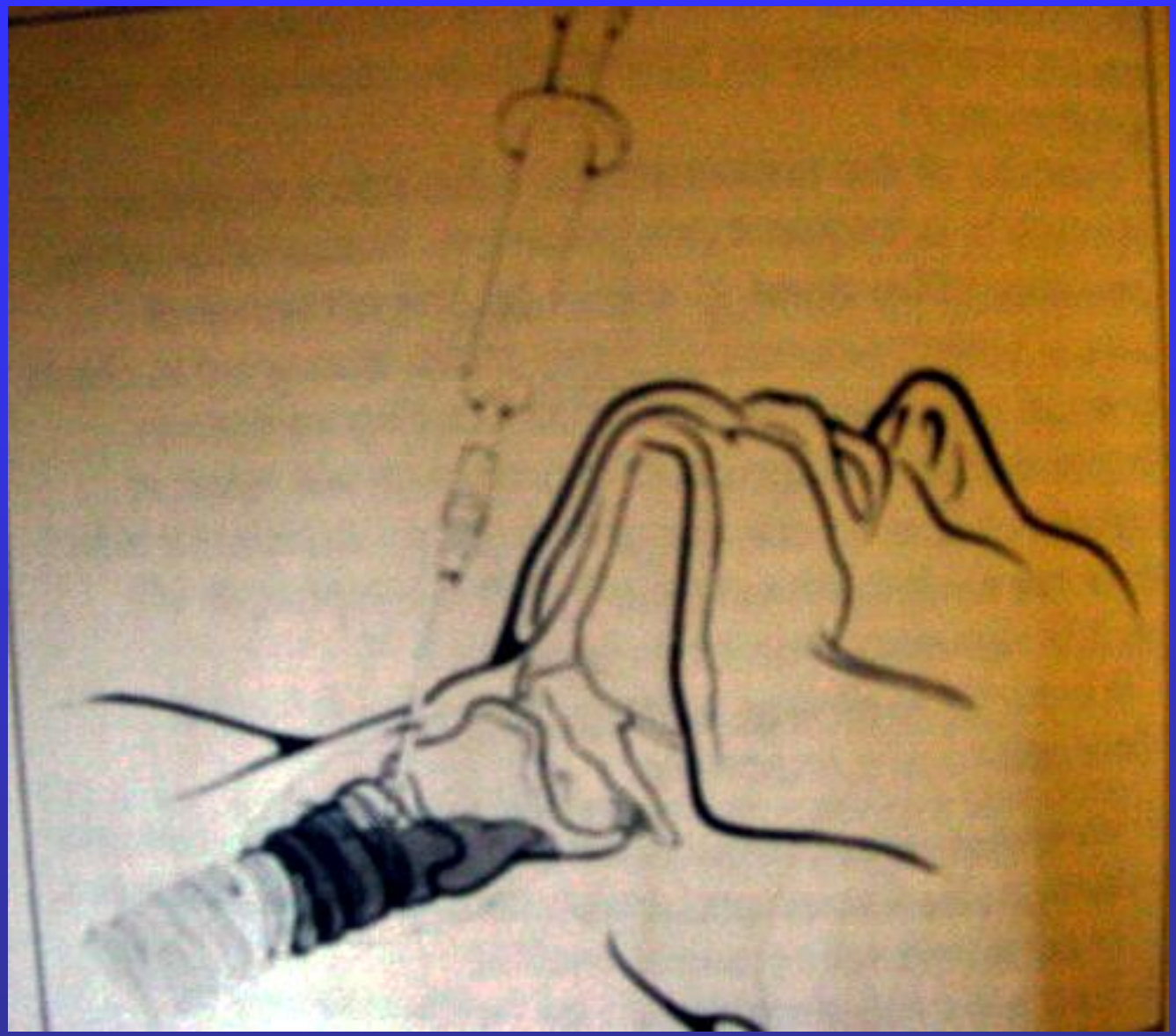
- Hold on to the tube!!
- Make sure the chest is rising
- Listen over the stomach to R/O an esophageal intubation
- Listen for bilateral breath sounds to R/O a right mainstem bronchus intubation
- Check the pulse oximeter
- Check the end tidal $pC0_2$ if available

