EMERGENCY AIRWAY MANAGEMENT

AIRWAY SIMULATION LAB

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RESPOND RIGHT EMS ACADEMY

CASE # 1

- 32 year old man brought by EMS with complaint of head injury
- Playing soccer, collided with another player, head versus knee
- Initially unconscious for 2 minutes, then awakened spontaneously; now alert and oriented to person, place, time and event
- Refused cervical spine immobilization
- At ED arrival: 130/78, 65, 20, 100%; alert and oriented
- 20 minutes later, nurse notifies you patient is confused and combative, 160/100, 60, 26, 91%, $ETCO_2$ 24 mm Hg

CASE # 2

- 45 year old woman, history of asthma, maintained on nebulizers/rescue inhaler and steroid burst prn
- Ambulatory to ED, complaining of worsening shortness of breath for 3 days, concurrent with recent heat wave
- Mildly productive cough, using nebulizers and inhalers very frequently
- 2 word conversational dyspnea, loud audible wheezing
- 140/100, 120, 36, 88% on nonrebreather mask, $ETCO_2$ 65 mm Hg
- Prior records show several intubations for respiratory failure in past

CASE # 3

- 67 year old man transported by EMS with dyspnea
- History of hypertension, hypercholesterolemia, CHF, atrial fibrillation
- In field: 190/120, 115 (irr), 32, 89% on nonrebreather
- At ED arrival: 200/120, 130 (irr), 40, 85% on nonrebreather, $ETCO_2$ 68 mm Hg
- 1-2 word conversational dyspnea, audible rales; rapid records review shows prior admissions for respiratory failure
- BiPAP started in ED; after 10 minutes, condition remains essentially the same
- What do you do now?

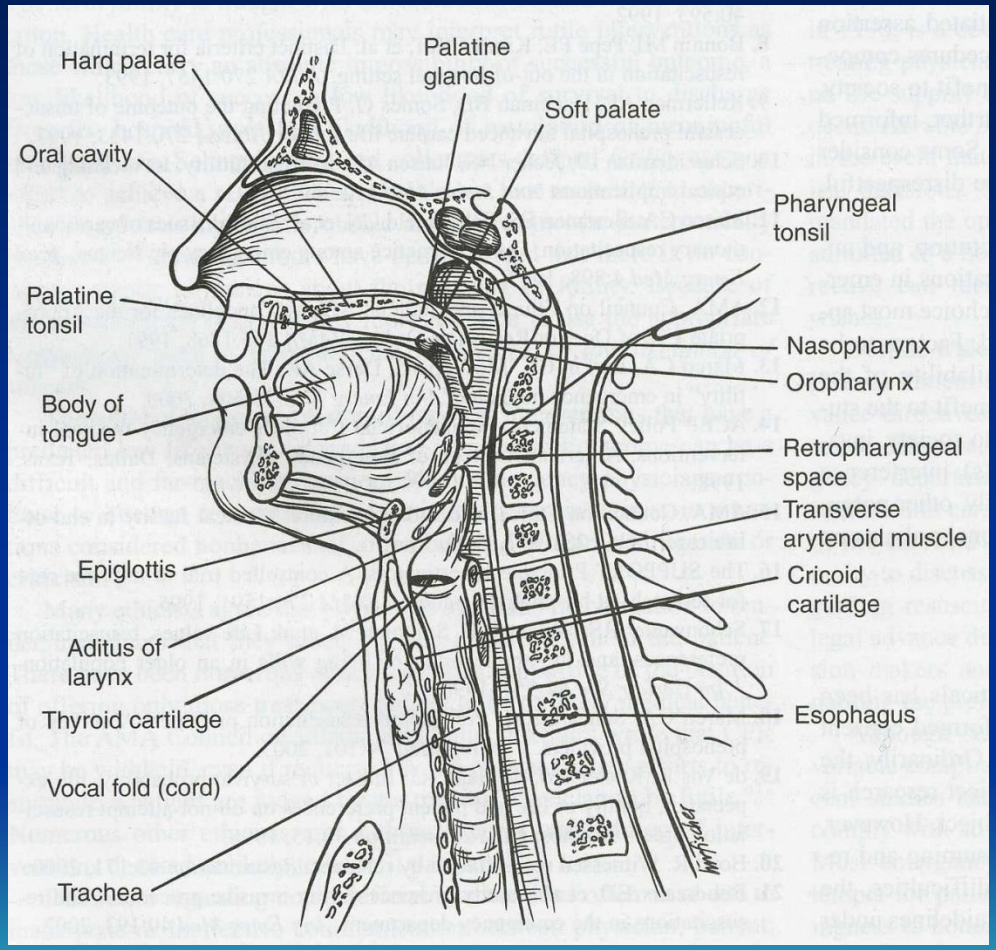
OBJECTIVES

- Identify upper airway anatomy and identify landmarks for intubation
- List causes of airway compromise
- Demonstrate basic airway maneuvers
- List, describe, and demonstrate indications for airway interventions
- Know how to predict a difficult airway/intubation and prepare accordingly
- Describe the intubation process as well as associated complications

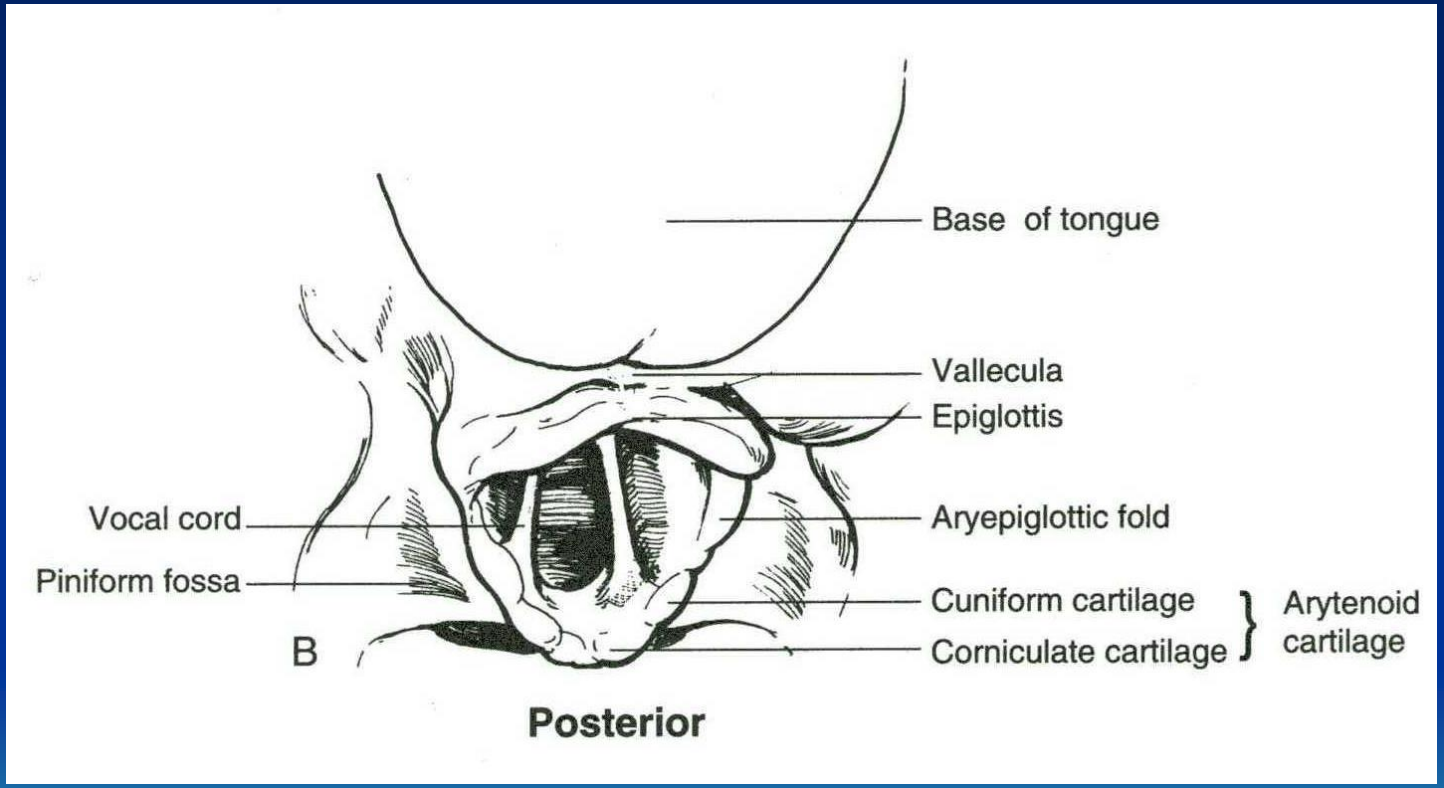
OBJECTIVES

- Verbalize alternative methods of intubation and ventilation
- Be familiar with Rapid Sequence Intubation (RSI) protocol and medications utilized
- Understand physiology behind preoxygenation/desaturation and concept of apneic oxygenation
- Know surgical airway techniques
- Know how to use extraglottic devices
- Know how and when to use NIPPV
- Understand oxyhemoglobin saturation curve and its relevance to *EVERY* airway case

UPPER AIRWAY ANATOMY



LARYNGEAL VIEW



CAUSES OF AIRWAY COMPROMISE

- Inhalation Injury (Smoke, toxic gas, superheated air)
- Infection (Tonsillar abscess, retropharyngeal abscess, Ludwig's Angina)
- Foreign bodies
- Trauma (cervical spine, esophageal, tracheal, facial)
- Tumors

CAUSES OF AIRWAY COMPROMISE

- CNS Depression (ineffective gag reflex)
  - Head Trauma
  - Facial Trauma (LeFort fractures)
  - Cervical spine trauma
  - Stroke
  - Overdose
  - Status Epilepticus
  - Alcohol

CAUSES OF RESPIRATORY COMPROMISE

- Pulmonary Edema
- Pneumonia
- COPD
- Asthma
- Acute on chronic respiratory failure/insufficiency
- Near Drowning
- Chest Trauma
- High Spinal Cord Injury

INDICATIONS FOR AIRWAY INTERVENTION

- Why airway intervention?
- Security of airway
- Protect airway from compromise
- Prevent deterioration of airway in the spontaneously breathing patient
- Provides a pathway for medication administration (which ones can be given via endotracheal tube?)
- Provide ventilatory support to increase oxygenation
- Provide direct route to lungs for suctioning

BASIC AIRWAY MANEUVERS

- Jaw thrust, chin lift (sometimes the easiest intervention is all you need!)
- Nasal cannula (yes, it could be that simple!)
- Repositioning patient (think about pulmonary edema-sit them up!)
- Suctioning
- Oral and Nasal Airways
- BVM

INTUBATION DECISION

- Ask yourself these questions if you are considering intubation:
- Can the patient protect their own airway?
- Are normal airway mechanisms failing?
- Can the patient maintain adequate ventilation/oxygenation?
- Consider apneic oxygenation?
- What is the anticipated clinical course?
- How much time do you have before you MUST intervene and intubate? (Elective vs “Crash” intubation)
- Is the patient a “difficult airway”?
- Are you prepared for the worst case scenario?

