Foundations of Emergency Airway Management: Drop that Difficult Tube!

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The Airway Problem(s):

- Declining success rates
- Declining indications
- Declining opportunity

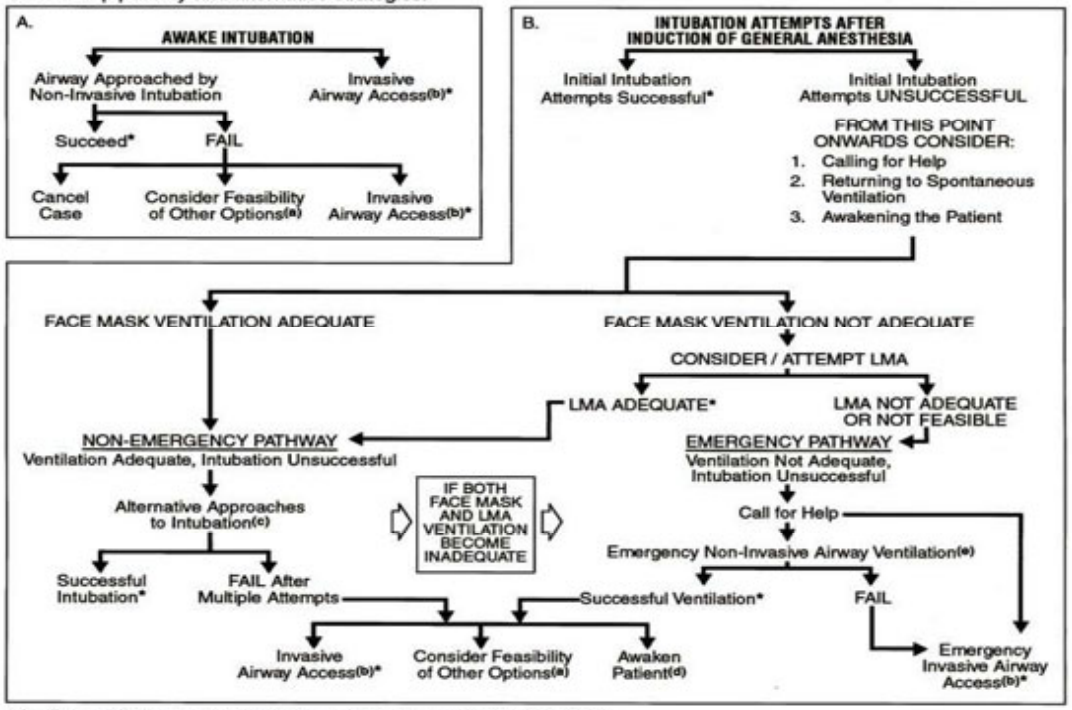
AMERICAN SOCIETY OF ANESTHESIOLOGISTS

DIFFICULT AIRWAY ALGORITHM

1. Assess the likelihood and clinical impact of basic management problems:
   - A. Difficult Ventilation
   - B. Difficult Intubation
   - C. Difficulty with Patient Cooperation or Consent
   - D. Difficult Tracheostomy
2. Actively pursue opportunities to deliver supplemental oxygen throughout the process of difficult airway management
3. Consider the relative merits and feasibility of basic management choices:

A.	Awake Intubation	vs.	Intubation Attempts After Induction of General Anesthesia
B.	Non-Invasive Technique for Initial Approach to Intubation	vs.	Invasive Technique for Initial Approach to Intubation
C.	Preservation of Spontaneous Ventilation	vs.	Ablation of Spontaneous Ventilation

4. Develop primary and alternative strategies:



*** Confirm ventilation, tracheal intubation, or LMA placement with exhaled CO_2**

a. Other options include (but are not limited to): surgery utilizing face mask or LMA anesthesia, local anesthesia infiltration or regional nerve blockade. Pursuit of these options usually implies that mask ventilation will not be problematic. Therefore, these options may be of limited value if this step in the algorithm has been reached via the Emergency Pathway.

b. Invasive airway access includes surgical or percutaneous tracheostomy or cricothyrotomy.

c. Alternative non-invasive approaches to difficult intubation include (but are not limited to): use of different laryngoscope blades, LMA as an intubation conduit (with or without fiberoptic guidance), fiberoptic intubation, intubating stylet or tube changer, light wand, retrograde intubation, and blind oral or nasal intubation.

d. Consider re-preparation of the patient for awake intubation or canceling surgery.

e. Options for emergency non-invasive airway ventilation include (but are not limited to): rigid bronchoscope, esophageal-tracheal combitube ventilation, or transtracheal jet ventilation.

Indications for Prehospital Endotracheal Intubation

- GCS less than eight ?

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- Cardiac arrest ?

Indications for Prehospital Endotracheal Intubation

- GCS less than eight ?
- Cardiac arrest ?
- Inability to effectively ventilate or oxygenate with less invasive means

Objectives

- Anticipate the difficult airway
- Mitigate the difficult airway
- Recognize the difficult airway

