

**Northwest Community EMS System - Continuing Education – January 2015**  
**Bougie-Assisted Endotracheal Intubation (ETI) - Post-Test Study-Questions – page 1**

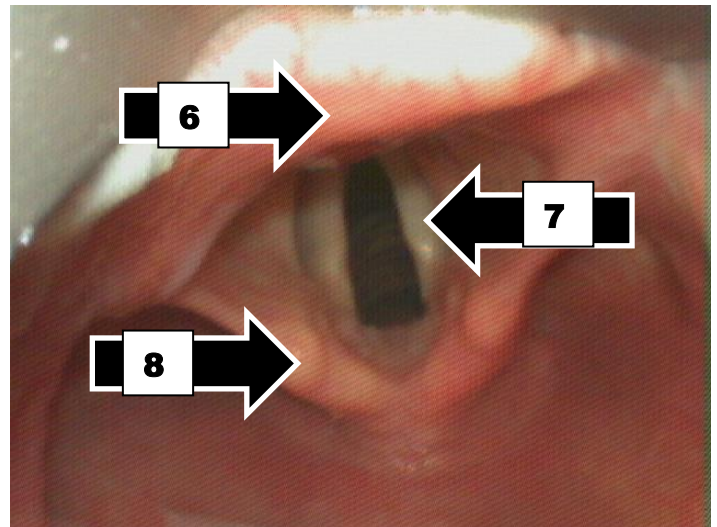
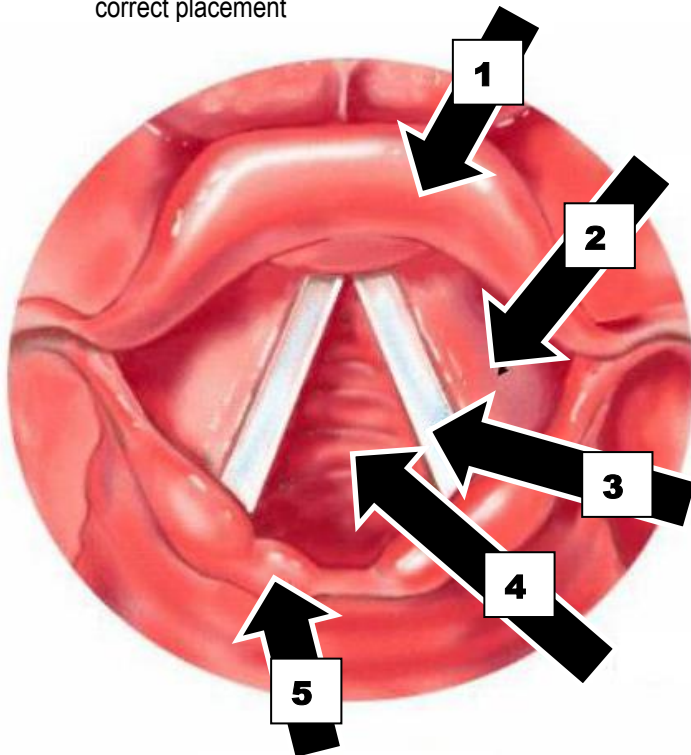
1. What is an advantage to bougie-assisted ETI?
  - A. Allows blind ETI
  - B. PM's can exchange King LTSD for ET tube
  - C. Narrow diameter allows improved visualization
  - D. Able to ETI despite inability to see any landmarks
2. What is an advantage to bougie-assisted ETI?
  - A. Allows blind ETI
  - B. Curved tip aids passage into glottic opening
  - C. Able to ETI despite inability to see landmarks
  - D. PM's can exchange a King LTSD for an ET tube
3. What should be done if PM's anticipate a VERY DIFFICULT intubation?
  - A. Use bougie on first attempt
  - B. Go immediately to surgical cricothyrotomy
  - C. Make no attempt to place an advanced airway
  - D. Must always attempt first ETI without using bougie
4. What structure(s) must be visualized to use the bougie?
  - A. Vocal cords
  - B. Tongue or pyriform fossa
  - C. Esophagus or vestibular folds
  - D. Epiglottis or posterior cartilage
5. If the pt has laryngeal or tracheal injury, can the bougie be used?
  - A. Yes, cautiously
  - B. Only with OLMC direction
  - C. No, it is a contraindication
  - D. Only if pt is greater than 70kg
6. Which describes the bougie?
  - A. Disposable & flexible
  - B. Disposable & rigid
  - C. Reusable & flexible
  - D. Reusable & rigid
7. What is the outer diameter of the bougie?
  - A. 5 fr / 2 mm
  - B. 15 fr / 5 mm
  - C. 30 fr / 10 mm
  - D. 44 fr / 15mm
8. How long is the bougie?
  - A. 6-7 cm
  - B. 60-70 cm
  - C. 600-700 cm
9. What type of tip does the NWC EMSS bougie have?
  - A. Straight
  - B. Curved
  - C. Either straight or curved
10. What is meant by a coude tip on the bougie?
  - A. Curved tip
  - B. Straight tip
  - C. Either curved or straight tip
11. What type of markings does the bougie have?
  - A. cm
  - B. Mm
  - C. inches
  - D. none
12. How should the tip of the bougie be shaped?
  - A. Straight
  - B. 15-20 degree angle
  - C. 35-40 degree angle
  - D. 45-90 degree angle
13. How much of the bougie tip should be shaped?
  - A. none
  - B. ½ inch
  - C. 1 inch
  - D. 3-6 inches
14. How should the bougie be inserted?
  - A. Firmly
  - B. Gently
  - C. With either gentle or firm pressure
15. When inserting the bougie, how far from the tip should the intubator hold it?
  - A. ~10 cm
  - B. ~20-30 cm
  - C. ~40-60 cm
  - D. @ 70 cm
16. When inserting the bougie, in what direction should the tip be directed?
  - A. Upward
  - B. Downward
  - C. Laterally at 45 degree angle
  - D. Laterally at 90 degree angle
17. If the epiglottis is visualized, how should the bougie be inserted?
  - A. Directed midline, above epiglottis
  - B. Directed laterally, above epiglottis
  - C. Directed midline, under epiglottis
  - D. Directed laterally, under epiglottis
18. If the posterior cartilage is visualized, how should the bougie be inserted?
  - A. Directed midline, above posterior cartilage
  - B. Directed laterally, above posterior cartilage
  - C. Directed midline, under posterior cartilage
  - D. Directed laterally, under posterior cartilage
19. What is an indication the bougie is in the trachea?
  - A. Clicking/vibration sensation felt
  - B. No clicking or vibration sensation is felt
20. What is an indication the bougie is in the esophagus?
  - A. Clicking/vibration sensation felt
  - B. No clicking or vibration sensation is felt
21. What is confirmation the bougie is in the trachea?
  - A. Resistance/hold-up is felt 25-40 cm @ teeth
  - B. No resistance/hold-up is felt and bougie can easily be inserted to 60 cm
22. What is confirmation the bougie is in the esophagus?
  - A. Resistance/hold-up is felt 25-40 cm @ teeth
  - B. No resistance/hold-up is felt and bougie can easily be inserted to 60 cm
23. When inserting the bougie the PM feels a clicking/vibration sense, what does that indicate?
  - A. Placement in the trachea
  - B. Placement in the esophagus
  - C. Placement in either trachea or esophagus