ORAL INTUBATION

- Airway Assessment (Mallampati Score, consideration of difficult airway)
- Necessary Equipment (suction, BVM, laryngoscope blades/handles, Video laryngoscopy, End-Tidal CO_2 detector, syringes, ventilator, tape)
- Does the equipment work before you use it?
- WHO CHECKED IT? (I'm from Missouri-Show Me!!!!)
- Medications for RSI (Have them at the bedside)
- PREPARE EVERYTHING BEFORE DOING ANYTHING!!
- Process for intubation-have one and stick with it
- Confirmation of ETT placement

DIFFICULT AIRWAY ASSESSMENT

- Airway distortion – Facial Trauma
- Facial swelling
- Lip swelling
- Poor dentition
- Dentures
- Small mandible
- Small mouth
- Large tongue
- Severe underbite or overbite
- Bullneck
- Obesity

DIFFICULT AIRWAY ASSESSMENT

- “MOANS”-Difficult BVM Ventilation
- M-Mask seal; thick facial hair, facial disruption, secretions
- O-Obese; >26 kg/m^2 BMI; difficult to ventilate, upper airway obstruction/angioedema/Ludwig’s Angina/PTA/Epiglottitis
- A-Age; >55 higher risk of difficult BVM ventilation; loss of muscle tone/tissue in upper airway
- N-No teeth; edentulous makes difficult mask seal, face caves in. Leave dentures in for BVM, remove for ETT
- S-Snores/Sniff; sleep apnea? BVM difficult/impossible in increased airway resistance (asthma) or decreased compliance (pulmonary edema)

DIFFICULT AIRWAY ASSESSMENT

- “LEMON” Airway Assessment
- L-Look externally; if it looks difficult, it is (“Mr. Potato Head Syndrome”)
- E-Evaluate (3-3-2 rule)
- M-Mallampati Class
- O-Obstruction; CARDINAL SIGNS-Hot potato voice, difficulty swallowing secretions, *stridor (predicts difficult airway)*
- N-Neck mobility; sniffing position is best

DIFFICULT AIRWAY ASSESSMENT

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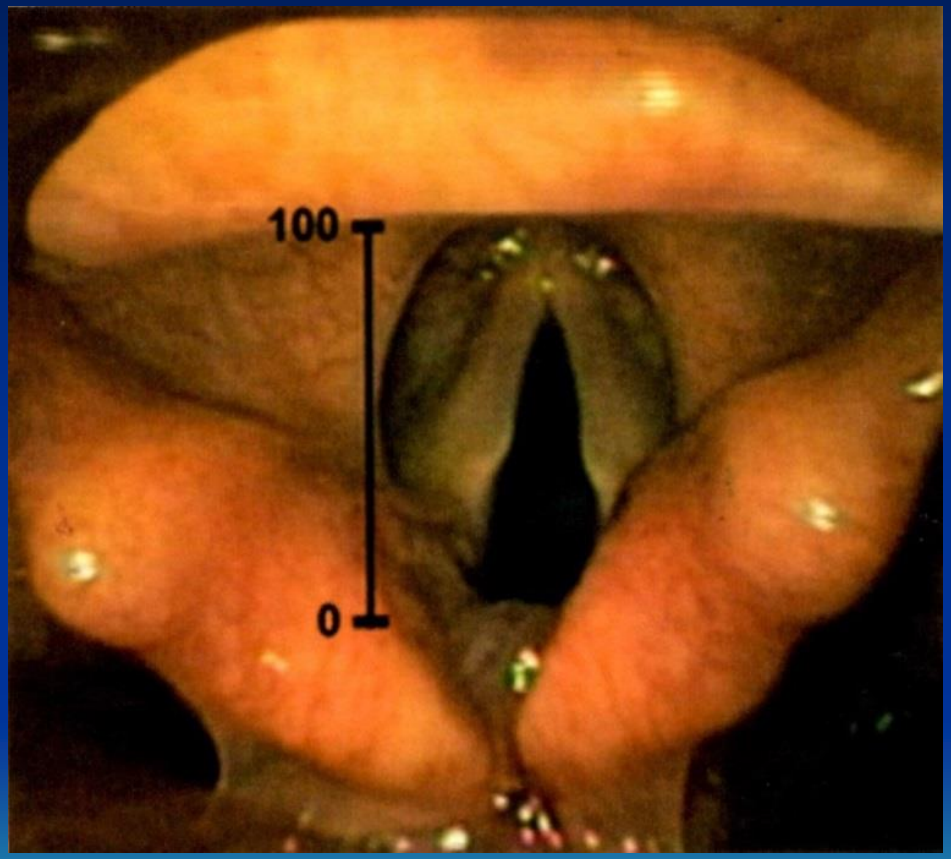
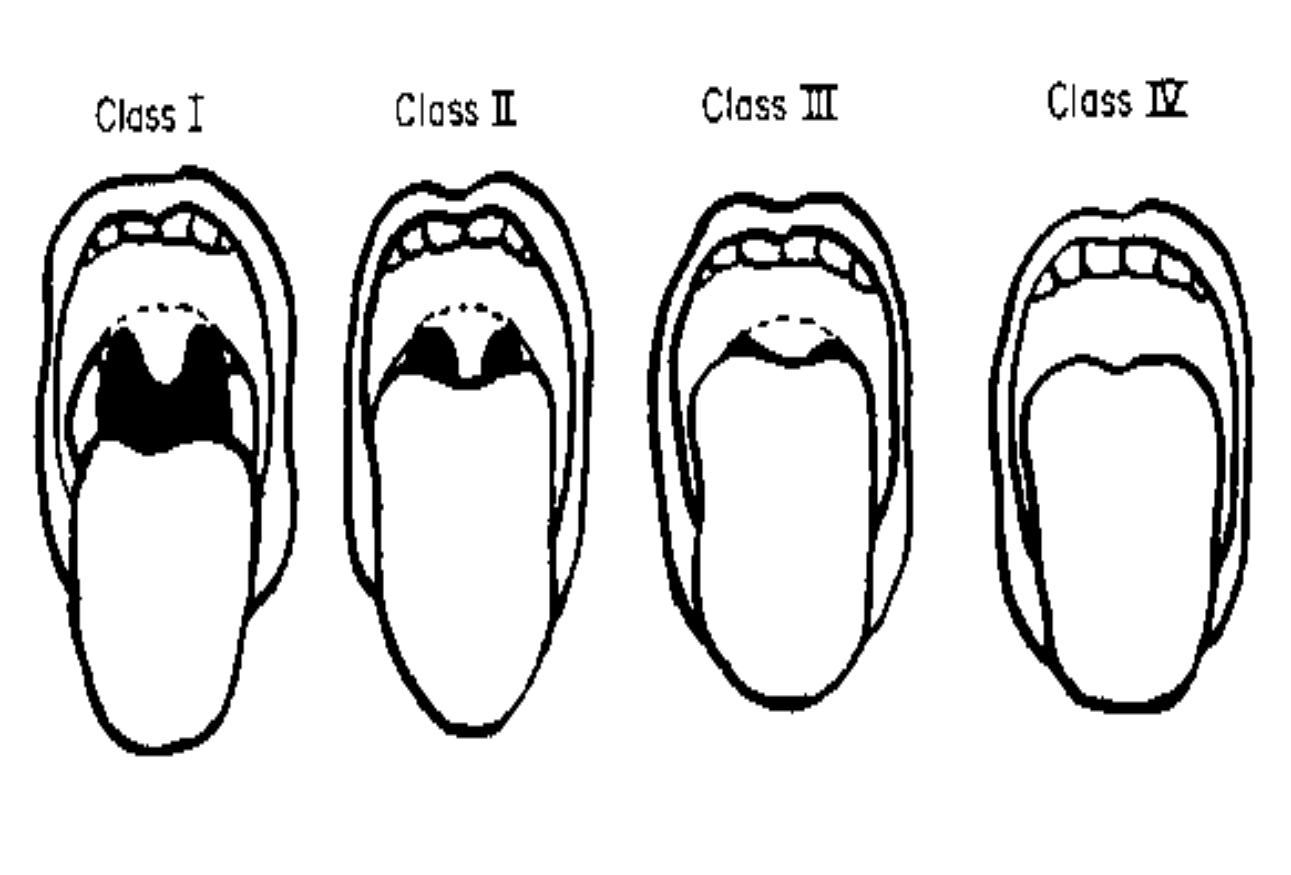
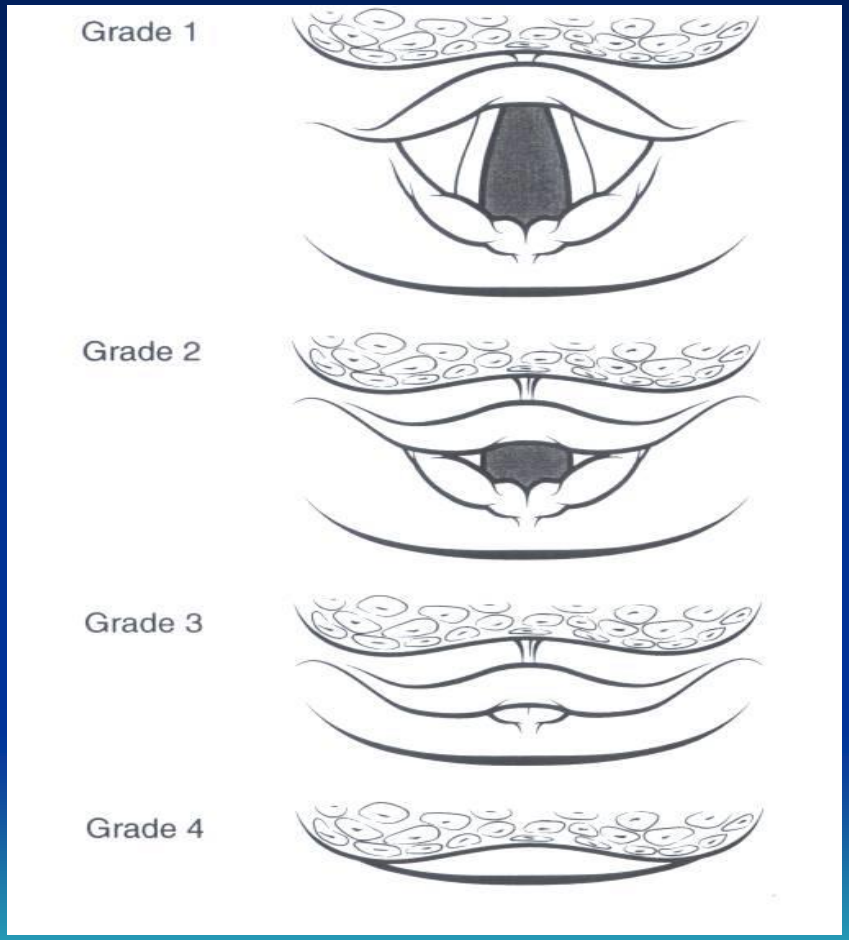


