

INTUBATION AND AIRWAY MANAGEMENT IN THE ICU

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LEARNING OBJECTIVES

- Indications & Contradictions
- Recognizing a Difficult Airway
- Special Considerations for Managing a Difficult Airway
- Related Equipment
 - Laryngoscopes
 - Intubation Box Contents
 - Sizing ET Tubes & LMA's
- Difficult Airway Box Initiative
- Key Steps in the Procedures
- Confirming Placement
- Measures to Consider if Confirmation is in Doubt
- References



COMMON INDICATIONS & CONTRADICTIONS

- **Indications:**
 - Hypoxemic and/or hypercapneic respiratory failure.
 - Prohibitive breathing pattern/prolonged tachypnea.
 - Inability to protect airway.
 - Severe and worsening respiratory muscle weakness.

- **Contraindications:**
 - Presence of a DNI order.
 - Laryngectomy
 - Epiglottitis (should be done by anesthesiologist)
 - Tachypnea due to anxiety or pain.



RELATED EQUIPMENT— WHAT YOU NEED IN THE ROOM

- PPE
- Manual Resuscitator/Mask (AMBU Bag)-Age Specific
- Oxygen flow meter(s)
- Suction source, tubing and Yankauer
- ETCO₂ Cable and Adaptor
- Difficult Airway Box – ***Recommended per American Society of Anesthesiologists Practice Guidelines***



ANATOMY OF INTUBATION BOX CONTENTS

- Upper Portion of Intubation Box
 - Age-specific disposable laryngoscope and handles
 - Multiple age-specific ET tubes
 - Stylette
 - 10 ml Syringe
 - ET Tube Tamer
 - Subglottic suction stickers
- Lower Portion of Intubation Box
 - Extra Age-specific ET Tubes
 - Color Sensing ETCO₂ detector
 - Bag with surgi-lube, saline, nipple adaptor
 - Extra Stylette and 10 ml syringe
 - Suction kits



RELATED EQUIPMENT-- SIZING ET TUBES & LMA'S

LMA Sizing

LMA Size	Patient Size
1	Neonate / Infants < 5 kg
1 ½	Infants 5-10 kg
2	Infants / Children 10-20 kg
2 ½	Children 20-30 kg
3	Children/Small adults 30-50 kg
4	Adults 50-70 kg
5	Large adult >70 kg

AGE	INTERNAL DIAMETER (mm)
Children	
Newborn	2.5
6 mo	3.5
1 yr	4.5
2 yr	5.0
4 yr	5.5
6 yr	6.0
8 yr	6.5
10 yr	7.0
12 yr	7.5
14 yr	8.0
Adults	
Female	7.0-8.0
Male	7.5-9.0
Special cases	



A WORD ABOUT VIDEO LARYNGOSCOPES

- Check remaining battery life for McGrath and periodically and before and change battery if needed.
- If distal end with video lens becomes soiled, you won't be able to see.
 - Use surgi-lube very sparingly
 - Distal end may need to be cleaned with excessive mucous or vomit.
- ET tube tip will not initially be visible until advanced.
- May require more of a curve to the ET tube.
- May result in more soft tissue injuries



Key Steps in the Procedure

- Confirm indication and obtain physician order (initially may be verbal)
- Gather & set-up equipment (see equip. slides)
- Assess Degree of Difficulty
 - Anatomical Issues
 - Baseline anatomy
 - Facial, Airway or neck trauma
 - Sedation Issues
- Position patient, preoxygenate and medicate, if needed.
- Check/remove dentures, excessive secretions.
- Insert laryngoscope, sweep tongue to the left, lift epiglottis to visualize glottis.
- Advance ET tube through oral pharynx under epiglottis and through glottis.
- Inflate ET tube cuff, connect manual resuscitator, ventilate.
- Confirm initial placement via ETCO₂, BBS, CXR.