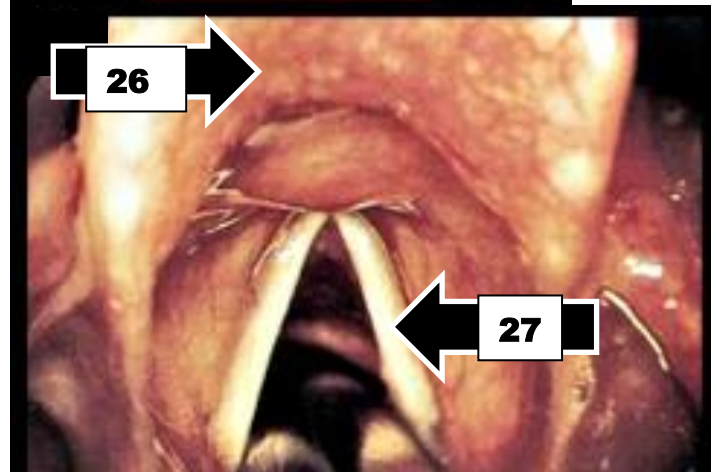
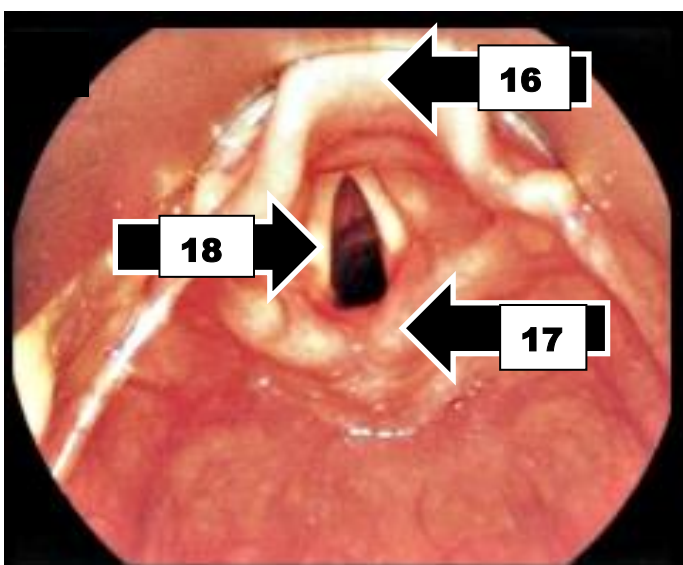
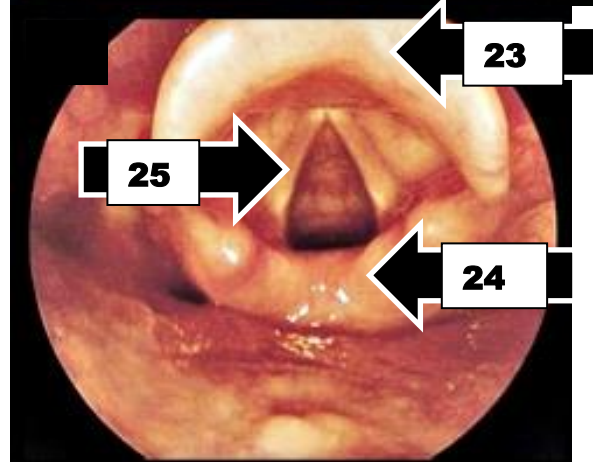
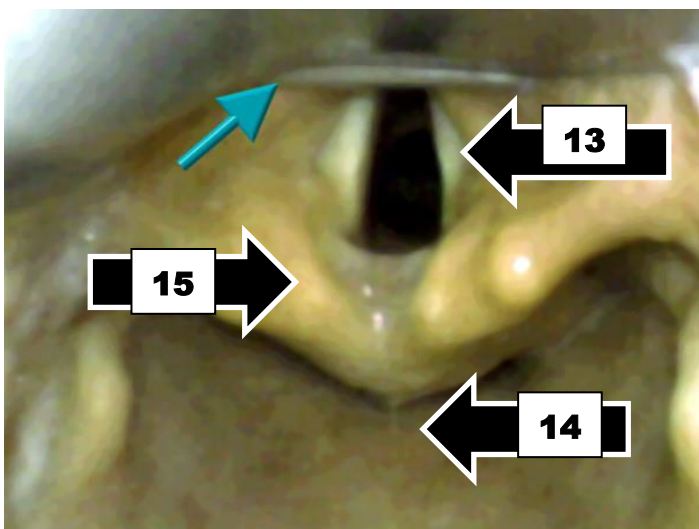
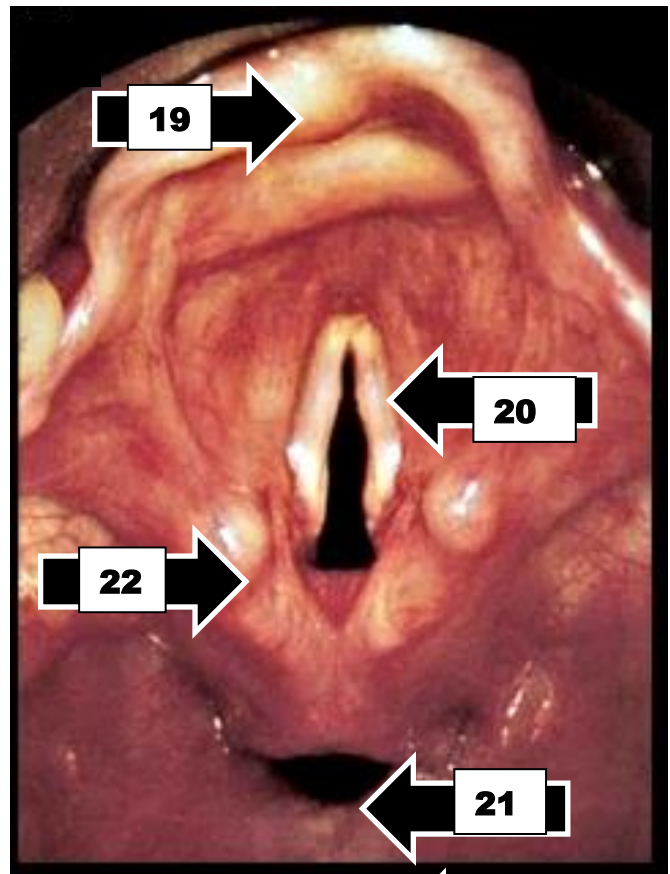