MALLAMPATI SCORE



MALLAMPATI SCORE



CLINICAL EXAMPLE: MALLAMPATI SCORE 4

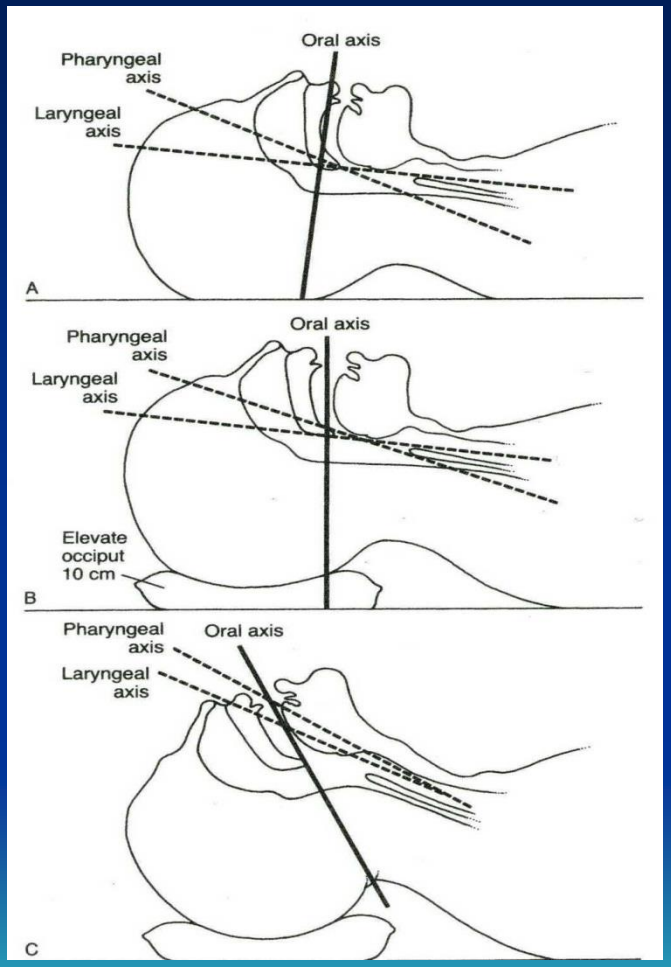
DIFFICULT AIRWAY ASSESSMENT

- “RODS”-Difficult Extraglottic Devices
- R-Restricted mouth opening
- O-Obstruction; UAO at level of larynx or below will make these devices impossible to pass
- D-Disrupted/Distorted airway; seal/or positioning of device may be compromised
- S-Stiff lungs/C-Spine; increased resistance (asthma)/decreased compliance (pulmonary edema) makes device use difficult; C-spine abnormalities may make device insertion very difficult

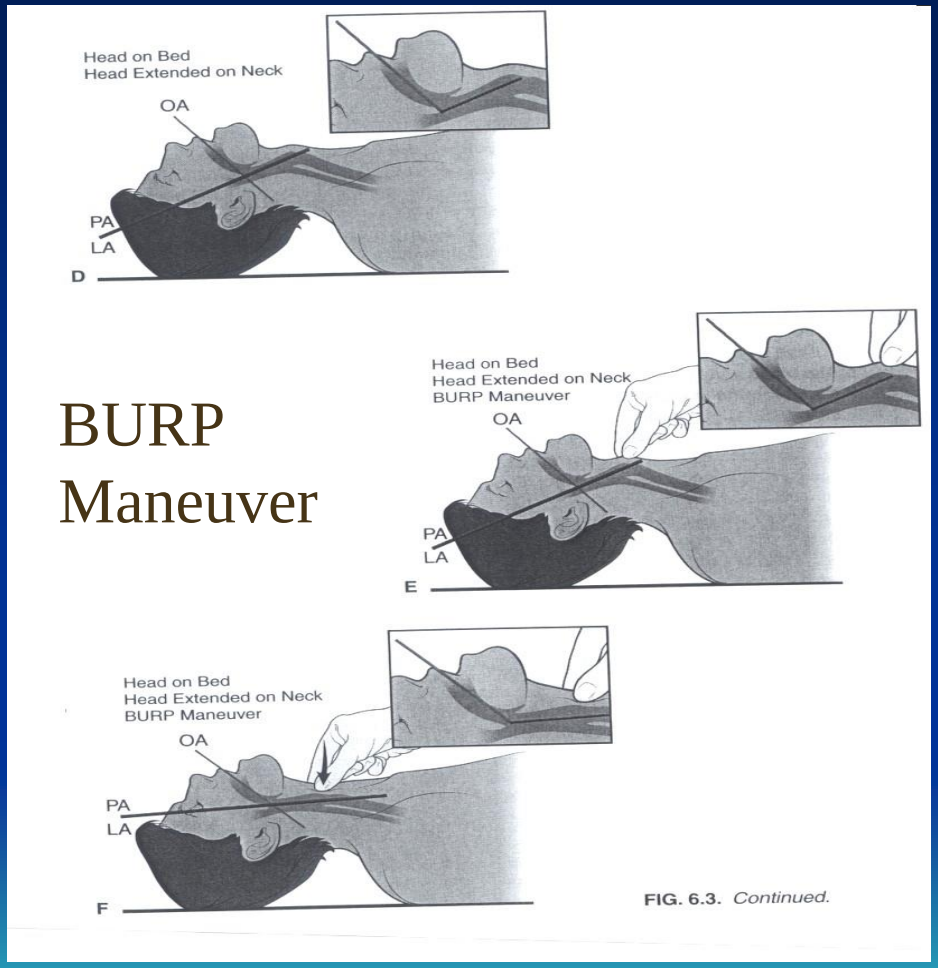
DIFFICULT AIRWAY ASSESSMENT

- “SHORT”-Difficult Cricothyrotomy
- S-Surgery/disrupted airway (anatomical distortion)
- H-Hematoma/Infection; procedure technically difficult if in path of incision; Not considered contraindication in life-threatening situations
- O-Obese; surrogate for any problem that makes percutaneous access difficult
- R-Radiation; distortion of tissues secondary to prior radiation therapy
- T-Tumor; tumor in/around airway, bleeding risk

INTUBATION AXES



INTUBATION POSITIONING



BURP Maneuver

FIG. 6.3. *Continued.*

INTUBATION POSITIONING

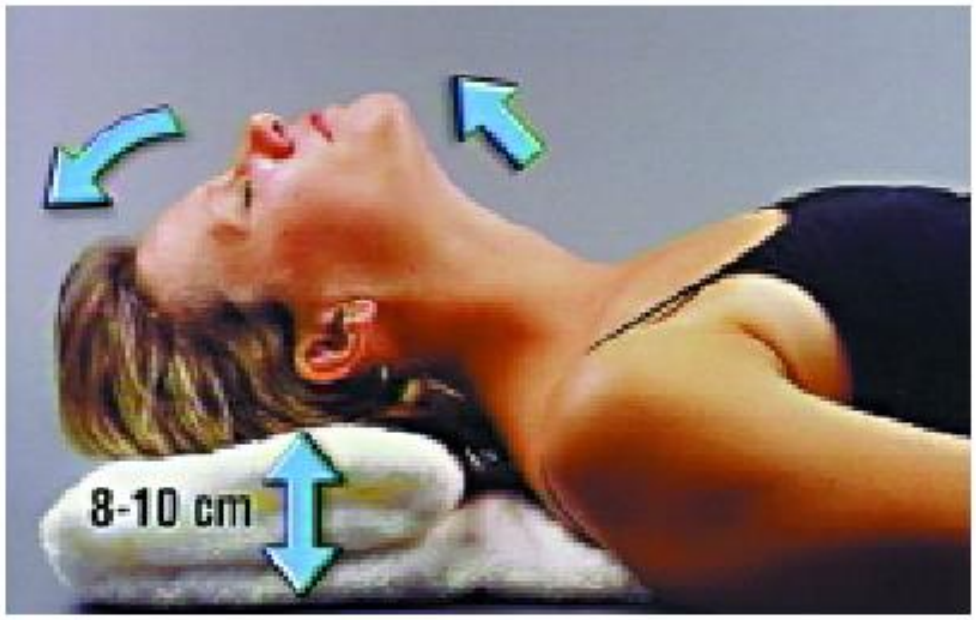


Figure 7. Ideal head positioning for laryngoscopy on an adult patient involves slight head elevation (neck flexion) and extreme atlanto-occipital extension. Figure courtesy of Richard M. Levitan, MD. Reprinted with permission from Airway Cam Technologies, Inc., Wayne, PA.