KEY POINTS-WHEN ASSISTING INTUBATION

- Help ensure all supplies and equipment are in the room (see preceding slides)
- Help prepare equipment
 - Insert stylette, connect syringe and test cuff
 - Have available, one size smaller ET tube and alternate laryngoscopes/blades.
 - Set up ETCO₂ cable and adaptor for waveform confirmation
 - Suction/Yankaur
- Help position the patient (pulled up in bed, sniffing position)
- Manually ventilate/oxygenate & Monitor SPO₂
- Help ensure all supplies and equipment are situated near intubater and functional
 - ET tubes, syringe, laryngoscope, suction, AMBU bag
- Apply cricoid pressure or prepare smaller ET tube if requested
- Once patient is intubated
 - Inflate cuff
 - Help confirm placement (BBS, ETCO₂)
- Once placement is confirmed
 - Secure ET tube
 - Manually ventilate patient
 - Set up ventilator



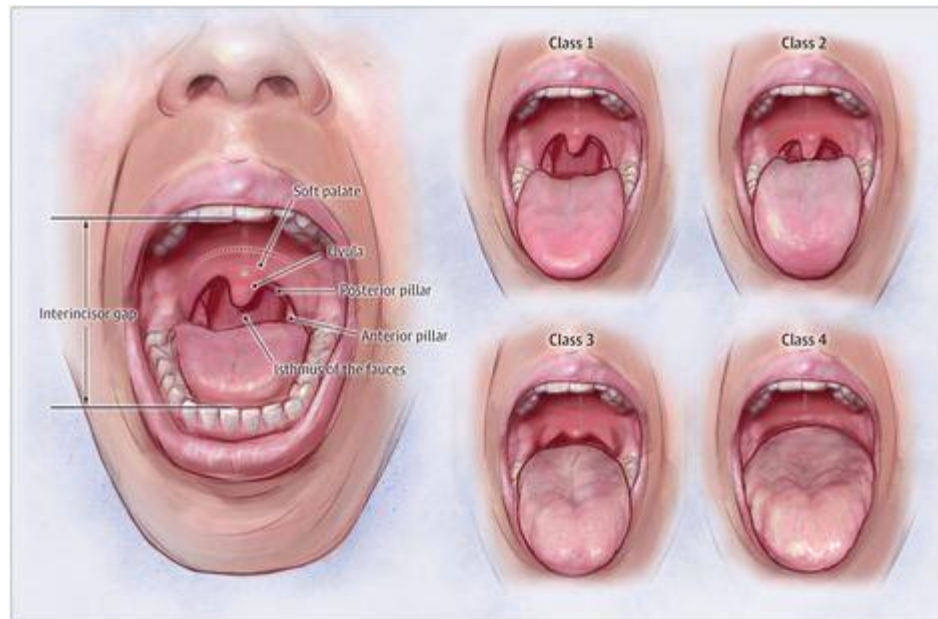
RECOGNIZING A DIFFICULT AIRWAY

- High Mallampati Score
- Reported history of difficult intubation
- History of multiple Intubations and/or Tracheostomies
- CXR Examination
 - Torturous trachea
 - Narrow upper A/W or trachea
- Ability to Adequately Sedate
 - ETOH or other substance abuse
- Upper Airway Trauma or Surgery

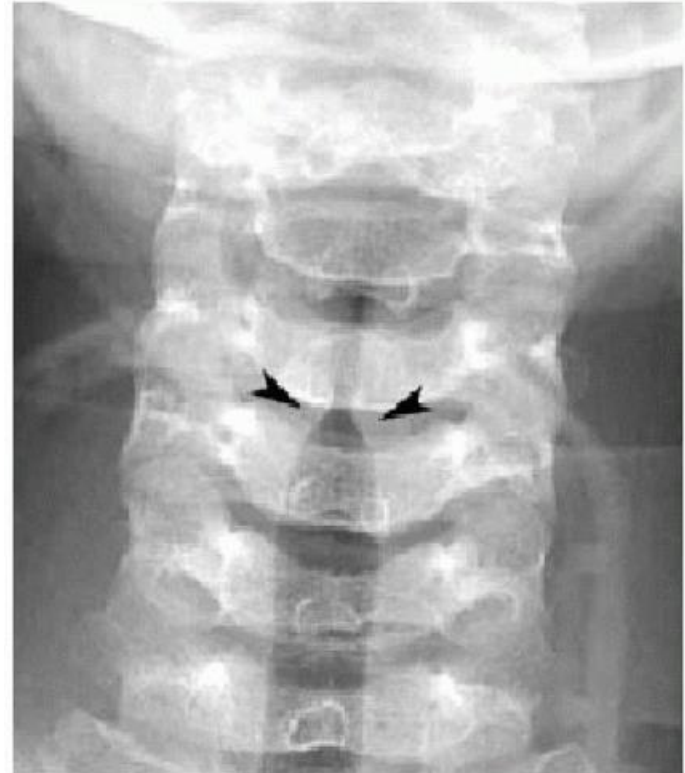


MALLAMPATI SCORE

- Ranges from 1 – 4 with four being the most difficult airway.