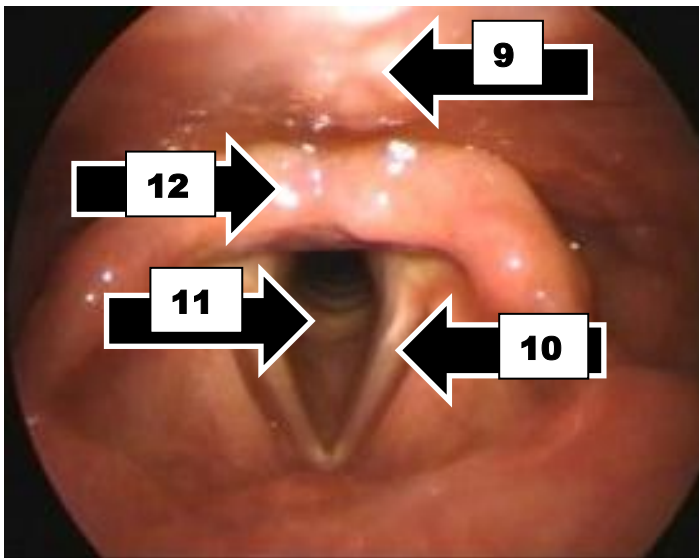
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**Bougie-Assisted Endotracheal Intubation (ETI) - Post-Test Study-Questions – page 2**