INTUBATION POSITIONING

RAPID SEQUENCE INTUBATION

- Induction refers to the production of deep level of unconsciousness
- Rapid sequence intubation involves combined administration of a sedative and neuromuscular blocking agent to facilitate tracheal intubation after preoxygenation
- Tracheal intubation follows laryngoscopy
- Cricoid pressure is maintained to prevent aspiration (Sellick Maneuver)
- Sellick maneuver is applied with the administration of the first RSI agent and maintained until the cuff is passed through the cords and inflated

RAPID SEQUENCE INTUBATION

- Principal contraindication to RSI is any condition preventing mask ventilation or intubation
- Mask ventilation may be the only way to ventilate a patient once they are paralyzed
- You should be able to control the airway with simple manipulation and BVM until you are ready to intubate
- RSI facilitates the process of intubation in even the most difficult airway
- Preparation is the key to preventing failure
- Prime goal is to avoid placing the breathing patient in the “can’t intubate, can’t ventilate” situation

SEVEN "P's" OF RSI

- Preparation
- Preoxygenation (more on this in a few slides)
- Pretreatment
- Paralysis with induction first
- Protection and positioning
- Placement with proof
- Postintubation management
- If you're a believer in Murphy's Law…..add in the "8th P"- PRAY

SEVEN “P’s” OF RSI

- Preparation includes two peripheral IV lines, cardiac monitor, pulse oximeter, suction, capnography
- Check laryngoscope blade and bulb; is the light “tight, bright and white?”
- If using video laryngoscopy, is the screen clean/picture clear?
- Does the endotracheal tube inflate and hold air?
- Is the stylet in the ET tube? Tube lubricated?
- Does the suction work? DOES IT WORK WELL?
- Do you have a difficult airway cart or kit? If so, is it at the bedside if you need it?

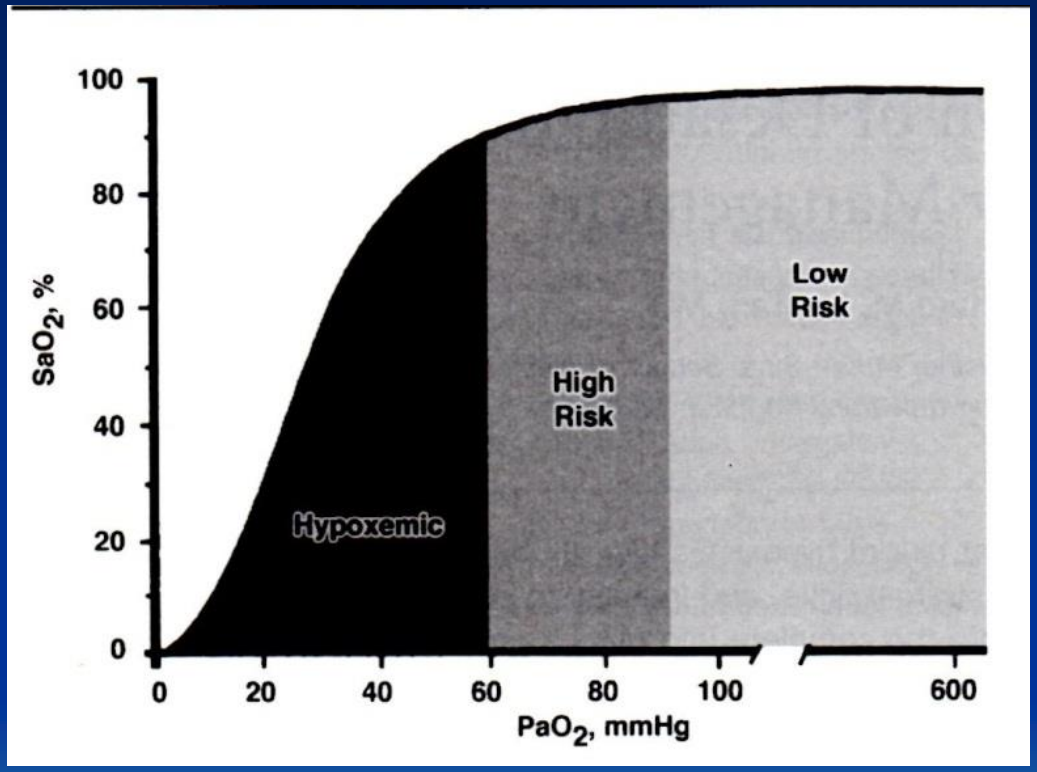
SEVEN "P's" OF RSI

- Preoxygenation means allowing the patient to breathe 100% FiO_2 for at least five minutes
- Best accomplished with a non-rebreather mask
- Bag-valve-mask ventilation, or any other type of positive pressure ventilation is NOT used during the preoxygenation phase of RSI
- For added oxygenation, having a patient on a nasal cannula, and then adding a nonrebreather mask over it, may give you an extra 2-3 minutes of oxygenation that will prevent hypoxia during intubation attempts ("apneic oxygenation"-more on this later)

SEVEN "P's" OF RSI

- Preoxygenation extends duration of "safe apnea", i.e., time until patient reaches saturation of 88-90%, corresponding to placement of definitive airway
- When desaturation occurs below this level, status on steep portion of oxyhemoglobin dissociation curve decreases to critical levels of oxygen saturation (<70%) within seconds!
- For preoxygenation, there are 3 goals:
- Bring saturation as close as possible to 100%
- Denitrogenate residual capacity of lungs
- Denitrogenate and maximally oxygenate bloodstream

SEVEN "P's" OF RSI



SEVEN "P's" OF RSI

- Duration of safe apnea is based on delivering 90-100% FiO2 when used with well-fitting mask
- True nonrebreather at 15 L/min capable of delivering 90% FiO2; rarely available in ED
- Standard available nonrebreather masks at 15 L/min deliver only 60-70% FiO2, do not provide complete denitrogenation, and DO NOT maximize duration of safe apnea
- These devices can deliver 90% by increasing flow rate to 30-60 L/min, which may be done by continuing to open the valve beyond 15 L/min

SEVEN "P's" OF RSI

- Preoxygenation should continue until FRC of lungs is denitrogenated to achieve >90%
- Three minutes worth of tidal volume breathing (patient's normal respiratory pattern) with high FiO2 source is acceptable duration of preoxygenation for most patients
- Tidal volume breathing can be augmented by asking patient to exhale fully before the 3 minute period
- Cooperative patients can be asked to take 8 vital capacity breaths (maximal exhalation followed by maximal inhalation)
- This generally reduces preoxygenation time to 60 seconds, although most critically ill ED patients cannot do this!

SEVEN "P's" OF RSI

- Preoxygenation creates reservoir of alveolar oxygen
- Patient breathing room air has 450 mL oxygen present in lungs; on 100% oxygen, this increases to 3L
- Total oxygen reservoir in lungs *and* bloodstream on room air is 1-1.5 L; preoxygenated patient will have 3.5-4 L
- Oxygen consumption during apnea is 250 mL/min (3 mL/kg/min)
- In healthy patients, duration of safe apnea on room air is 1 minute; when preoxygenated, this increases to *8 minutes!*

SEVEN "P's" OF RSI

- In sick patients, especially those with poor cardiac output, pulse oximeter may lag behind actual central arterial circulation by 60-90 seconds; *Use Capnography!*
- Effects of shunting, increased metabolic demand, anemia, volume depletion and decreased cardiac output are synergistic in reducing oxygen storage in lungs and shortening safe apnea time in critically ill patients
- Desaturation to 85% may be as short as 23 seconds in critically ill patients versus 502 seconds in healthy adult

SEVEN "P's" OF RSI

RISK CATEGORY (PULSE OX ON HIGH FLOW OXYGEN)	PREOXYGENATION (3 MINUTES)	ONSET OF MUSCLE RELAXATION (60 SECONDS)	APNEIC PERIOD DURING INTUBATION
Low Risk (Pulse Ox 96-100%)	Nonrebreather mask with maximum oxygen flow	Nonrebreather mask and nasal cannula at 15L/min	Nasal cannula-15 L/min
High Risk (Pulse Ox 91-95%)	Nonrebreather mask, CPAP or BVM with PEEP valve	Nonrebreather mask, CPAP or BVM wit PEEP valve and nasal cannula at 15 L/min	Nasal cannula-15 L/min
Hypoxemic (Pulse Ox $\leq$ 90%)	CPAP or BVM with PEEP valve	CPAP or BVM with PEEP and nasal cannula at 15 L/min	Nasal cannula-15 L/min

PRETREATMENT AGENTS

AGENT	DOSE	INDICATIONS	PRECAUTIONS
Lidocaine	1.5 mg/kg IV or topically	↑ ICP, Bronchospasm, laryngospasm	- SNS attenuation + ICP attenuation
Fentanyl	3 ug/kg IV	↑ ICP, Cardiac ischemia; ↓ SNS reflex to intubation	Resp depression, Chest wall rigidity Hypotension
Atropine	0.02 mg/kg IV 0.01 mg/kg IV	Peds < 5 y Peds < 10 y receiving Succinylcholine Bradycardia-Adults	Minimal dose 0.10 mg
Midazolam	0.1 mg/kg IV	Sedation Reversible Amnesia	Wide therapeutic index No analgesia Apnea