- ***…and simplify the difficult airway***

Intubation Controversies

Preparation

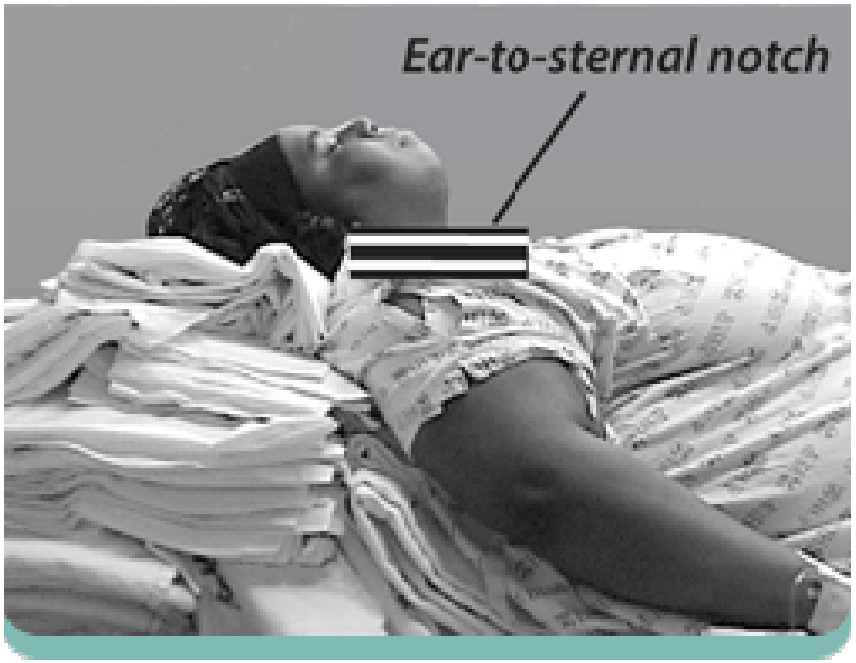
Preparation

- Supplies
- Equipment
- Additional personnel
- Rescue plan
- Adjuncts

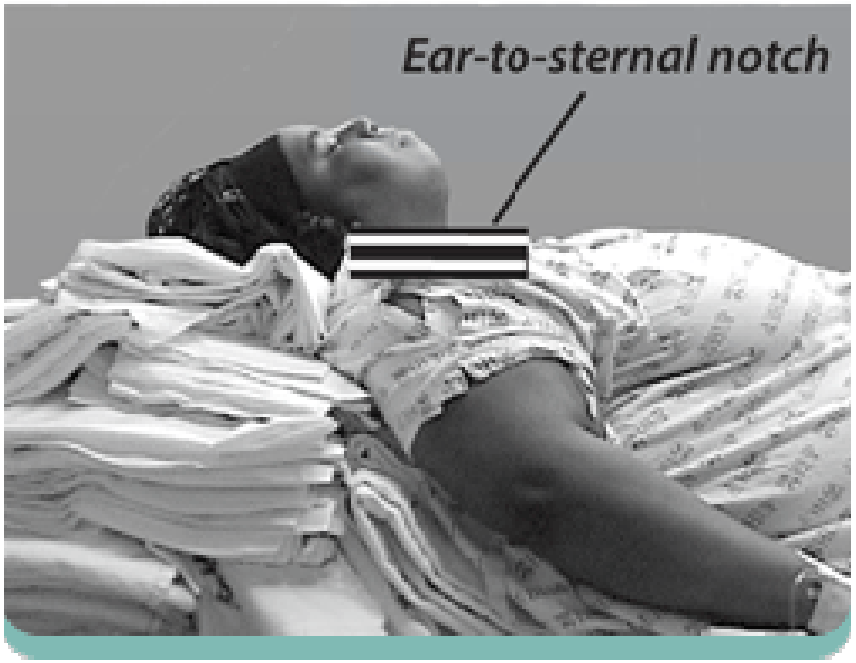
Preparation

- 2 tubes
- 2 blades
- Gum elastic bougie / introducer
- Scalpel / needle cric kit
- CO2 detector

Positioning for ETI

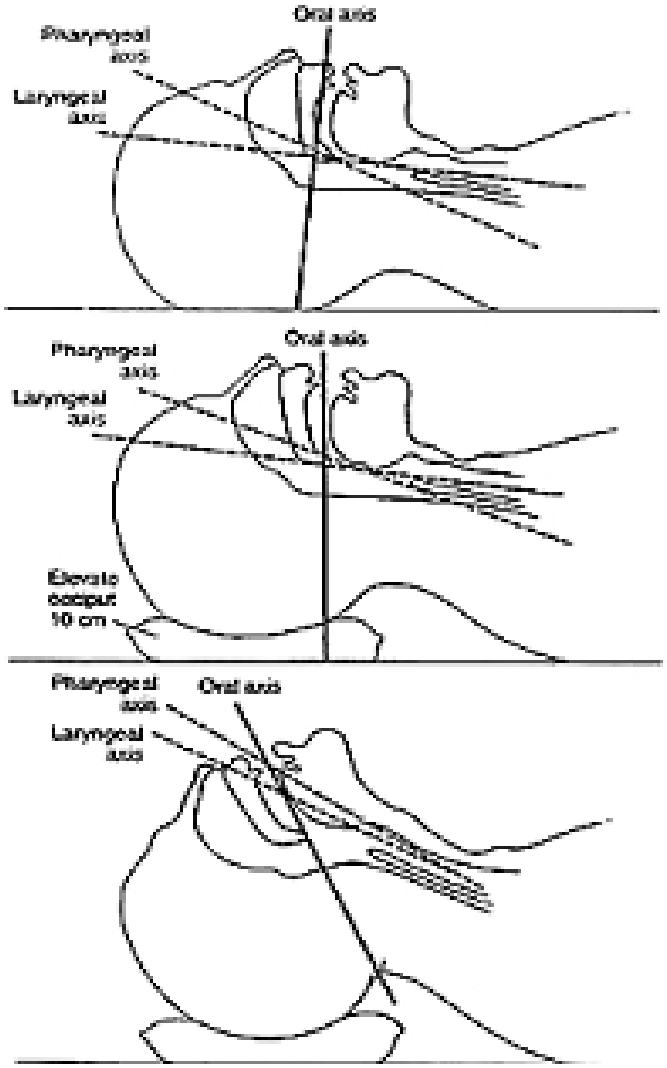


Positioning for ETI



Align the Axes

- Draw operator's eye to glottic opening
- Head elevation
- Mild neck extension



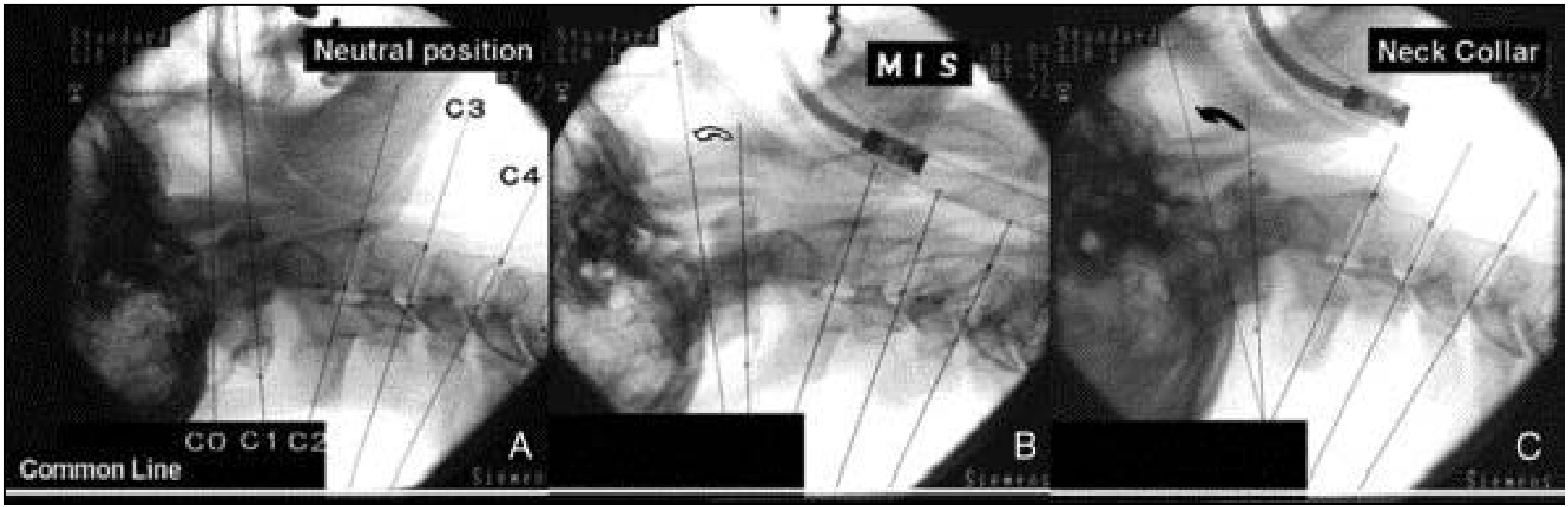


Figure 1. Lateral spine radiograph of neutral position (A), maximal movement at AWS intubation under manual inline stabilization (B), and neck collar immobilization (C). All pictures are of the same patient. C0/1 angle when wearing a neck collar (<-) is more extended compared with MIS ([left double arrow]).