24. When inserting the bougie, the PM feels resistance/hold-up ~30cm at teeth, what does that indicate?
- Placement in the trachea
  - Placement in the esophagus
  - Placement in either trachea or esophagus
25. When inserting the bougie the PM does NOT feel a clicking/vibration sense, what does that indicate?
- Placement in the trachea
  - Placement in the esophagus
  - Placement in either trachea or esophagus
26. When inserting the bougie, the PM is able to insert it to 60 cm @ teeth without any resistance, what does that indicate?
- Placement in the trachea
  - Placement in the esophagus
  - Placement in either trachea or esophagus
27. What causes the clicking/vibration sense that may be felt when the bougie is correctly placed?
- Tracheal rings
  - Esophageal sphincters
  - Passage over the vocal cords
  - Rubbing against the epiglottis
28. At what depth should the bougie be positioned, prior to advancing ET tube over bougie?
- ~10 cm @ teeth
  - ~25 cm @ teeth
  - ~40 cm @ teeth
  - ~60 cm @ teeth
29. Who should place the ET tube on the bougie?
- Assistant
  - Intubator
30. What should be done, when advancing the ET tube over the bougie?
- Laryngoscope should be removed from mouth
  - Laryngoscope should be lifting tongue off posterior pharynx
  - Laryngoscope can either be removed from or left in the mouth
31. What should be done if intubator forgets to keep laryngoscope in place?
- Advance ET tube over bougie without laryngoscope in place
  - Reinsert laryngoscope prior to advancing ET tube over bougie
32. When advancing the ET tube over the bougie, what should be done when the ET tube reaches the intubators fingers on the bougie?
- Intubator should take over control of ET tube
  - Intubator should allow assistant to pass ET tube into trachea
33. When advancing the ET tube over the bougie, what should be done when the ET tube reaches the intubators fingers on the bougie?
- Intubator should maintain control of/hold on bougie
  - Assistant should take over control of/hold on bougie
34. How should the ET tube be advanced into glottis opening over the bougie?
- Insert straight in
  - Rotate ET tube counter-clockwise
35. What is a sign of a possible difficult intubation?
- Thin neck
  - Class I mallampati score
  - Need for in-line intubation
  - Grade I Cormack-Lehane view
36. What is a sign of a possible easy intubation?
- Thin neck
  - Class IV mallampati score
  - Need for in-line intubation
  - Grade IV Cormack-Lehane view
37. On an apneic pt, what should be done prior to beginning BVM ventilation?
- Start an IV/IO
  - Insert oral/nasal airway
  - Attach pt to ECG monitor
  - Obtain pulse oximetry reading
38. How is an oral airway correctly sized?
- Tip of nose to angle of jaw
  - Corner of mouth to earlobe
  - Front of teeth to angle of jaw
  - Corner of mouth to angle of jaw
39. When sizing nasal airways, which is more important?
- Length
  - Diameter
40. How should an oral airway be inserted in both adult & peds pts?
- Using a tongue blade
  - Insert upside down & rotate in place
41. Should capnography be attached to BVM prior to placement of an advanced airway?
- No
  - Yes
  - Only if pt is in cardiac arrest
  - Only if RQP/ITD is being used
42. How long should pts be preoxygenated prior to advanced airway placement?
- 1 minute
  - 3 minutes
  - Only until O2 sat is 100%
  - Only until O2 sat is 94-98%
43. How quickly/slowly should the bag be squeezed to deliver one breath?
- Quickly, as fast as possible
  - Over 1 second
  - Over 2-3 seconds
  - Slowly over 6 seconds
44. What is a correct rate to ventilate an adult pt with asthma/COPD?
- Once every 3 seconds
  - Once every 5 seconds
  - Once every 6 seconds
  - Once every 10 seconds
45. What is a correct rate to ventilate an adult pt (without asthma/COPD)?
- Once every 2 seconds
  - Once every 4 seconds
  - Once every 6 seconds
  - Once every 10 seconds
46. When ventilating a pt with a BVM, how should a PM know when to stop squeezing the bag?
- When chest rise is seen
  - When 350 mL has been delivered
  - When 750 mL has been delivered
  - When the PM has squeezed the bag entirely