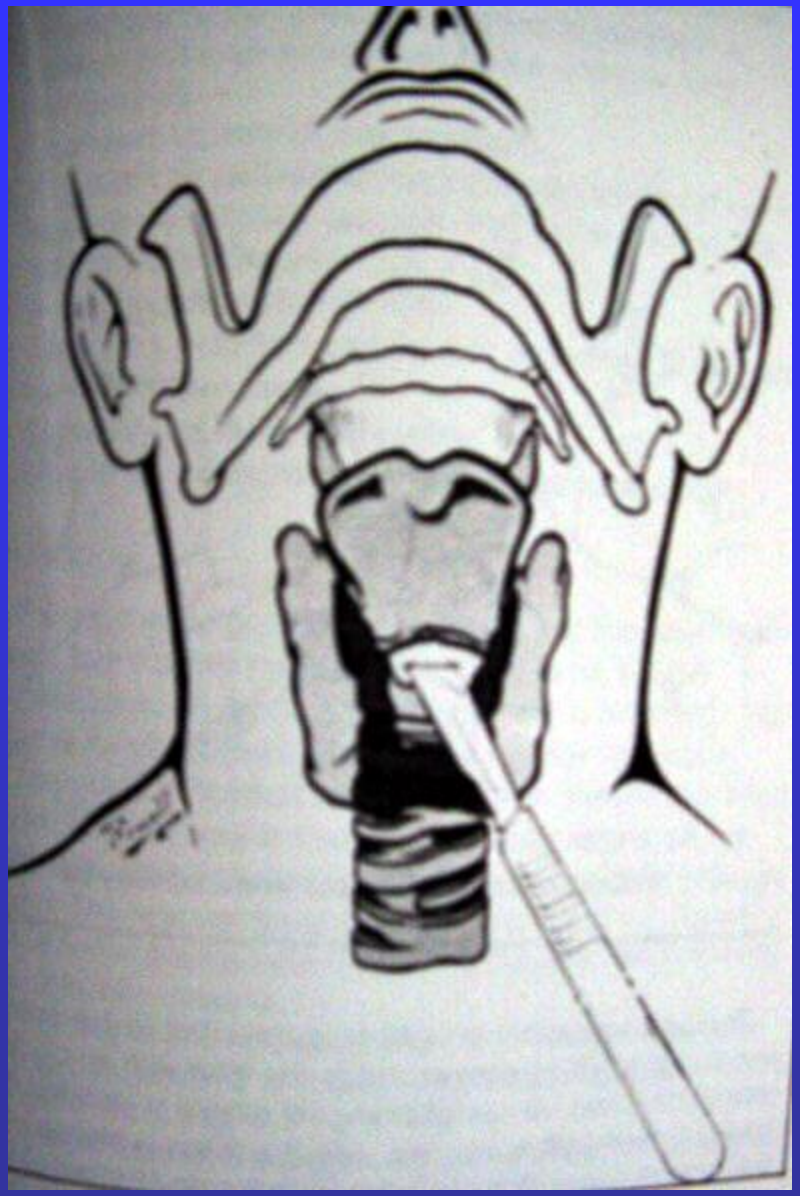
If in doubt re: tube location

- Repeat laryngoscopy OR
- Take out the tube and mask ventilate the patient until adequate oxygenation and ventilation have been restored.
- DO NOT undertake prolonged efforts at intubation in the hypoxic hypercarbic patient.