SEDATIVE INDUCTION AGENTS

AGENT	DOSE	INDUCTION	DURATION	BENEFITS	CAVEATS
Ketamine	1-2 mg/kg IV	1 min	5 min	Bronchiolar Dilatation Dissociative amnesia	↑ secretions ↑ ICP Emergence reactions
Etomidate (Amidate)	0.3 mg/kg IV	1 min	7-10 min	↓ ICP ↓ IOP Neutral BP	Myoclonus Vomiting No Analgesia *Adrenal suppression?
Thiopental	3-5 mg/kg IV	30-60 seconds	10-30 mins	↓ ICP	Hypotension
Methohexital (Brevital)	1 mg/kg IV	< 1 min	5-7 min	↓ ICP Short duration	Hypotension Seizures Larynx Spasm

SEDATIVE INDUCTION AGENTS

AGENT	DOSE	INDUCTION	DURATION	BENEFITS	CAVEATS
Propofol (Diprivan)	1-2 mg/kg IV	20-40 seconds	8-15 min	Antiemetic ↓ ICP Antiseizure	Apnea Hypotension No analgesia
Fentanyl	3-8 ug/kg IV	1-2 min	20-30 min	Reversible analgesia Neutral BP	Dose variable ICP effects variable Chest wall rigidity
Midazolam	0.1-0.3 mg.kg	1-2 min	15-30 min	Reversible amnesia, anxiolysis, sedation	↓ BP ↓ inotropic effect

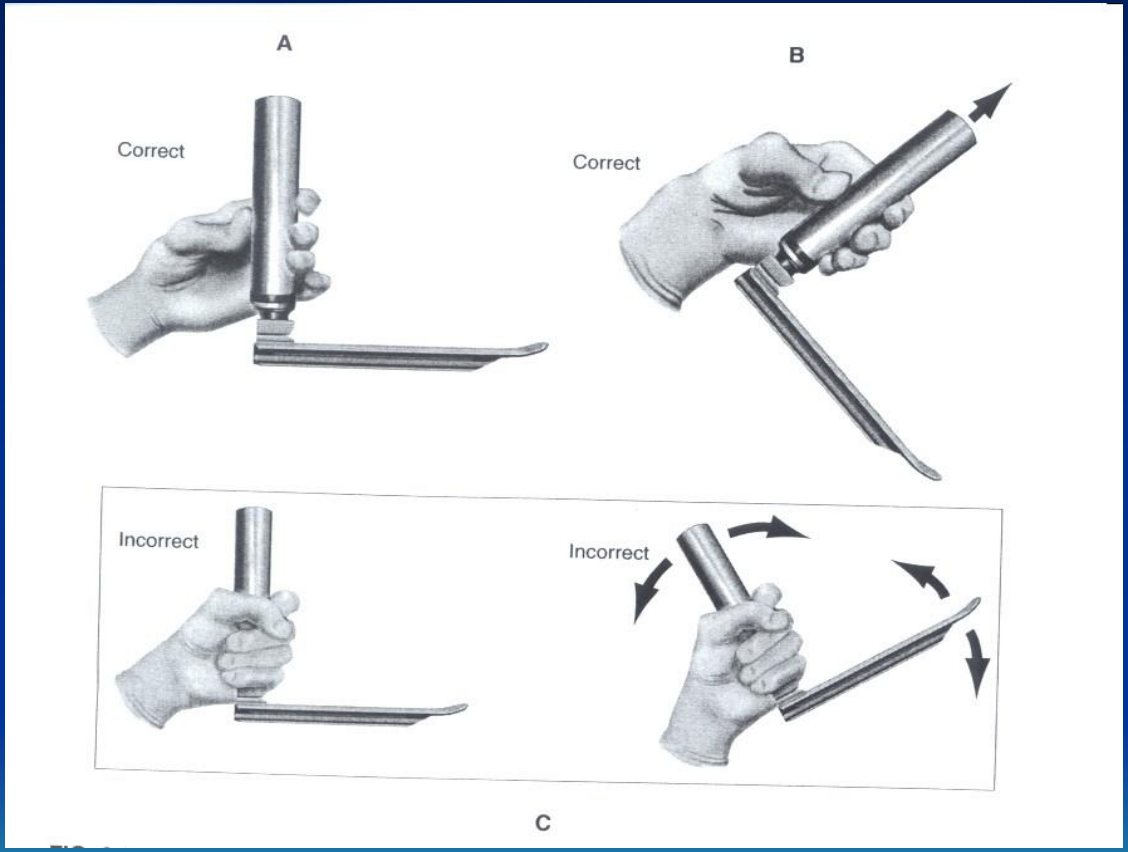
SUCCINYLCHOLINE

Adult Dose	1-2 mg/kg IV
Onset	45-90 seconds
Duration	5-9 minutes
Benefits	Rapid onset, short duration
Complications	Bradydysrhythmias/Masseter spasm ↑ intragastric/intraocular/intracranial pressure Malignant hyperthermia, hyperkalemia Histamine release, cardiac arrest Prolonged apnea with pseudocholinesterase deficiency Fasciculations (in virtually all patients) Concurrent use of NDMR for defasciculation ↓ potency of Succinylcholine

NONDEPOLARIZING AGENTS

AGENT	ADULT DOSE-INTUBATION	ONSET	DURATION	SIDE EFFECTS
Vecuronium (intermediate-long acting)	0.08-0.125 mg/kg 0.15-0.28 mg/kg (high dose protocol)	2-5 min	25-40 min	Prolonged recovery in elderly/obese or Hepatorenal disease
Rocuronium (intermediate-long acting)	0.6-1.2 mg/kg; 0.03 mg/kg for defasciculation	1-1.5 min	30-45 min	Tachycardia
Doxacurium	0.05-0.08 mg/kg	3-4 min	80-100 min	Prolonged block
Atracurium (intermediate)	0.4-0.5 mg/kg	2-3 min	25-45 min	Hypotension Histamine release Bronchospasm

LARYNGOSCOPE USE



LARYNGOSCOPE USE

Figure 12. The forces involved in laryngoscopy demonstrated on the head of a pediatric manikin. The main lifting force of the laryngoscope is parallel to the handle. Under no circumstances should the handle of the laryngoscope be levered backwards. The handle is gripped down at the base. Figure courtesy of Richard M. Levitan, MD. Reprinted with permission from Airway Cam Technologies, Inc., Wayne, PA.

INTUBATION VIEWS

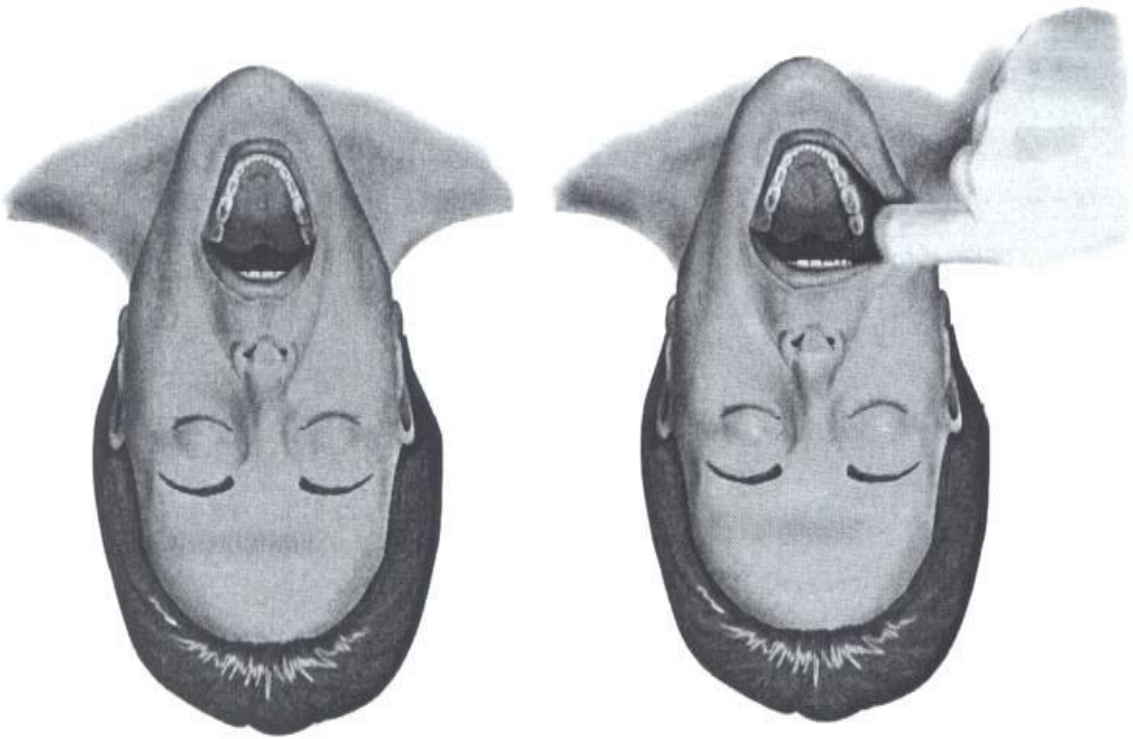


FIG. 6.8. Retraction of the corner of the mouth by an assistant's index finger will provide ample room for unobstructed passage of the ETT.