X-RAYS SUGGESTIVE OF A DIFFICULT INTUBATION



ONE OF THE SCALES FOR ASSESSING AIRWAY DIFFICULTY: EL GANZOURI RISK INDEX

Lower is associated with easier airway with > 2 being more difficult.

Variable	Finding	Points
Mouth opening	≥ 4 cm	0
	< 4 cm	1
Thyromental distance	> 6.5 cm	0
	6.0–6.5 cm	1
	< 6.0 cm	2
Mallampati score	I	0
	II	1
	III	2
Neck movement	> 90°	0
	80–90°	1
	< 80°	2
Ability to prognath	Yes	0
	No	1
Body weight	< 90 kg	0
	90–110 kg	1
	> 110 kg	2
History of difficult intubation	None	0
	Questionable	1
	Definite	2



SPECIAL CONSIDERATIONS FOR A DIFFICULT AIRWAY

- Consider calling anesthesia
- Consider RSI (Sedate, and paralyze)
- Use a video laryngoscope
- In Extreme cases (Can't intubate-Can't ventilate) ,
 - Bronch Assisted Intubation
 - Alternative Devices (e.g., LMA, I-Gel)
- Specialized equipment/supplies
 - Bougie
 - Smaller sized ET tubes
- Use cricoid pressure & optimize patient position
 - In-bed, Head at top of bed, sniffing position
- If possible, leave oxygenation cannula in place
- Use Difficult airway box, to be kept in adult units
- Fiberoptic equipment



CAN'T INTUBATE—CAN'T VENTILATE— A MEDICAL EMERGENCY

- If Repositioning Head/Cricoid is Not Effective
- Get Difficult Airway Box
- Use an Adjunctive Airway
 - LMA
 - I-Gel
- Bronch Assisted—If Available
- Emergency cricothyrotomy



DIFFICULT AIRWAY BOX-NEEDED IN ADDITION TO INTUBATION BOX

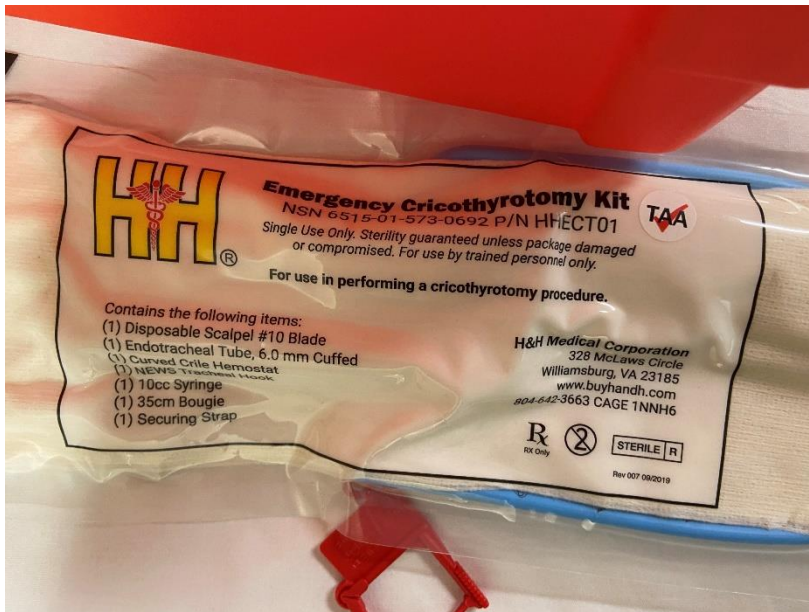


EQUIPMENT INCLUDED IS INSIDE THE LID

Emergency Department Difficult Airway Box	
1	Emergency Cricothyrotomy Kit
1 Each	i-gel Airway; Size 3, 4, 5
1	McGrath MAC Video laryngoscope
2 each	McGrath MAC disposable blade; Size 3, 4
1	Bougie
2	DuCanto rigid suction catheter
1 each	Sterile gloves; Size 6.5, 7, 7.5, 8