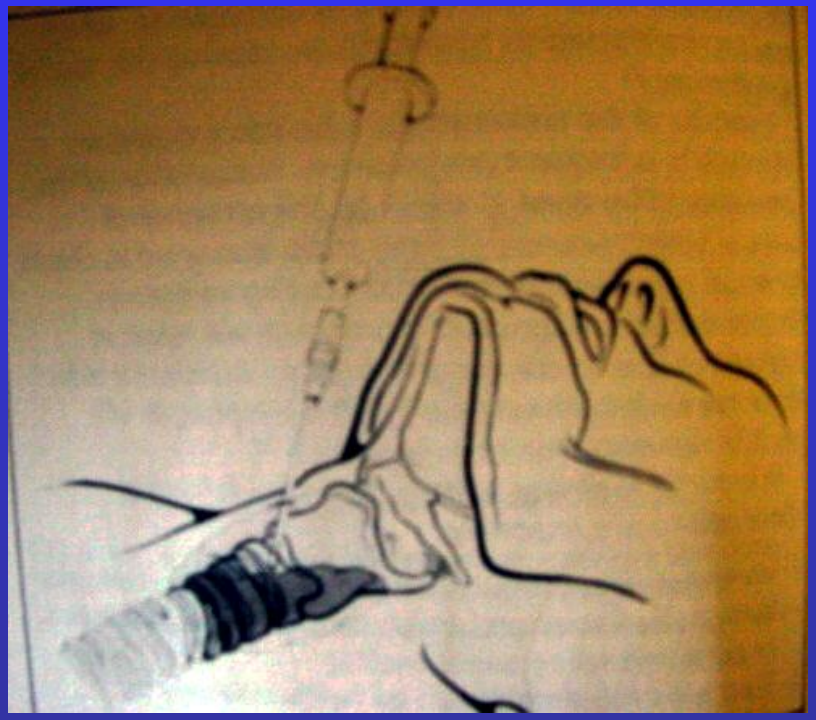


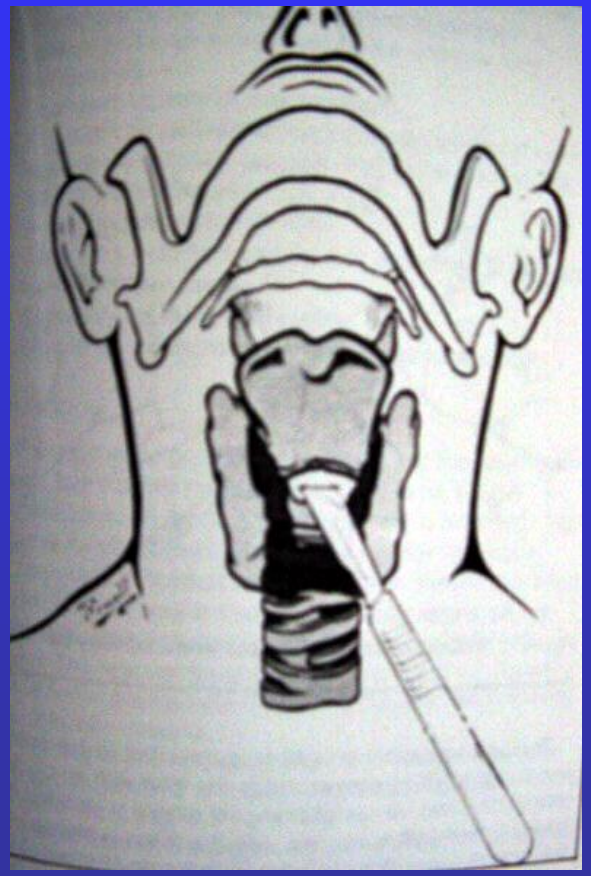

HYOID CARTILAGE
"ADAM'S APPLE"
THYROID CARTILAGE
CRICOTHYROID MEMBRANE
CRICOID CARTILAGE
TRACHEA