LARYNGOSCOPIC VIEW

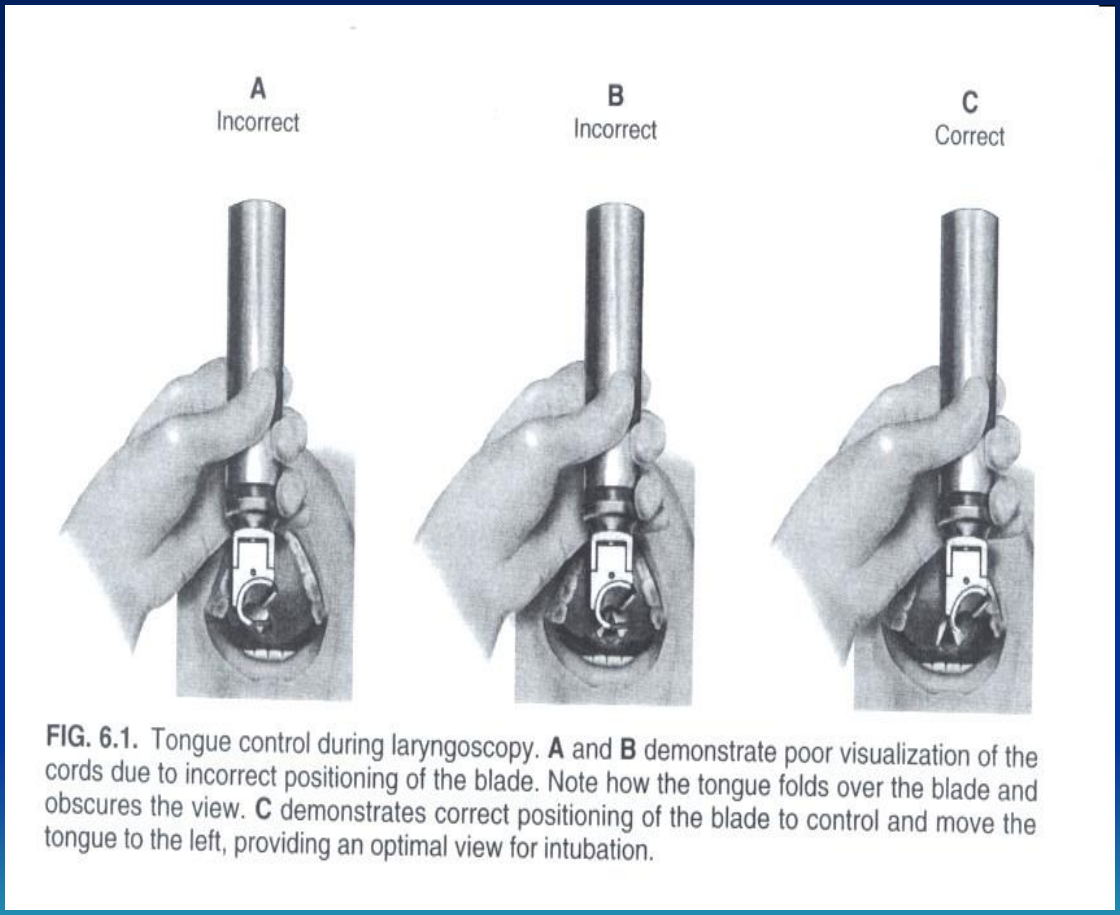
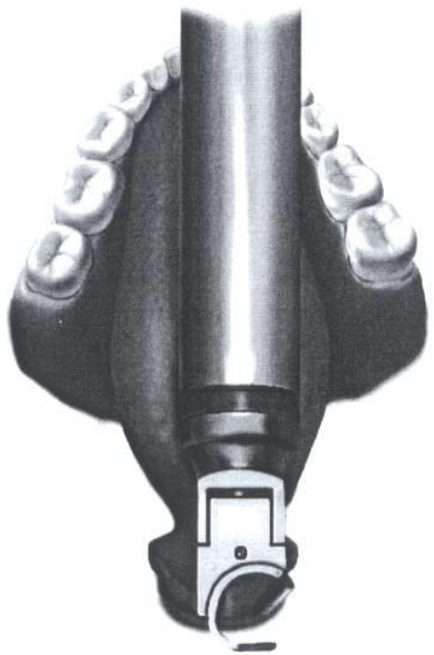
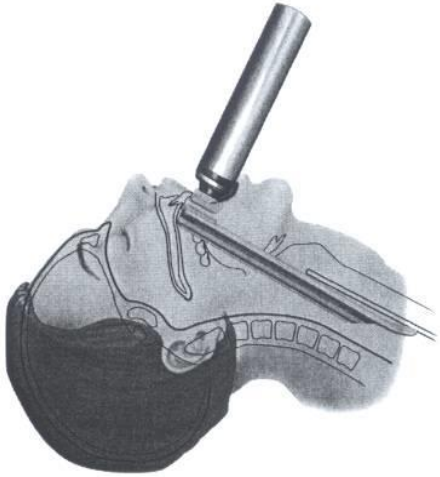


FIG. 6.1. Tongue control during laryngoscopy. **A** and **B** demonstrate poor visualization of the cords due to incorrect positioning of the blade. Note how the tongue folds over the blade and obscures the view. **C** demonstrates correct positioning of the blade to control and move the tongue to the left, providing an optimal view for intubation.

LARYNGOSCOPIC VIEW





A B

FIG. 6.5. A: The initial starting position for the visual phase of laryngoscopy. **B:** Note that the blade is in the esophagus and the blade/handle junction is at the patient's teeth. Note the position of the cords proximal to the tip of the blade.

LARYNGOSCOPIC VIEW

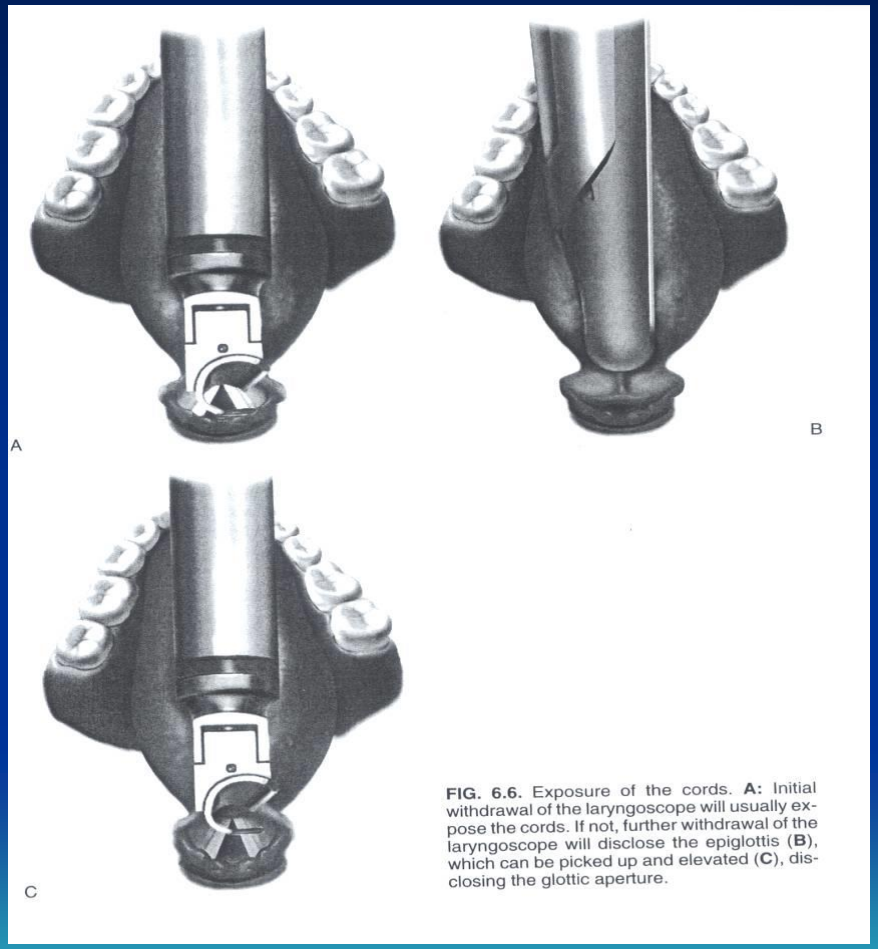


FIG. 6.6. Exposure of the cords. **A:** Initial withdrawal of the laryngoscope will usually expose the cords. If not, further withdrawal of the laryngoscope will disclose the epiglottis (**B**), which can be picked up and elevated (**C**), disclosing the glottic aperture.

“BURP” MANEUVER

Figure 14. External laryngeal manipulation by the laryngoscopist's right hand on the patient's thyroid cartilage.