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47. When intubating an adult, unless contraindicated, where should padding be placed?  
A. Under the head  
B. Under the shoulders  
C. Under the entire torso  
D. No padding is needed for adults
48. When properly positioned for ETI, what should the pts earlobe should be horizontal with?  
A. Sternum  
B. Tip of toes  
C. Midaxillary line  
D. Anterior axillary line
49. For an average adult, approximately how much padding is needed?  
A. 2 inches  
B. 4 inches  
C. 8 inches  
D. 10-12 inches
50. During an ETI attempt, when the intubator has a laryngoscope in the pts mouth, what should the assistant be doing?  
A. Holding stethoscope on chest wall  
B. Monitoring HR, ECG, O2 sat, elapsed time  
C. Preparing equipment to secure ET tube in place  
D. Preparing equipment to confirm correct placement
51. What constitutes an intubation attempt?  
A. Insertion of blade in mouth  
B. Attempt to pass ET tube into trachea  
C. Ventilating an ET tube
52. If an ETI attempt is unsuccessful, should the ET tube be left in place or removed prior to making a second attempt?  
A. Removed  
B. Left in place  
C. Either removed or left in place
53. Can the King LTSD airway be used without making an attempt at ETI?  
A. No  
B. Yes  
C. Only with OLMC direction
54. What placement should be suspected if - when using the EDD, if no resistance is felt?  
A. Trachea  
B. Esophagus  
C. Either trachea or esophagus
55. What can be done to improve the loudness of breath sounds when auscultating to confirm correct tracheal placement of an ET tube?  
A. Nothing  
B. Inflate ET tube cuff  
C. Ventilate once every 1-second  
D. Ventilate with 1000 mL of tidal volume
56. Which is a correct volume of air to place in the cuff of a properly sized ET tube?  
A. 2-3 mL  
B. 6-8 mL  
C. 12 mL  
D. 20 mL
- 57-60. What structure is the arrow pointing toward?  
A. Tongue  
B. Trachea  
C. Epiglottis  
D. Esophagus  
E. Vocal cords  
F. Pyriform fossa  
G. Vestibular folds  
H. Posterior cartilage