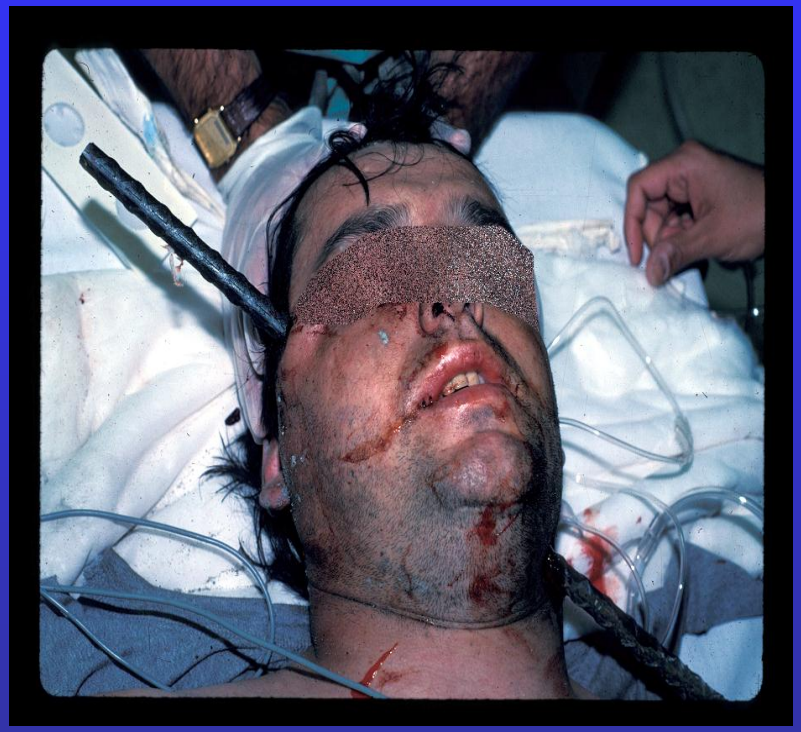
Cricothyroidotomy

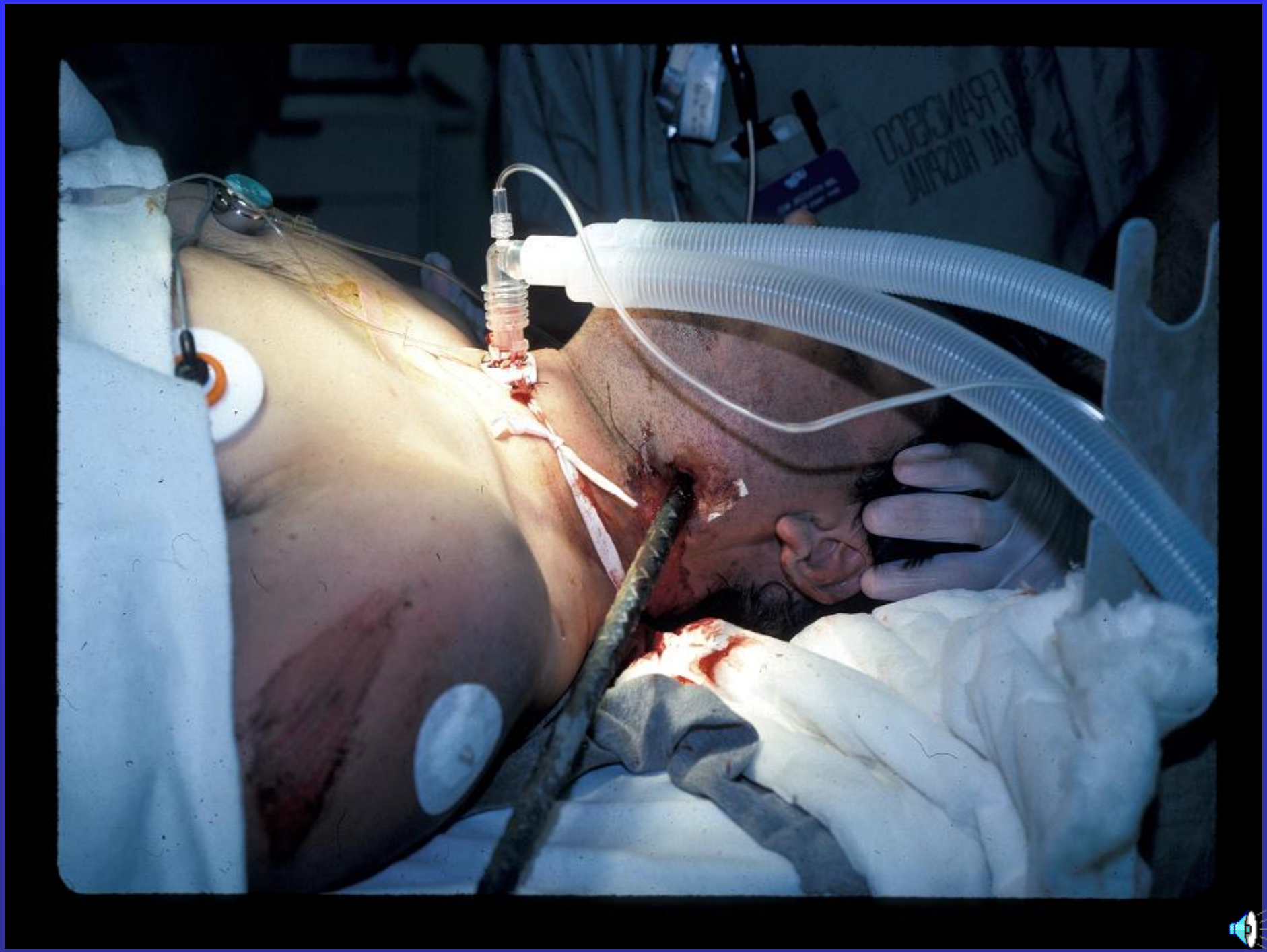


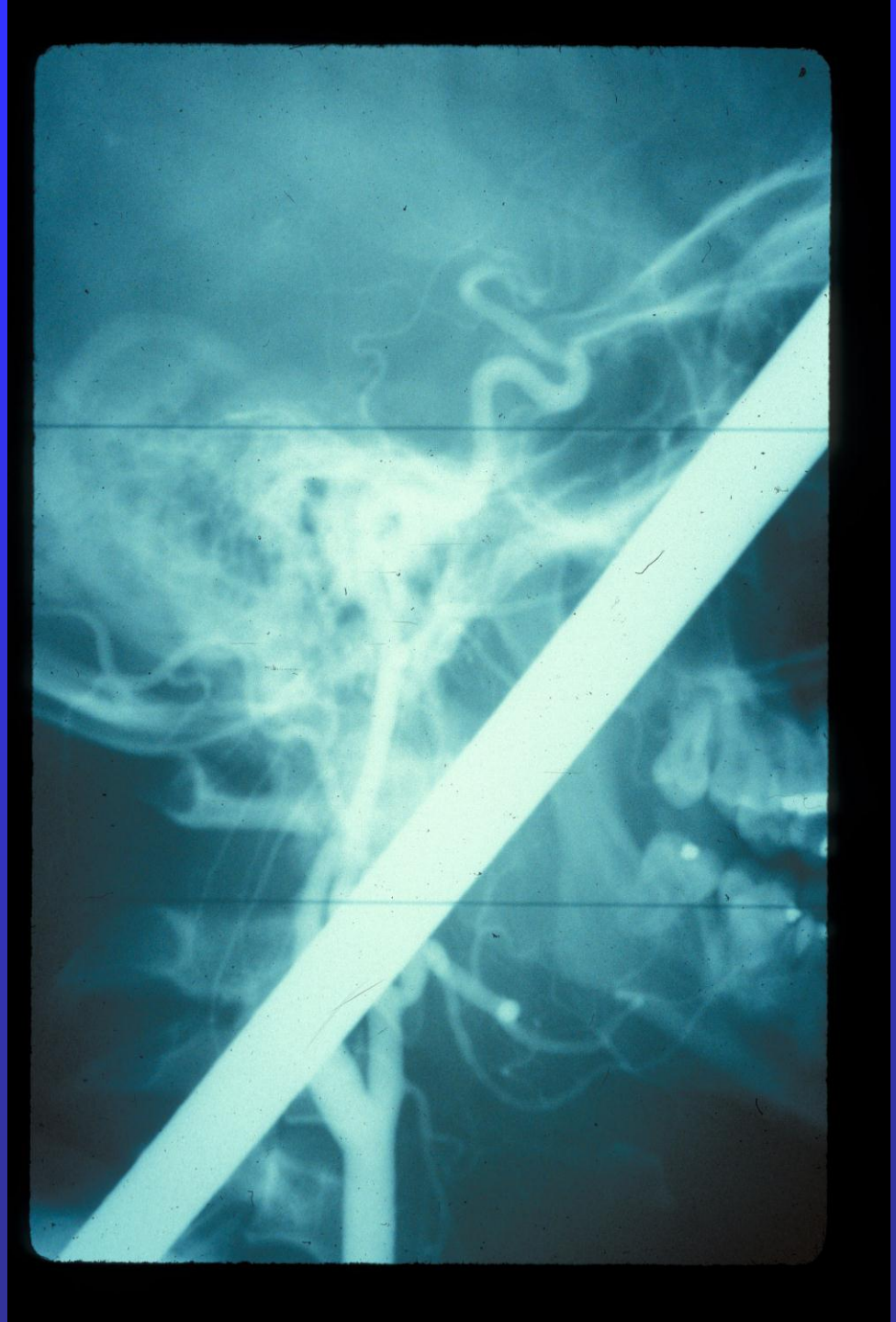


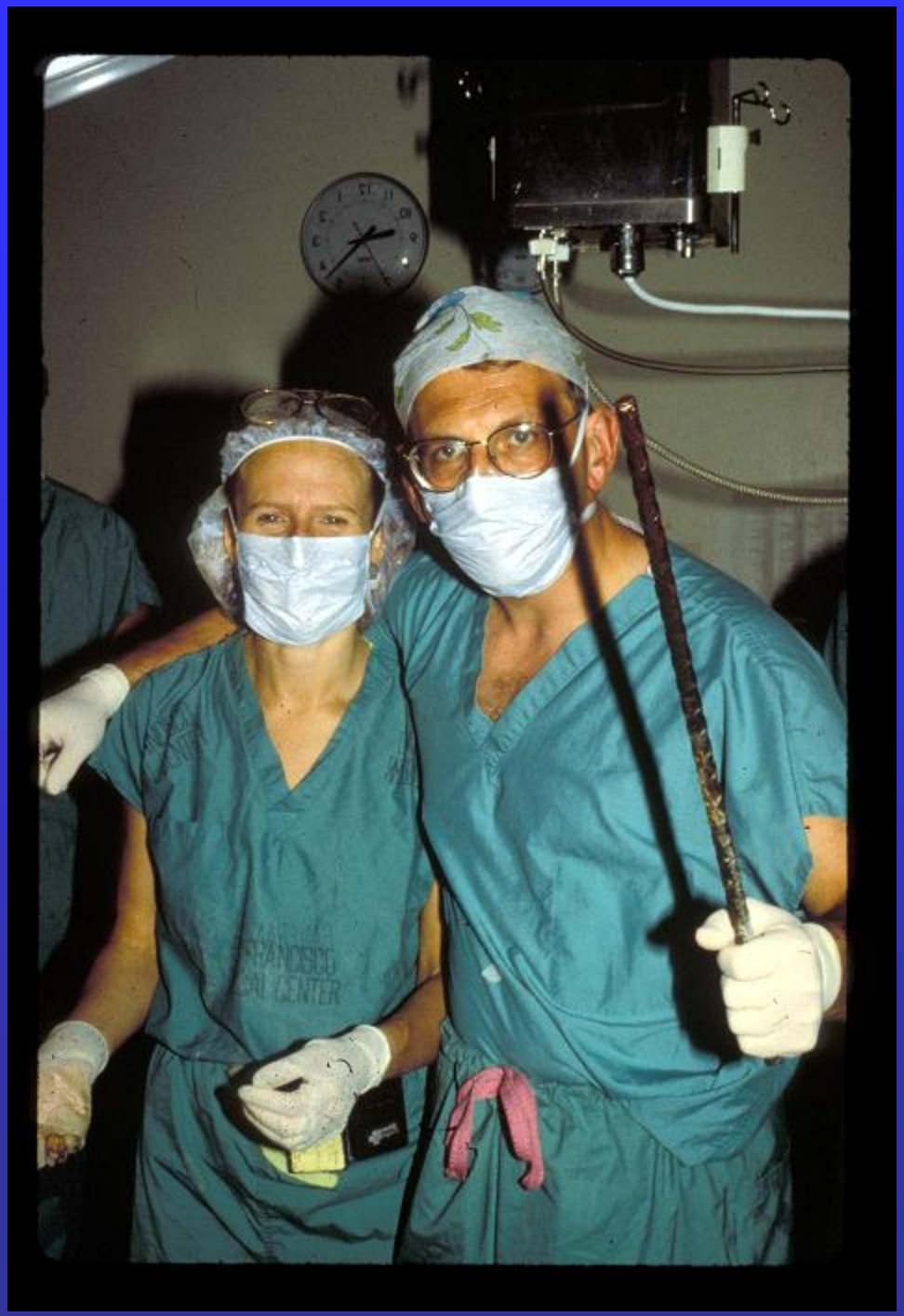