EMERGENCY CRIC KIT



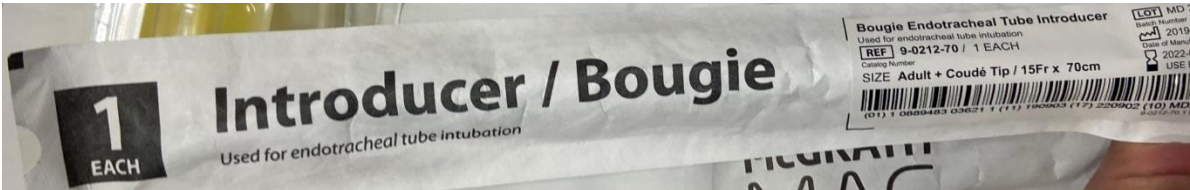
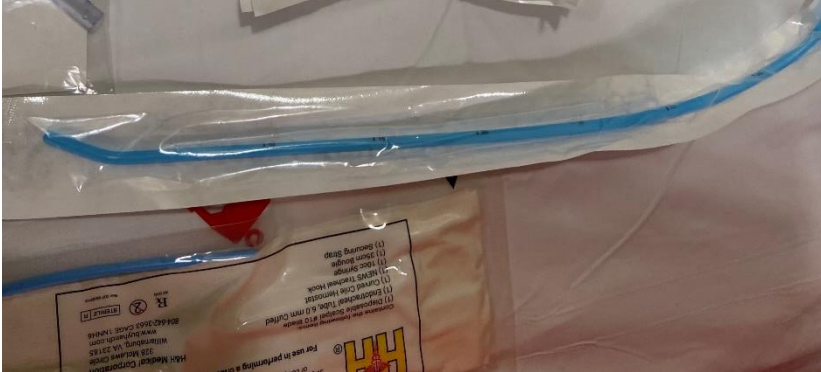
I-GEL (ALTERNATIVE TO LMA FOR IMPROVED SEAL) SIZE 3,4,5