# Northwest Community EMS System - Airway Mgmt w/ Intubation

## AIRWAY

### BSI/PPE

- ☐ Gloves ☐ Goggles ☐ Mask

### Airway Opening

- ☐ Head tilt & ☐ Chin lift maneuver (modified jaw thrust PRN)
- ☐ Suction mouth w/ rigid/Yankaur tip PRN
- ☐ Size OPA: front of teeth to angle of jaw
  - ☐ Use tongue blade to depress tongue and insert
- ☐ Size NPA: tip of nose to earlobe
  - ☐ Lubricate well and insert (straight down) along floor of nostril
- ☐ Size & ☐ insert oral (OP) or nasal (NP) airway (NP: don't need to remove, in place if >1 ETI attempt needed)
- ☐ Consider use of OPA and bilateral NPA
- ☐ Apply mask over nose and mouth (without occluding nostrils)
- ☐ Maintain mask face seal w/ thumb & index finger
- ☐ Maintain open airway by lifting chin w/ middle, ring & 5th finger

## BREATHING

- ☐ Pre-oxygenate for 3 min - with capnography sensor on BVM  
*If pt spontaneously breathing: attempt preoxygenation w/ NRB mask to prevent gastric distention from BVM*
- ☐ Squeeze bag over 1 sec, just to see chest rise (~400-600 mL)
- ☐ Avoid high pressure (opens esophagus-causes gastric distention)

### 2 Person BVM Ventilation

- # 1** ☐ Hold mask over nose & mouth w/ thumb & index finger or thumb aspect of hands (thenar eminence)
  - ☐ holds airway open w/ middle, ring & 5<sup>th</sup> finger under jaw
- # 2** ☐ Use one hand to squeeze the bag and
  - ☐ consider use of cricoid pressure w/ other hand

- ☐ Ventilate at 10/min (1 every 6 sec)
- ☐ Asthma/COPD ventilate @ 6-8/min
- ☐ Avoid hyperventilation (rate, volume, or pressure)
- ☐ Confirm BVM connected to oxygen @ 15 LPM
- ☐ Attach to ECG monitor
- ☐ Obtain O<sub>2</sub> saturation reading ASAP (if pulse present)