Airway Scope Laryngoscopy Under Manual Inline Stabilization and Cervical Collar Immobilization: A Crossover In Vivo Cinefluoroscopic Study.

Journal of Trauma-Injury Infection & Critical Care. 71(1):32-36, July 2011.
DOI: 10.1097/TA.0b013e3181e75873

Preoxygenation /BVM

- NRB
- High flow O2
- Washout
- BVM

1) Ideal BVM positioning is obtained by aligning the patient's external auditory meatus with the sternal notch.

2) Traditionally, the 'EC' hand position is utilized to obtain a seal with the mask.

Assessment: PREDICT the difficult airway

What is a difficult airway?

- LEMON
- Mallampati
- Cormack-Lehane
- Or…

What is a difficult airway?

Every airway has potential for difficulty!

Predictors

- Look Externally
- Evaluate the 3-3-2 rule
- Mallampati
- Obstruction
- Neck Mobility

Predictors: Suboptimal preparation

"….Reporting of any associated event was more frequent in sedation without paralysis (16 per 100) than for RSI (11 per 100). In a sample restricted to those encounters whose first method was either RSI or sedation without paralysis, likelihood of any associated event was 1.7 times higher when no paralytic was used (13 vs. 8 per 100, odds ratio 1.7, 95% CI 1.3–2.2; *p* 0.0001)…"

EMERGENCY AIRWAY MANAGEMENT: A MULTI-CENTER REPORT OF 8937 EMERGENCY DEPARTMENT INTUBATIONS

Ron M. Walls,*† Calvin A. Brown III,* Aaron E. Bair,‡ and Daniel J. Pallin*†§ on behalf of the NEAR II Investigators[1]