MCGRATH VIDEO LARYNGOSCOPE AND BLADES 3,4



BOUGIE

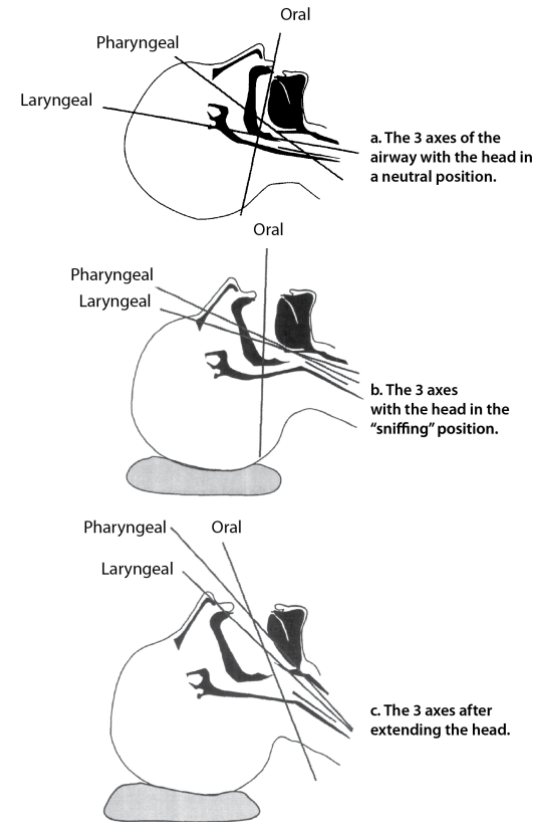
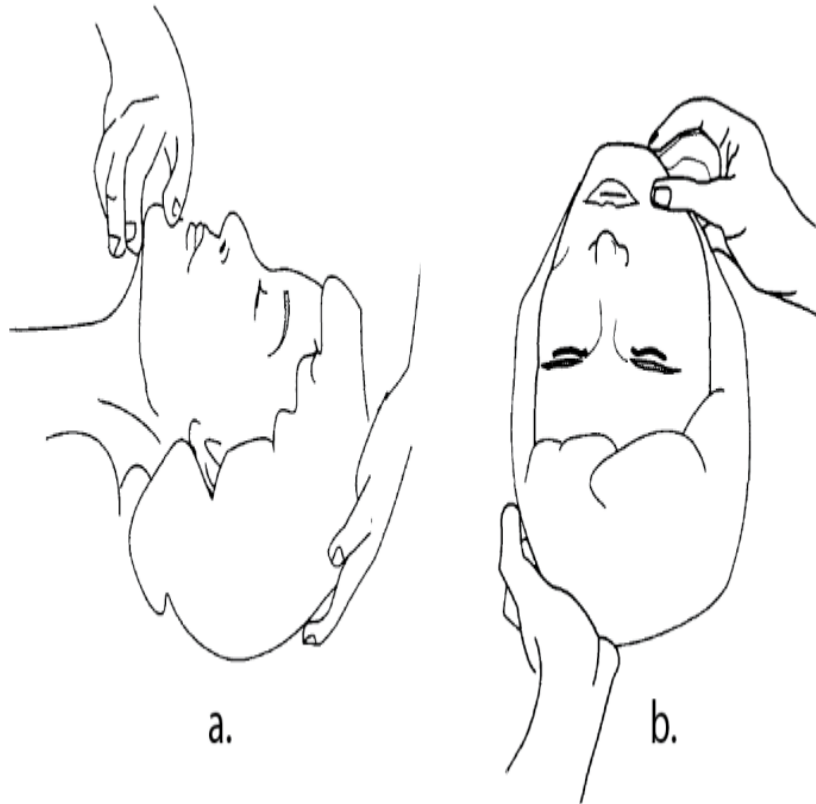


DUCANTO SUCTION CATHETER

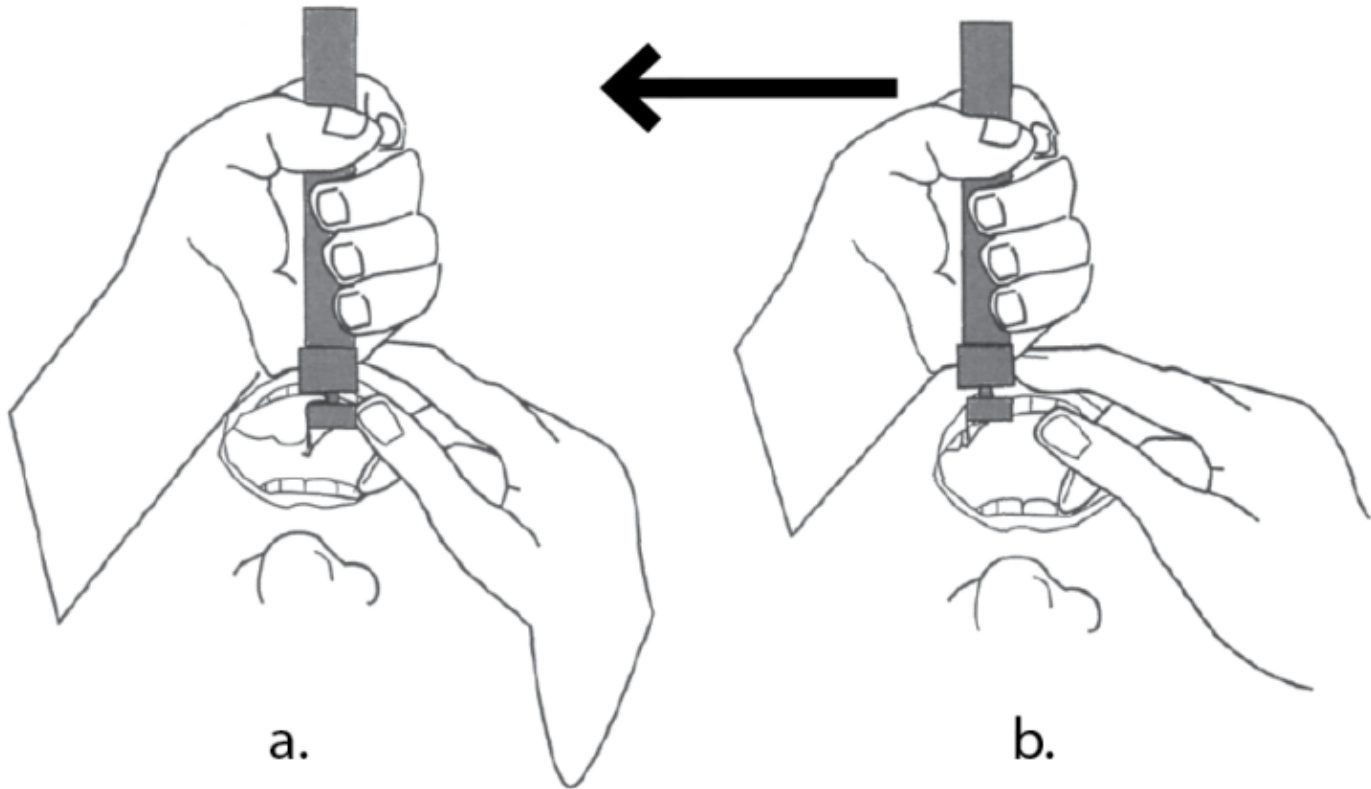
- DuCanto Catheter has a **larger inside diameter** than a standard Yankauer suction tip to facilitate the removal of fluids as well as solid material. The larger suction lumen makes it significantly less likely to clog in an emergency situation.