Airway Case Presentation

- Construction worker well from scaffold on to steel rebar which entered neck
- Admitted to ER awake and alert, hemodynamically stable
- Increasing SOB








FRANCISCO
MED CENTER

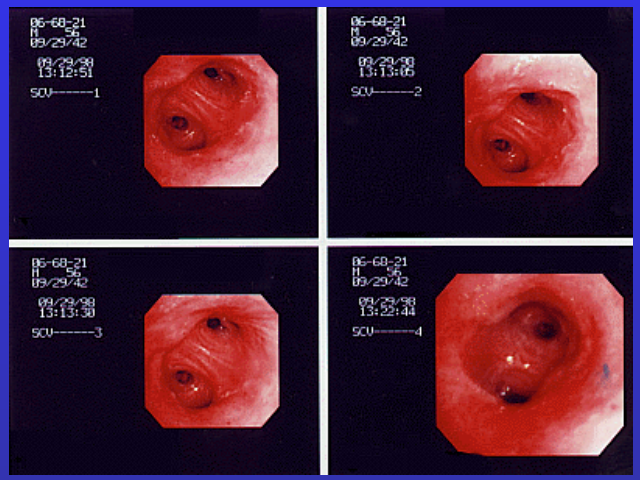
Airway Case Presentation

- Inebriated young man fell five stories from roof on to abdomen, chest and face
- Admitted to ER in shock intubated with
  - Head injury GCS 3
  - Maxillofacial injuries
  - Massive subcutaneous emphysema
  - Tense distended abdomen
  - Near amputation right foot