Look externally

- Facial trauma
- Large incisors
- Beard or moustache
- Large tongue

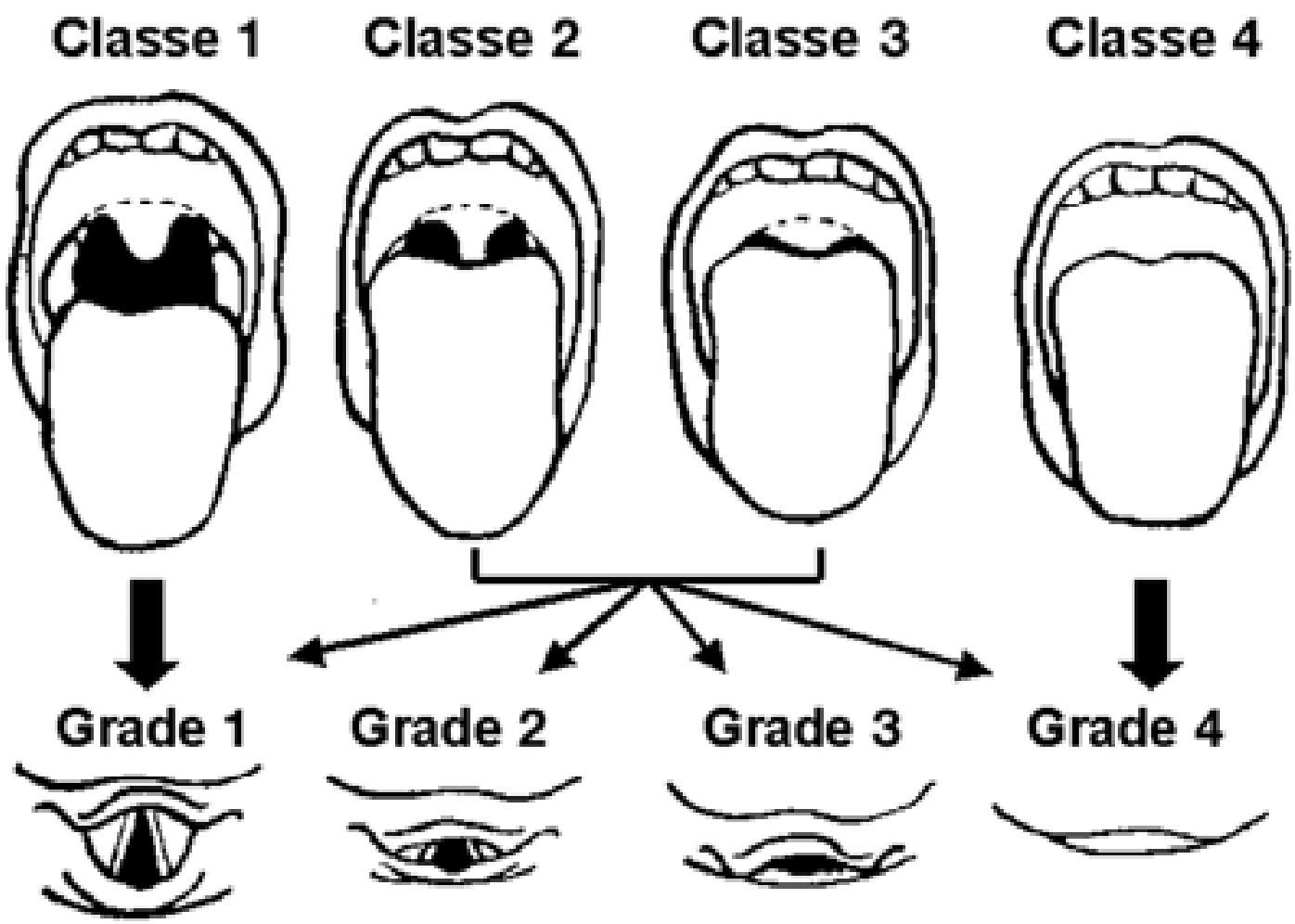
Evaluate the 3-3-2 rule

- Inter incisor distance
- Hyoid-mental distance
- Thyroid to mouth

Mallampati

- Grades I-IV
- Scoring system utilized in the OR
- Not practical in ED

Mallampati classification
Class 1
Class 2
Class 3
Class 4

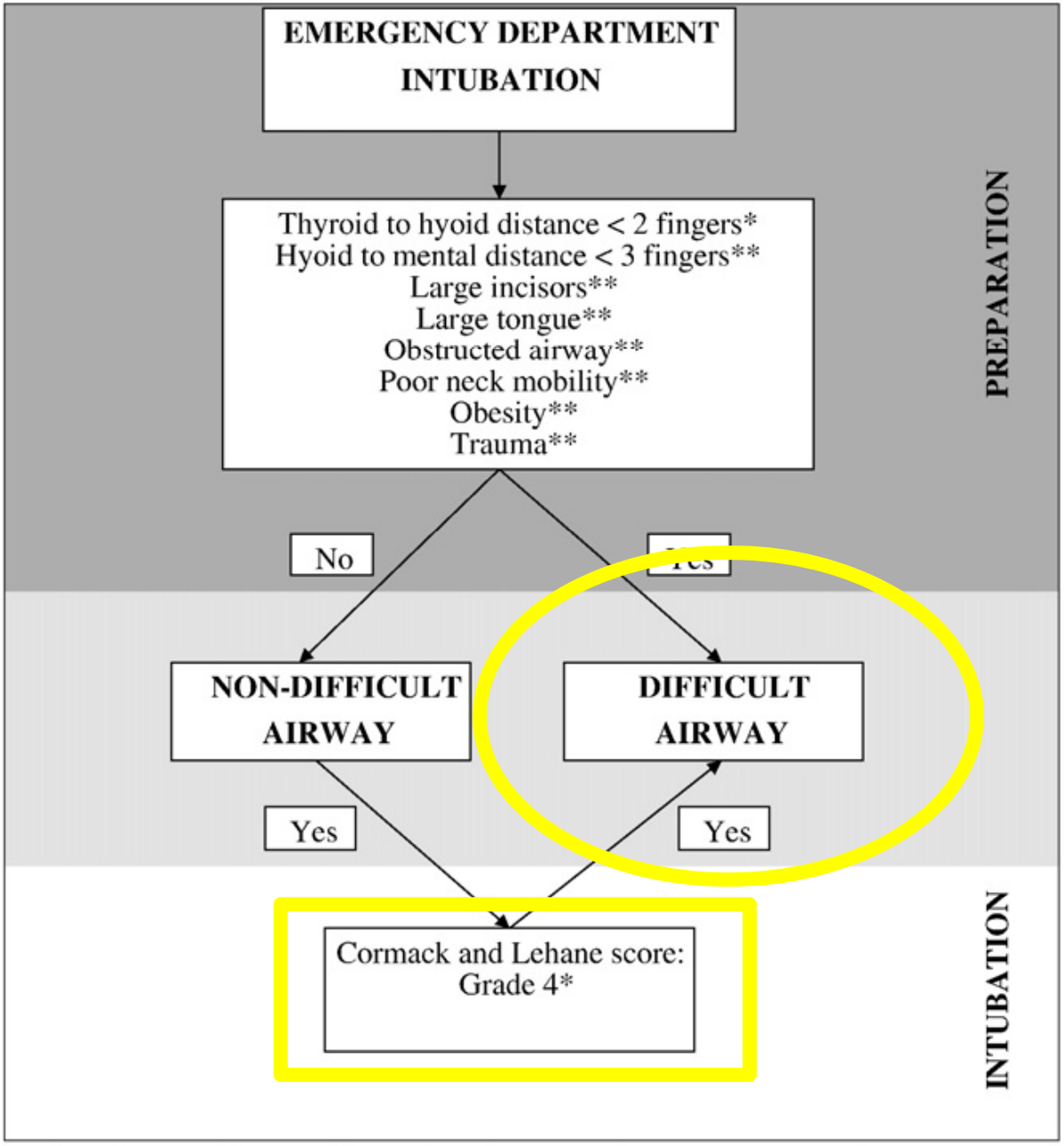

Classe 1
Classe 2
Classe 3
Classe 4
Grade 1
Grade 2
Grade 3
Grade 4

Neck Mobility

- C Spine restriction
- Fusion
- Previous surgeries

The Unknowns

- Airway distortion
- Airway anatomy
- Mass
- Lingual tonsil
- Radiation / scarring



*Independent variables in predicting difficult airway in logistic regression analysis.
** Significant analysis in univariate analysis.

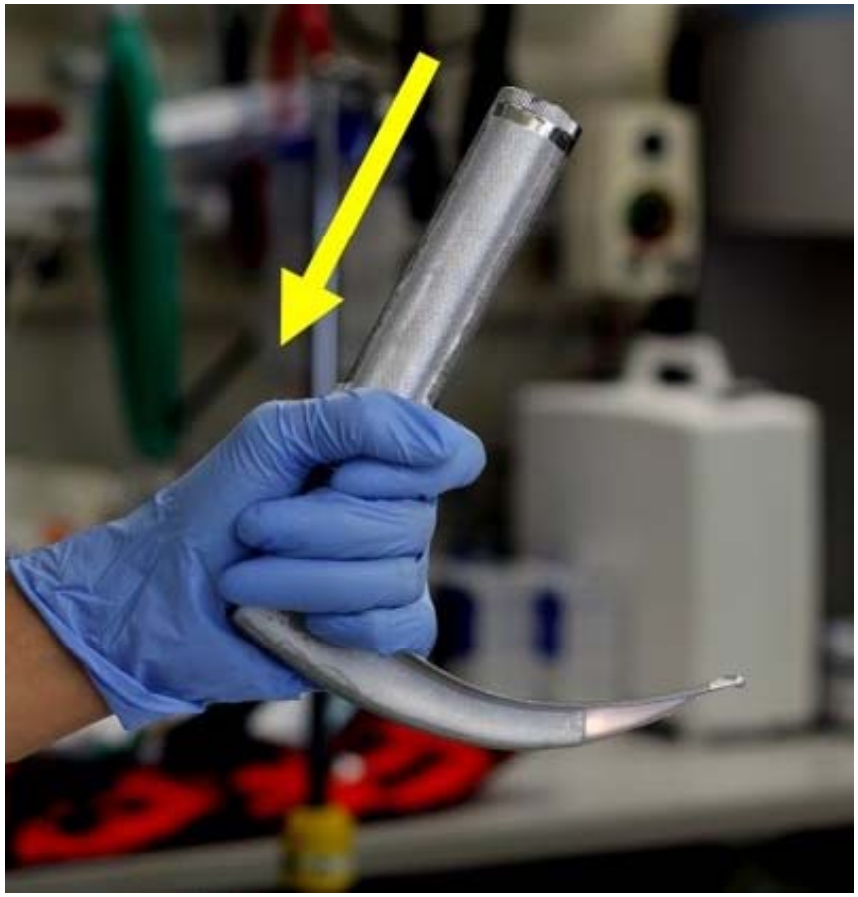
Pass the Tube (Laryngoscopy)

Laryngoscopy

- Begins with mouth opening
- Scissor technique
- Increase inter-incisor distance
- Displace mandible inferiorly