## PREPARATION

Assess for difficult intubation  
Have everything ready BEFORE placing blade in pts mouth

### Equipment

- ☐ Suction: connect Yankeur, turn on to ✓
- ☐ Alternative airway: King LTSD airway in sight

### Laryngoscope

- ☐ Attach blade to handle
- ☐ Check light source (bright & tight)

### ET tube

- ☐ Choose correct size ETT (women 7-8, men 8-9)
- ☐ Insert & shape stylet
- ☐ Check cuff (while in pkg) & leave syringe attached
- ☐ Apply lubricant

### Confirmation & Securing

- ☐ EDD
- ☐ Capnography (already attached to BVM)
- ☐ Stethoscope (put around your neck)
- ☐ ETT holder (place under pts neck)
- ☐ c-collar or lat head immobilizer

### Medications PRN

- ☐ Head injury / ↑ ICP: Lidocaine – per SOP
- ☐ Pain: Fentanyl - per SOP
- ☐ Drug-Assisted
- ☐ Midazolam – per SOP
- ☐ Etomidate – per SOP
- ☐ Benzocaine – whenever midazolam/etomidate used, unless CI

## INTUBATE

- ☐ Place head in sniffing position, unless contraindicated (head extended, neck flexed – earlobe horizontal w/ sternum)
- ☐ Pad ~8-10 cm (4") under occipital/head, unless contraindicated
- ☐ Remove ETT from pkg and hold in (R) hand (so don't have to look away to pick up tube when cords visualized)
- ☐ Open mouth w/ cross-finger technique
- ☐ PRN: External laryngeal manipulation (ELM) of thyroid cartilage
- ☐ PRN: (R) sided cheek/lip retraction - request assistant to perform
- ☐ Assistant to monitor pts (1) HR, (2) ECG, (3) O<sub>2</sub> sat, (4) elapsed time during procedure
- ☐ Insert curved blade from (R) side of mouth, sweep tongue to (L)  
NOTE: Every insertion of blade into pts mouth is considered an "intubation attempt" Limit/maximum 2 attempts per patient
- ☐ Lift upward and forward (without tilting blade backward on teeth)  
Curved blade inserted into vallecula; straight blade lifts epiglottis
- ☐ Visualize vocal cords (anterior to/above posterior cartilage)
- ☐ Pass tube from (R) side of mouth through vocal cords (not straight down blade)
- ☐ If not passed within 30 sec of apnea:
  - (1) Remove ETT & Re-oxygenate X 30 sec
  - (2) Consider change: PM, Pt position, Blade, Meds, King LT
- ☐ If not passed 2<sup>nd</sup> attempt: reoxygenate x 30 sec & use King LT  
NOTE: Do NOT need 2 unsuccessful ETI attempts to use King LT airway (e.g, unable to visualize cords, poor pt access)
- ☐ Pass tube until cuff disappears beyond vocal cords ~19-23 cm @ front teeth/gums (ETT size X 3)
- ☐ While holding ETT in place remove laryngoscope blade from mouth and stylet from ETT

## CONFIRM

- ☐ Attach EDD and aspirate for - ease of air return
- ☐ If EDD resistance: attempt direct visualization ETT thru vocal cords
- ☐ Attach bag-valve device w/ capnography to ETT
- ☐ Ventilate and auscultate (1<sup>st</sup>) over stomach for – absence of gastric sounds (listen to gastric before lung sounds)
- ☐ Ventilate and auscultate (R), then (L), mid-axillary line and anterior (L) & (R) chest for - equal breath sounds
- ☐ If absent: Remove ETT & Re-oxygenate for 30 sec prior to re-attempting ETI
- ☐ If difficulty hearing / confirming breath sounds: consider inflating cuff to minimize air leak and listen
- ☐ Note ETCO<sub>2</sub> number & waveform
- ☐ Ventilate at 10/min (1 every 6 sec); unless asthma/COPD (ventilate @ 6-8/min)
- ☐ Avoid hyperventilation (rate & depth), squeeze bag over 1 sec, watch for chest expansion