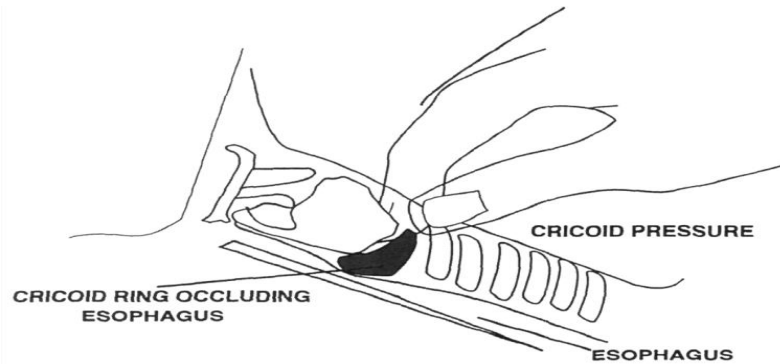
Proper Patient Positioning-Sniffing Position



INSERTING THE LARYNGOSCOPE- INSERT CAREFULLY AVOIDING THE TEETH (A) AND SWEEP THE TONGUE TO THE LEFT (B)



A LITTLE CRICOID PRESSURE—CAN GO A LONG WAY



a.

Before cricoid pressure



b.

With cricoid pressure



CONFIRMING PLACEMENT

- Preliminary verification
 - Auscultation of lungs (+) and abdomen (-)
 - Fogging in the ETT is generally **Not** a good means of verification.
- Confirmation
 - **Gold Standard:** ETCO₂ with waveform capnography, if available.
 - Color-Change indicator, if waveform is not available
 - Chest X-Ray



IF CONFIRMATION IS IN DOUBT

- Deflate Cuff, Extubate & Manually Ventilate.
- If Able to Manually Ventilate, Continuing Doing So.
- If Not, Quickly Assess & Address Cause
 - Is more sedation needed?
 - Reposition patient?
- Reposition head, apply cricoid, user Smaller ET tube.
- If readily available, consider Fiberoptic Intubation
- Consider Another Approach
 - LMA, I-Gel, Emergency Cric



TAKE HOME POINTS

- Intubation is a potentially high-risk, but life saving procedure.
 - Almost half of the med/mal cases where RT's are named as defendants involve intubation and airways
- Hope for the best (an easy airway) but plan/prepare for the worst (a difficult airway).
- Know thy Limitations...Know when to defer to others (Anesthesiologists)
- Intubation proficiency takes preparation
 - Reading, reviewing and watching videos/images
 - Practice in a simulated environment
 - Have an experienced preceptor who can guide the trainee with actual patients (and take over if needed).
 - There is no substitute for experience



SELECTED REFERENCES

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