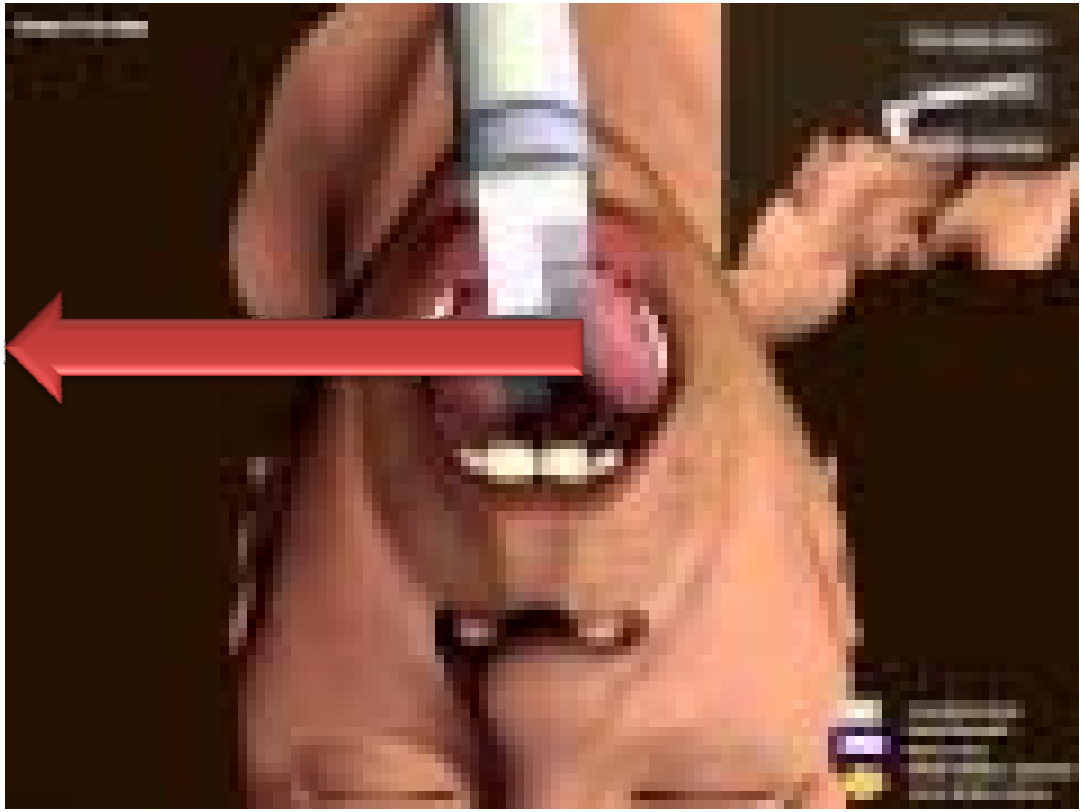
Laryngoscopy

- Grip on handle



Laryngoscopy

- Tongue control



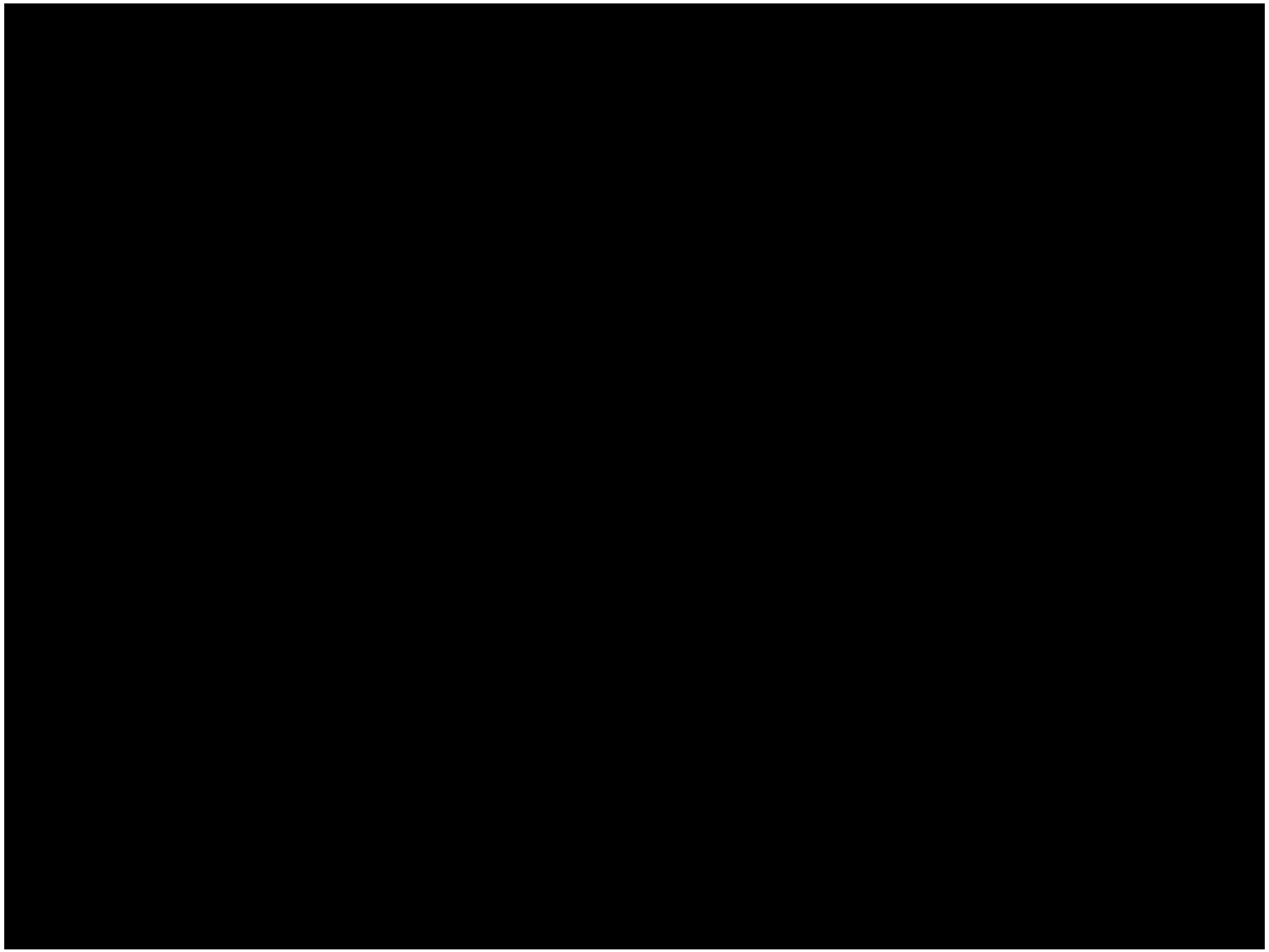
- Tongue should NOT straddle blade!
- Displace tongue to left