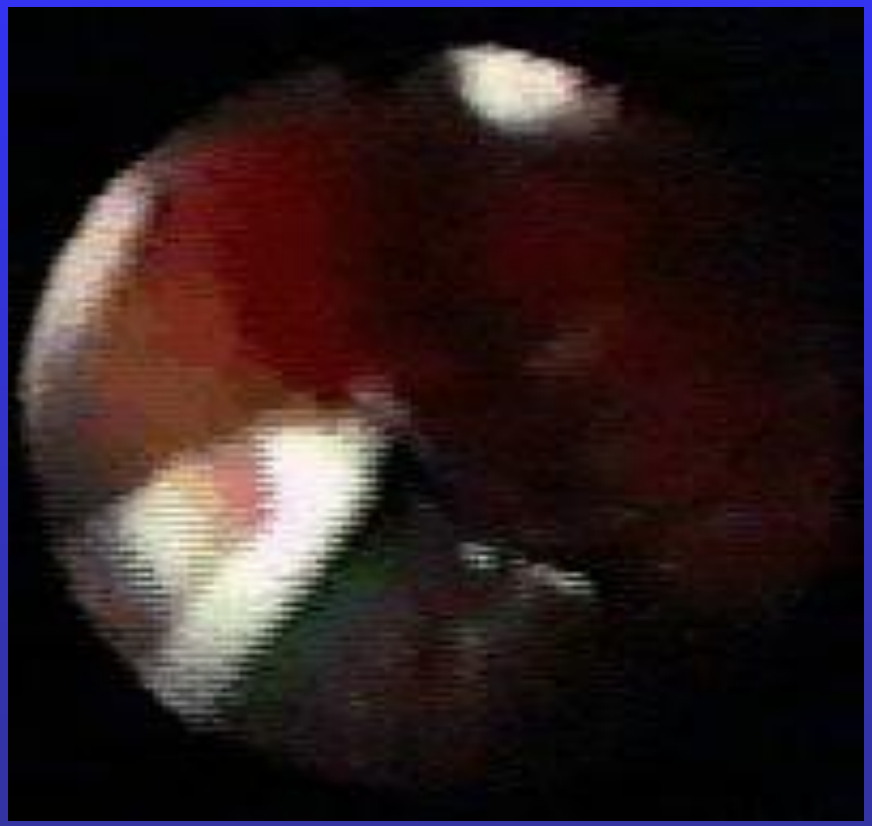
Operating Room

- Laparotomy
  - Tension pneumoperitoneum
  - Air coming from mediastinum underneath xyphoid with each positive pressure breath
  - Non-bleeding small splenic hematoma
- Abdomen closed rapidly with tube draining mediastinum

Flexible Fiberoptic Bronchoscopy



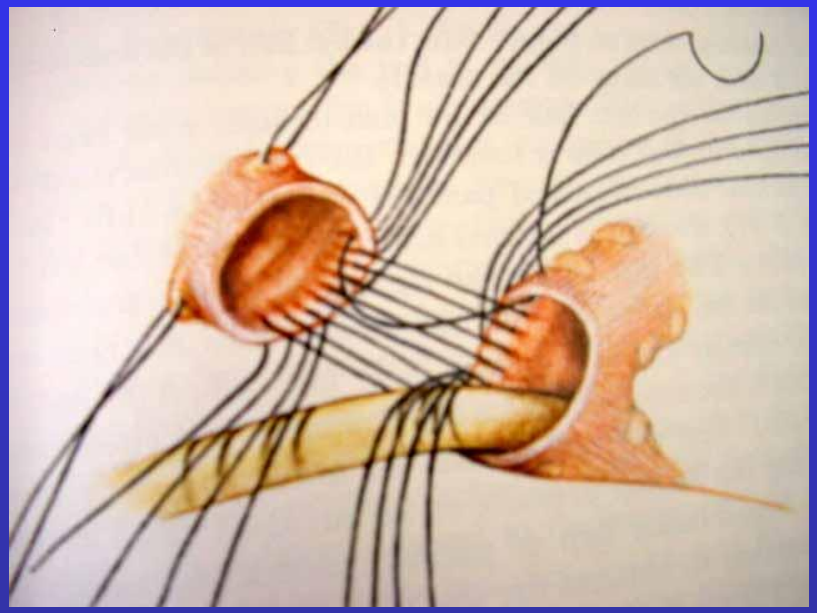
Normal



Our patient

Management of Airway

- Neck exploration: Larynx and cervical trachea in tact
- Right thoracotomy: mediastinal pleura intact, complete transection of trachea
- ETT in mediastinum ventilating distal trachea via soft tissues



Prophylactic Tracheostomy

- Gunshot wound to innominate vein
- At the end of the procedure (which required occlusion of the innominate vein proximally and distally)—massive swelling
- Decision– tracheostomy PRIOR to leaving the OR for safety!!

Summary

Clinical Signs of Airway Obstruction

- Inspiratory stridor
- Paradoxical motion of the chest wall
- Use of accessory muscles of respiration
- Tachypnea
- tachycardia
- Flaring of the ala nasae
- Sweating
- Cardiac arrhythmia
- Hypoxia (a very late sign)

Emergency Steps to Control Airway

- Chin Lift/Jaw Thrust/Suction—C/spine stabilization
- Oral/Nasal Airway
- Intubation
- Laryngeal Mask
- Cricothyroidotomy
- Tracheostomy (for the highly skilled and experience operator)