LARYNGOSCOPIC VIEW

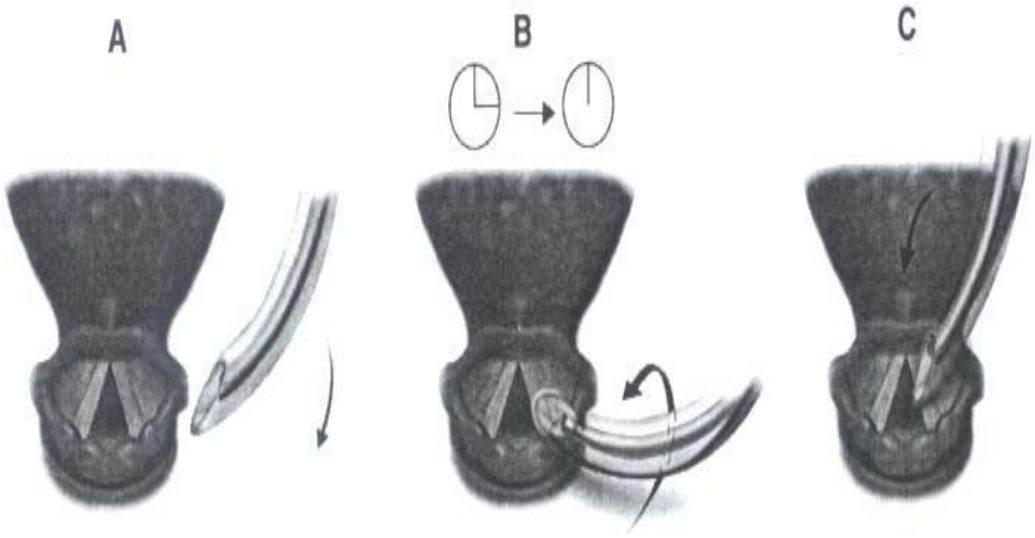
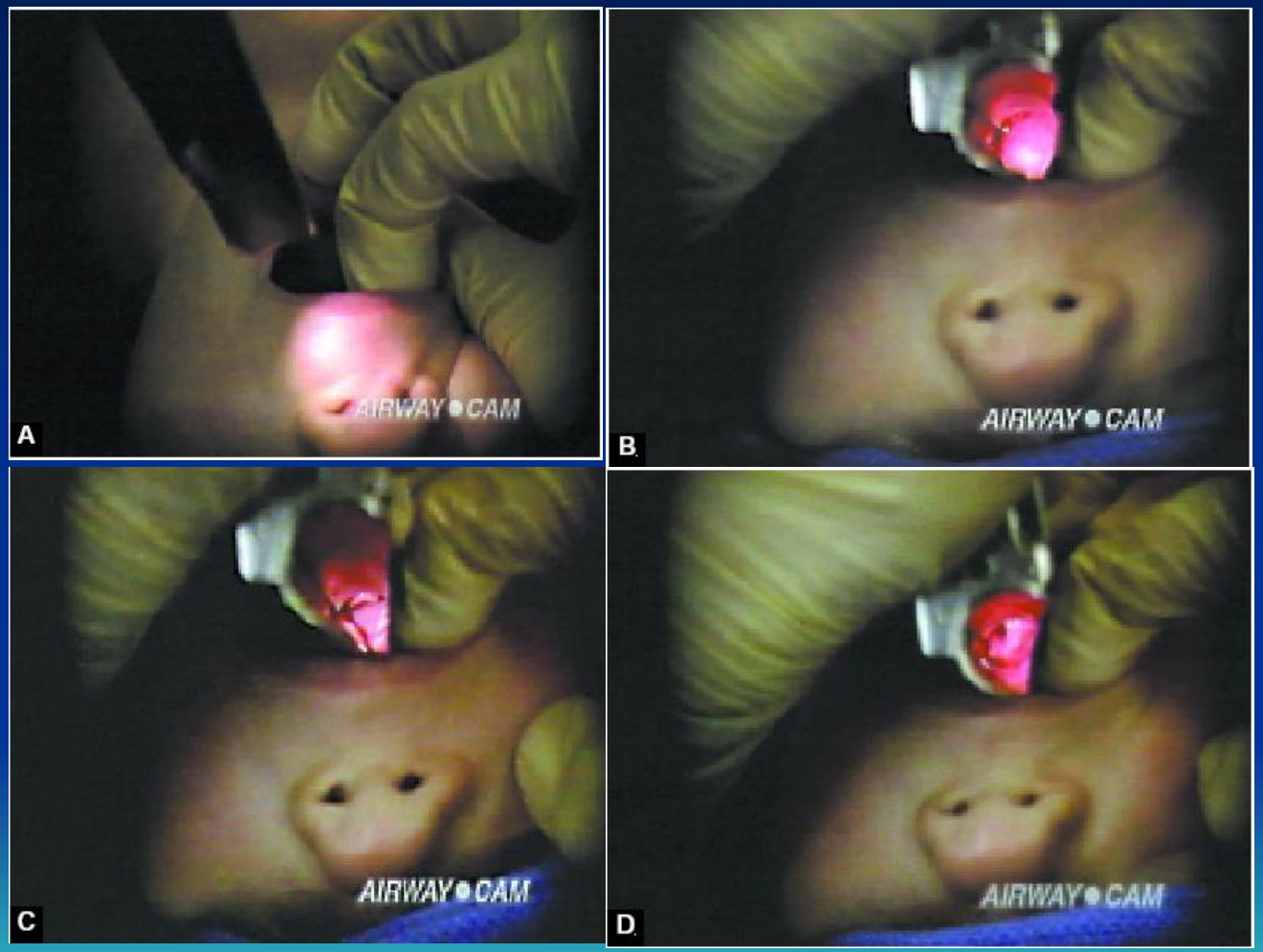


FIG. 6.9. The ETT is rotated 90 degrees counterclockwise (**B**) as it is passed through the cords, changing the initial horizontal (widest) axis of the bevel (**A**) to the vertical (narrowest) axis (**C**).

LARYNGOSCOPIC VIEW



LARYNGOSCOPIC VIEW

APNEIC OXYGENATION

- Used to extend the “safe apnea” time beyond what can be achieved with standard preoxygenation alone
- During apnea, differential rate between alveolar oxygenation absorption and CO_2 generates negative pressure gradient, resulting in a ventilatory mass flow of gas from upper respiratory tract to lungs
- As long as airway remains patent, any supplemental oxygen administered through nares will be delivered to alveoli *without any ventilation!*
- This technique is called *Apneic Oxygenation*

APNEIC OXYGENATION

- In healthy patients, apneic oxygenation can assure significant sufficient oxygenation for up to an hour, but *cannot* prevent progressive rise of $PaCO_2$
- "Ap-Ox" has demonstrated significant reduction in incidence of clinically significant hypoxemia during elective intubation
- Critically ill patients have collapsed alveoli, high alveolar-arterial gradient and high metabolic requirements
- Blood arrives to lungs poorly oxygenated, with sizeable portion directly shunted to alveoli without any reoxygenation

APNEIC OXYGENATION

- High incidence of hypoxemia during attempts at intubation due to critical apneic phase that occurs between induction and successful passage of ET tube
- Slight desaturation to 90% is not harmful; however, this is the point of the oxyhemoglobin dissociation curve where the steep descent occurs rapidly
- Clinically significant hypoxemia is defined as any fall of SpO_2 to level at which any further drops of arterial partial pressure of oxygen lead to near-exponential drops in SpO_2
- This is conventionally defined as <90; this is also the point of inflection on the Oxy-Hgb curve where “fall off” is steep

APNEIC OXYGENATION

- In a healthy preoxygenated patient the safe apnea time can be up to 8 or 9 minutes, compared to ~1 min if they were breathing room air
- In critically ill patients critical desaturation can occur almost immediately despite optimal attempts at preoxygenation
- Factors that decrease safe apnea time:
- Inadequate preoxygenation, airway occlusion, pulmonary shunt
- Increased oxygen consumption (VO2), critical illness
- Obesity, pregnancy, small children

APNEIC OXYGENATION

- Nasal cannula can be used for apneic oxygenation because the pharynx fills with high FiO2 gas and functions as an oxygen reservoir, even when the mouth is open (a patent airway must be maintained!)
- Ensure patient is preoxygenated with nasal cannula (15 L/min oxygen flow rate)
- Administer induction agent
- Maintain the nasal cannula flow rate at 15 L/min and administer oxygen via non-rebreather mask or BVM as well

APNEIC OXYGENATION

- If SpO2 <95% consider apneic oxygenation with positive pressure
- CPAP or with BVM with PEEP valve with coexistent administration of oxygen at 15 L/min via nasal cannula
- Alternatively, abandon apneic oxygenation and provide 6 gentle ventilations/minute (<15cmH20)
- Maintain a patent airway until the time of intubation using face-mask technique with jaw thrust, nasopharyngeal airway or oropharyngeal airway

APNEIC OXYGENATION

- Remove the mask at the time of intubation, but continue to oxygenate via the nasal cannula (NO DESAT)
- *N*asal *O*xygen *D*uring *E*fforts *S*ecuring *A* *T*ube
- This term was coined by Richard Levitan, one of the airway gurus of emergency medicine
- Also designed his own intubating laryngoscope!

CASE # 1

- 32 year old man brought by EMS with complaint of head injury
- Playing soccer, collided with another player, head versus knee
- Initially unconscious for 2 minutes, then awakened spontaneously; now alert and oriented to person, place, time and event
- Refused cervical spine immobilization
- At ED arrival: 130/78, 65, 20, 100%; alert and oriented
- 20 minutes later, nurse notifies you patient is confused and combative, 160/100, 60, 26, 91%, $ETCO_2$ 24 mm Hg

CASE # 1 REVIEW

- What injury does this patient have?
- Why do you suspect he has this injury?
- How do you control his airway?
- Does he *NEED* to be intubated?
- What medications would you select?
- Pretreatment-Lidocaine and Fentanyl; both attenuate ICP, Fentanyl decreases SNS stimulation
- Sedative-Etomidate, Brevital, Propofol
- Neuromuscular blocker-Succinylcholine or Rocuronium

CASE # 2

- 45 year old woman, history of asthma, maintained on nebulizers/rescue inhaler and steroid burst prn
- Ambulatory to ED, complaining of worsening shortness of breath for 3 days, concurrent with recent heat wave
- Mildly productive cough, using nebulizers and inhalers very frequently
- 2 word conversational dyspnea, loud audible wheezing
- 140/100, 120, 36, 88% on nonrebreather mask, $ETCO_2$ 65 mm Hg
- Prior records show several intubations for respiratory failure in past

CASE # 2 REVIEW

- What condition does this patient have?
- What would you do next?
- Would you consider BiPAP?
- If you proceed to intubation, what medications do you select?
- Pretreatment-Lidocaine (decreases bronchospasm)
- Sedative-Ketamine (excellent bronchodilator, something this patient desperately needs!) Etomidate is also acceptable
- Neuromuscular Blocker-Succinylcholine or Rocuronium

CASE # 3

- 67 year old man transported by EMS with dyspnea
- History of hypertension, hypercholesterolemia, CHF, atrial fibrillation
- In field: 190/120, 115 (irr), 32, 89% on nonrebreather
- At ED arrival: 200/120, 130 (irr), 40, 85% on nonrebreather, $ETCO_2$ 68 mm Hg
- 1-2 word conversational dyspnea, audible rales; rapid records review shows prior admissions for respiratory failure
- BiPAP started in ED; after 10 minutes, condition remains essentially the same
- What do you do now?