Laryngoscopy

- Progressive visualization of structures
- Tongue
- Base
- Epiglottis

Progressive Visualization

External Laryngeal Manipulation



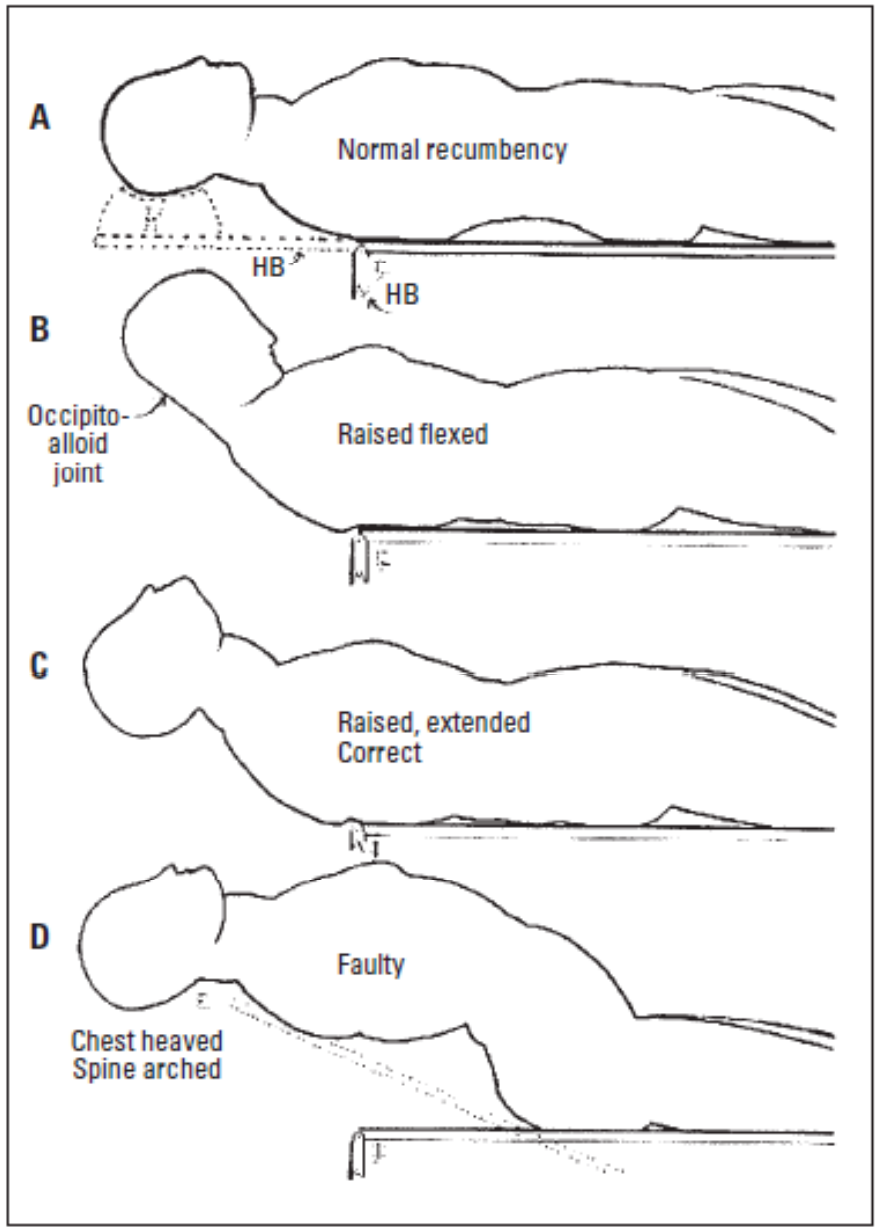
Video Laryngoscopy

“I can’t see cords!”

- Strategies for optimizing the laryngeal view
- HELP!
- Bougie / Endotracheal Tube Introducer
- Different blade
- Video assisted devices

HELP

- May expose laryngeal inlet
- Requires assistance of second rescuer

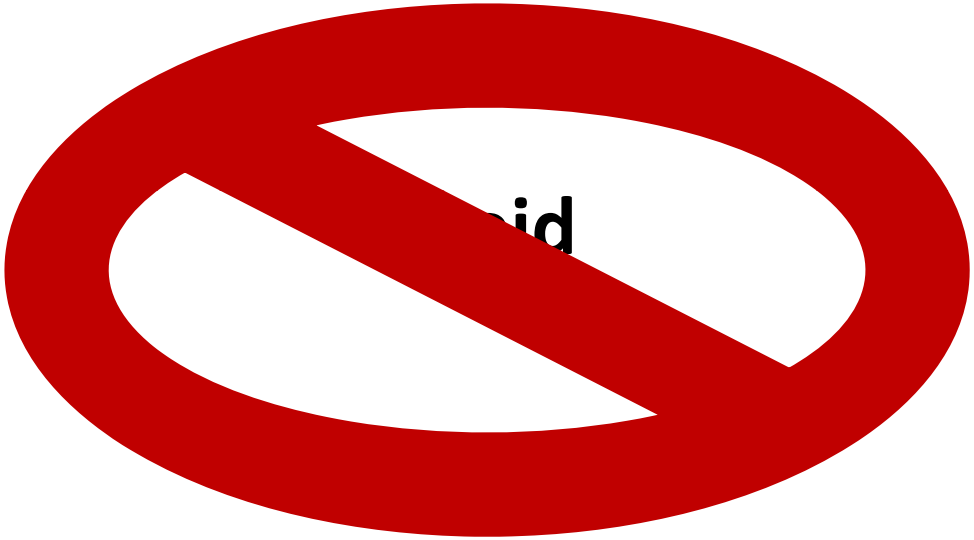


Levitan (2003) Ann Emerg Med.

Engage the Epiglottis

- Seat tip of blade in vallecula
- Use Macintosh as Miller
- Head should elevate from bed/stretcher

Gimme some pressure?

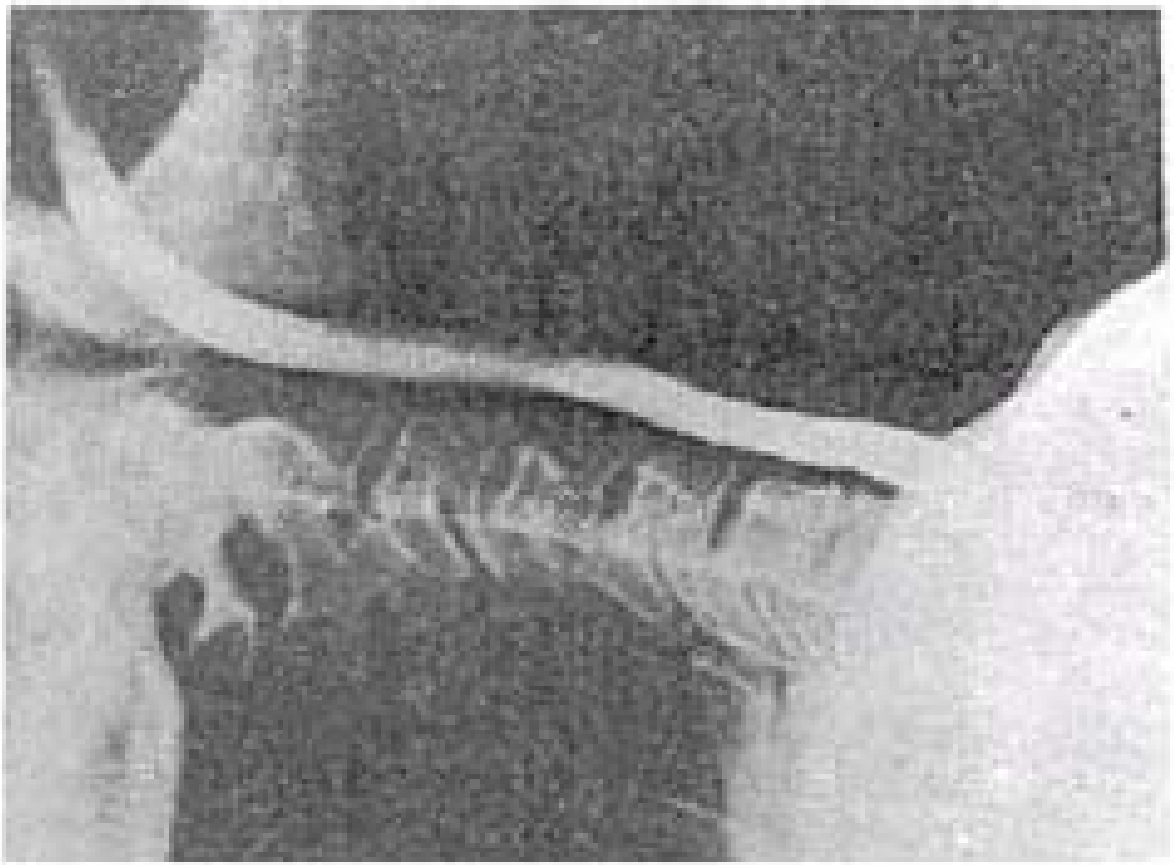


The Beginnings

- Pushing cricoid against esophagus
- Studies in cadavers
- Prevented passive regurgitation

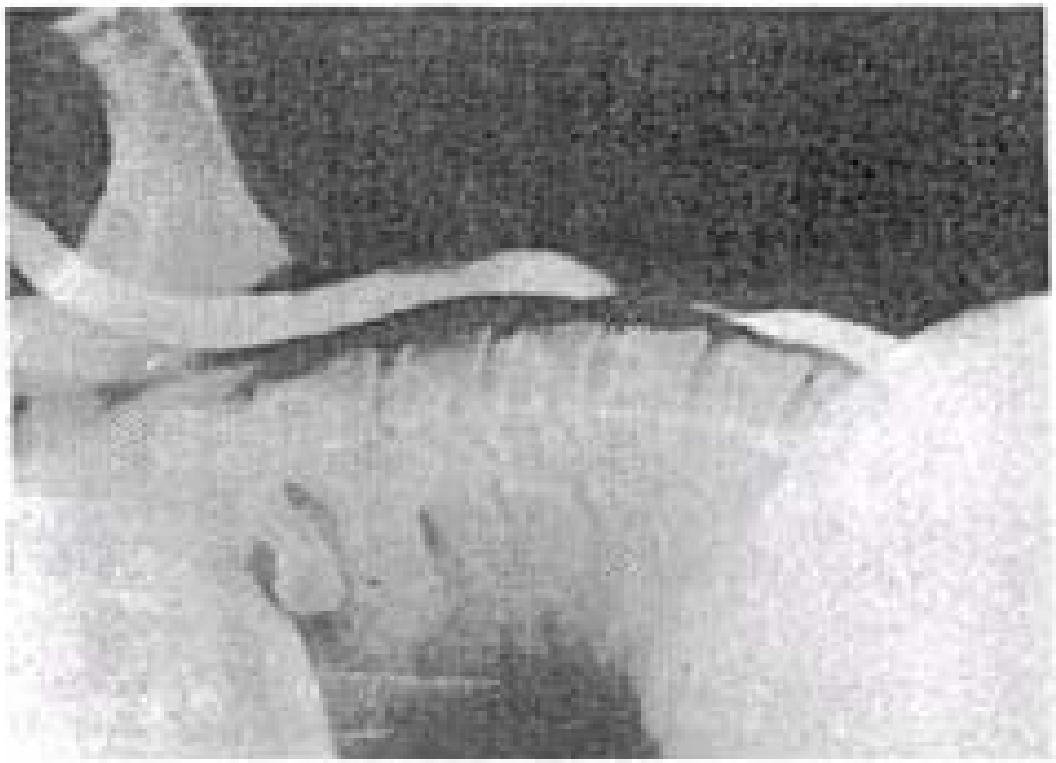
Be careful in its application!

Cricoid Pressure



From The Lancet 1961:2(404-406)

Cricoid Pressure



Cricoid Conundrum

- Laryngeal fracture
- Airway obstruction
- Vocal cord paralysis
- Rupture of esophagus during retching
- Incorrect amount of pressure

Guidelines 2010

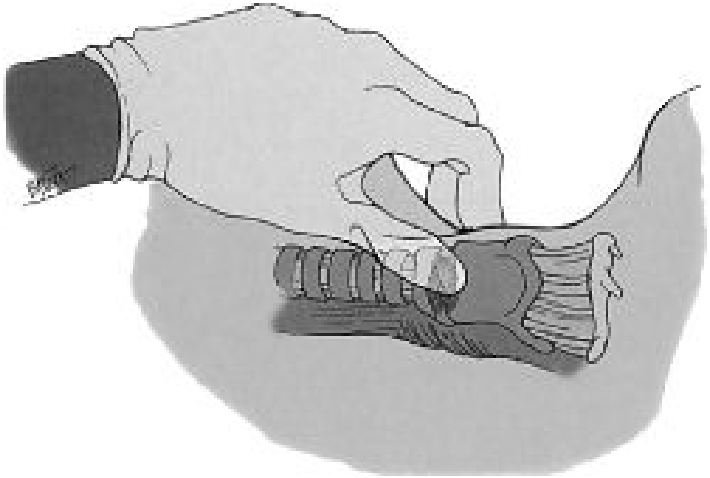
"Cricoid pressure in nonarrest patients may offer some measure of protection to the airway from aspiration and gastric insufflation during bag-mask ventilation.However, it also may impede ventilation and interfere with placement of a supraglottic airway or intubation. The role of cricoid pressure during out-of-hospital cardiac arrest and in-hospital cardiac arrest has not been studied. If cricoid pressure is used in special circumstances during cardiac arrest, the pressure should be adjusted, relaxed, or released if it impedes ventilation or advanced airway placement. ***The routine use of cricoid pressure in cardiac arrest is not recommended***."