CASE # 3 REVIEW

- What is the diagnosis for this patient?
- What is your next step?
- What medications would you select?
- Pretreatment-Lidocaine (decreases ICP and prevents bronchospasm), Fentanyl (attenuates SNS intubation reflex, decreases cardiac ischemia)
- Sedative-Etomidate, Propofol
- Neuromuscular Blocker-Succinylcholine; Rocuronium can be considered, has tachycardia as a side effect

TRICKS OF THE TRADE

- In emergency medicine, airway management is one of the most invasive techniques we utilize
- Over the years, these are a few of the tricks I have picked up that have helped me with airway management:
- In patients who have COPD and asthma, loading with Magnesium Sulfate, 2 grams IVPB over 20 minutes, may provide added bronchodilation and prevent need for intubation
- If you are even remotely considering intubation, add about 3 ml of Lidocaine to the nebulizer; this will autoanesthetize the patient's airway before intubation and prevent tachycardia and blunt ICP response

TRICKS OF THE TRADE

- Use NIPPV early and often; it works well and many times can turn around even the most critical patients
- Start using apneic oxygenation; it is proven to prevent desaturation in critically ill patients and makes intubation much safer
- Use End tidal CO_2 monitoring on all patients! It is an early warning system that gives you real time assessment of perfusion, metabolism and respiration
- DO NOT rely on pulse oximetry! This only tells you what the oxygen saturation was 90 seconds ago and is NOT real time analysis like end tidal detection

TRICKS OF THE TRADE

- When using paralytics, don't be afraid to use a "heavy" dose to achieve complete paralysis
- Beirne's Laws of Airway Management
- 1. Use every trick and tool you have to make each intubation successful the *FIRST* time
- 2. Bougie is an excellent device that helps intubate even the most difficult airway
- 3. Expect the unexpected! Things usually go wrong during emergencies. Be ready for any and all problems that arise
- 4. All airways are not created equal! I have yet to meet the standard 70 kg patient in my ED

TRICKS OF THE TRADE

- 5. Sometimes all you need is a simple airway or repositioning of your patient to maintain an open airway-don't overthink it!
- 6. Don't be afraid of Ketamine in airway cases-it is an excellent bronchodilator and sedative and may actually improve the patient's condition
- 7. Let your Respiratory Therapist help you! They are tremendous resources and know their own tricks of the trade
- 8. Despite all our best efforts and skills, patients often die
- 9. Elective intubation beats crash airway scenarios
- 10. All you need is love-treat the airway with kindness. You and the patient will both be much happier!!

THE “A TO Z” LIST

- “A” - Airway (What were you expecting? This is an AIRWAY COURSE!); what type do you have available?
- “B” - Breathing (That’s right, that thing you are doing for the patient; put them on the vent or keep using the BVM)
- “C” - Check the cuff (Don’t forget to inflate it; make sure it holds air!)
- “D” – Drugs (Have all the medications you need)
- “E” - End Tidal CO_2 detector (Make sure it turns yellow!)
- “F” - Final look (any doubt about the tube, now is the time to look again and verify it is between the cords)
- “G” – Gag reflex; it WILL return, so be prepared!

THE “A TO Z” LIST

- “H” - Hold the tube until it is secure; DON’T LET IT GO UNTIL YOU HAVE IT TAPED!
- “I” - Induction agent; did it wear off? Do you need to give more?
- “I” - Intubation; does the patient really need it?
- “J” - Just remain calm; the hard part is done!
- “K” - Keep an eye on the vital signs
- “L” - Laryngoscope; do you remember where you put it? (remember, they’re expensive)
- “M” – Medications; have them readily available
- “N” - NIPPV; do you think this patient qualifies for it?

THE “A TO Z” LIST

- “O”- Oxygen; make sure you have enough in the tank
- “P” - Preparation; do you have all the equipment you need, and does it work? Have you checked it?
- “P” - Paralysis; is the patient adequately paralyzed?
- “Q” - Quiet during lung auscultation after the tube is in
- “R” - Repeat the vital signs frequently
- “S” - Stylet; use it if you need it, don’t forget to remove it
- “T” - Tube; check it every time you move the patient!
- “U” - Utilize your time and resources effectively
- “V” - Ventilation; is it getting more difficult? (why??)

THE “A TO Z” LIST

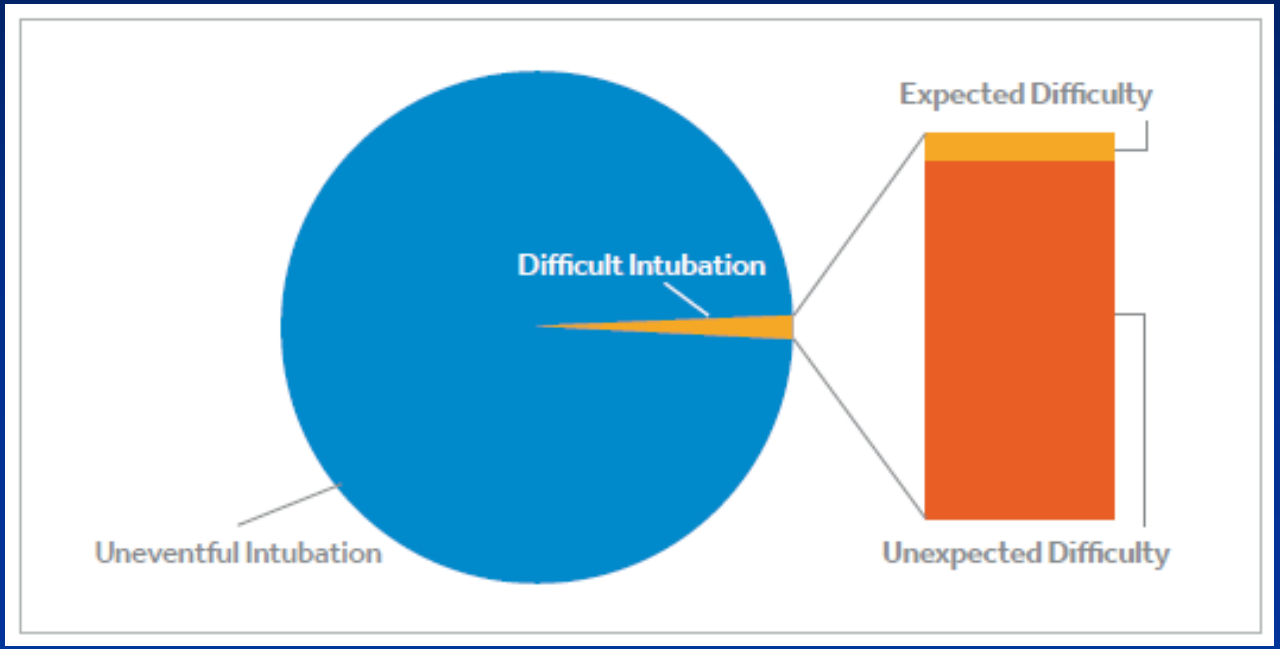
- “W”- Wet; do the lungs need to be suctioned?
- “X” - X ray to check tube position
- “Y” - “You”; be confident in your skills and abilities
- “Z” - Zemuron (Rocuronium) is an excellent nondepolarizing neuromuscular blocker; if you plan on using something besides Succinylcholine, give Zemuron a look

WHY USE VIDEO LARYNGOSCOPY?

- Difficult intubations are rare, occurring in 1% to 4% of all cases
- Unfortunately 50% to 93% of difficult intubations are unanticipated

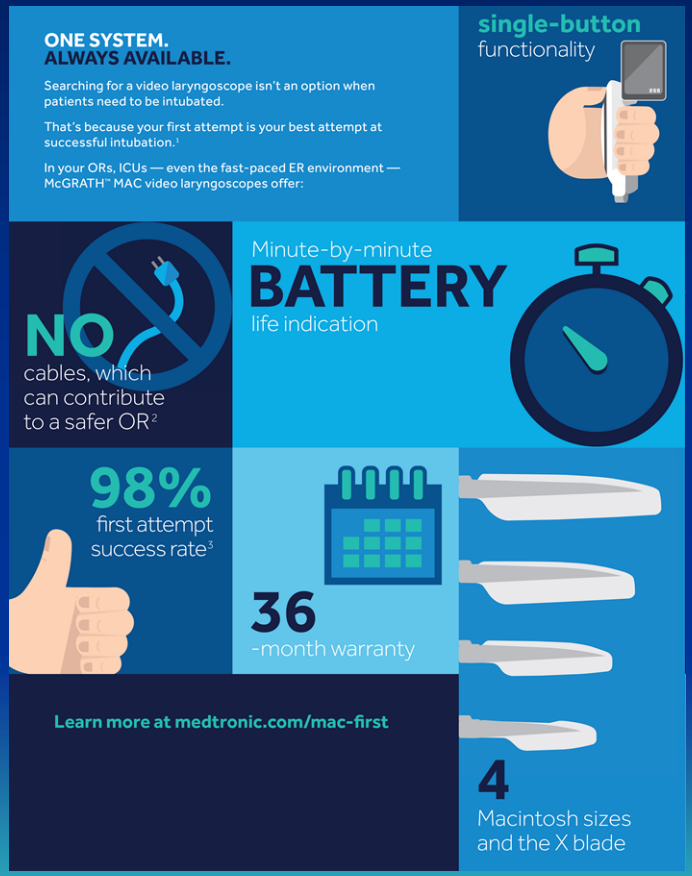
- Difficult intubations can lead to catastrophic impact to patients, such as
  - Airway Trauma
  - Brain Damage
  - Possible Death
- Video laryngoscopy improves first intubation success and reduces failures

WHY USE VIDEO LARYNGOSCOPY?



McGrath MAC Video

- Unexpected difficult intubations happen and can cause long-term complications for patients
- Video larygoscopy is supported by evidence to improve the success of first-time intubations when a difficult airway unexpectedly occurs
- The McGrath MAC video laryngoscope has been shown to decrease the incidence of difficult intubations compared to direct laryngoscopy
- MAC Intubation Guide
- MAC Getting Started
- MAC Clinical Use with Lidocaine
- MAC Clinical Use Pediatric



QUESTIONS?