ACQUISITION

THE DISCOVERY THAT YOU'RE NO LONGER A BIG FISH IN A SMALL POND, OR EVEN A SMALL FISH IN A BIG POND, BUT A SMALL FISH IN A BIG FISH.

Cricoid Summary

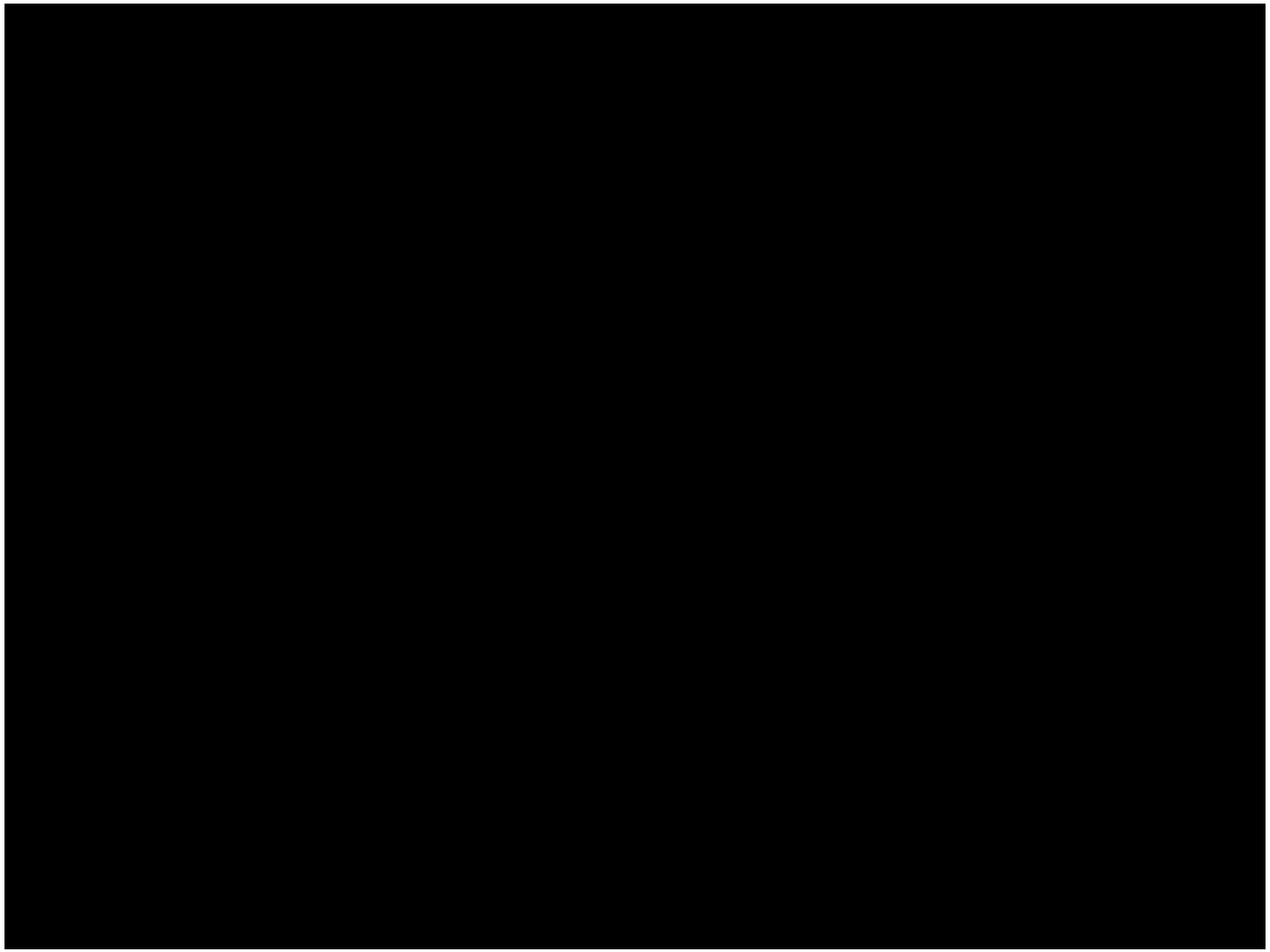
- May prevent passive insufflation
- Use caution to apply correctly
- Do not use excessive force
- Little evidence to support continued use



Tube Delivery

- Arcuate
- Straight to cuff
- Hockey stick

Arcuate vs Straight to Cuff



Tube Delivery

- Tube does not obscure line of sight
- Rests against posterior oropharynx
- Angled towards glottic opening

Rescue Devices: What's Plan B?

B for BVM

- Two NPA
- One OPA
- One good seal

B for Bougie

- Facilitates blind intubation
- Angled tip directed towards trachea
- Feel for tracheal rings
- Leave blade in mouth

B for Bougie

B for Bougie

- The bougie should stop at the R main stem
- Consider esophageal placement if the bougie slides too far inferiorly
- Tracheal rings felt in 30%
- Placement is blind

Alternative Devices

- LMA
- ILMA
- Combitube
- King LTS-D

Characteristics

- Easy to deploy
- Blind insertion
- Easy to learn
- Safe

C for Cricothyroidotomy

- “Can’t intubate, can’t ventilate”
- Decreasing in frequency
- Surgical approach fastest

Cricothyroidotomy

Critical Points for the Cric

- Identification
- Immobilization
- Suction
- Cutting to air
- Keep it simple

Confirmation

- Lung sounds
- Fogging in tube lumen
- Chest rise
- Direct visualization

- END TIDAL CARBON DIOXIDE

Confirmation- C02

- Almost 100% sensitive
- Challenges with no gas exchange
- Prolonged arrest
- Colorimetric
- Continuous

Confirmation- C02

"Continuous waveform capnography is recommended in addition to clinical assessment as the most reliable method of confirming and monitoring correct placement of an endotracheal tube ."

AHA Guidelines 2010

Confirmation- CO2 Limitations

- False negatives with PE
- False negatives in severe obstruction
- Contamination with gastric contents
- Decreased blood flow to lungs
- If no C02, use a second method

Summary

- Prepare
- Position
- Precoordinate
- Pass the tube
- Prove you're in
- Post intervention management

GOALS

It's Best to Avoid Standing Directly Between a Competitive Jerk and his Goals.

Key Points

- Ear to sternal notch
- Difficult airway assessment
- Technical pointers
- External laryngeal manipulation
- Tube delivery

Thanks!

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