## SECURE

- ☐ Inflate ETT cuff with ~4-10mL air (until no air leak heard)
- ☐ Remove syringe
- ☐ Note ETT depth cm @ front teeth/gums
- ☐ Secure ETT in place w/ tube holder
- ☐ Lateral head immobilization - apply (c-collar or lat head immob)
- ☐ Insert OP airway as bite block - PRN
- ☐ Suction ETT w/ soft suction catheter - PRN

## REASSESS

Frequently to detect displacement and complications (esp after pt mvmt or pt status/condition changes)

- ☐ EtCO<sub>2</sub> ☐ HR ☐ Lung sounds
- ☐ O<sub>2</sub> sat ☐ BP

# Northwest Community EMS System

## Procedure Endotracheal Intubation (ETI) – Bougie Assisted

### Introduction

- This procedure is to supplement, not replace, the ETI procedure
- Refer to ETI procedure for additional details
- Compared to ET tube (ETT), the bougie's narrow diameter (~5 mm) allows improved visualization, and curved upward tip facilitates easier passage into glottic opening

### Indications

- Anticipated difficult ETI, may be used for first attempt
- Inability to visualize vocal cords or second intubation attempt
- Requires visualization of either epiglottis (minimum) or posterior cartilage (preferable)

### Contra-indication

Inability to visualize either epiglottis or posterior cartilage

### Caution

Laryngeal or tracheal injury – can exacerbate trauma

### Equipment

- “Bougie” also known as “endotracheal tube introducer,” “eschmann stylet,” “gum-elastic bougie”
  - Disposable, single-use, flexible with shape retention
  - Size: 15 Fr, 60-70 cm, coude tip (coude = curved)
- ETT: avoid too large of tube, gap between bougie and ETT can hinder advancement

### Procedure

1. Prepare patient and equipment per standard ETI procedure
2. Remove bougie from package
  - a. Note markings and orientation of upturned coude tip
  - b. If needed, straighten bougie and curve distal end (~1” from tip) at 35-40° angle
3. Grip bougie like pencil w/ curved tip facing upward in right hand (laryngoscope in left hand)
  - a. Caution: Minor rotation of bougie can significantly change orientation and location of tip and prevent placement and confirming clicking sensation (described below)
4. Visualization & Insertion
  - a. Insert gently; avoid forceful insertion - can cause tracheal trauma/perforation
  - b. Epiglottis: insert bougie directed midline - under epiglottis
  - c. Posterior cartilage: insert bougie directed midline - above posterior cartilage
5. Confirmation
  - a. Clicking/vibration sensation felt (60-95% cases) when bougie tip rubs against tracheal rings; note – to be felt, tip must be directed anteriorly
  - b. Bougie will stop advancing and resistance (“hold-up”) will be felt 25-40 cm at teeth because of distal airway narrowing
  - c. If inserted into esophagus - no clicking/vibration is felt and tip easily advances well beyond 40 cm
6. Intubator maintains view with laryngoscope and firm hold onto bougie
  - a. Maintain bougie 25 cm @ teeth
  - b. Keep laryngoscope in place to allow ETT to pass under tongue
7. Assistant advances ETT (with lubricated tip) into proper position
  - a. With bougie tip placed in trachea, assistant places ETT over bougie and advances ETT
  - b. As ETT reaches intubators fingers, assistant takes over hold on bougie while intubator continues advancing ETT toward glottic opening
  - c. Counter-clockwise rotation of ETT facilitates insertion through vocal cords into larynx
8. Once ETT cuff passes beyond vocal cords, while firmly holding ETT in place, carefully remove bougie
9. Confirm, secure and reassess per ETI procedure



## Continuing Education – Jan 2015 (rev) Bougie Assisted Intubation

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**NOTE: Mandatory CE = any content missed - needs to be made up to receive credit.**



## Objectives - Agenda

1. Why need bougie-assisted intubation?
2. S/S difficult endotracheal intubation (ETI)
3. Alternatives for airway mgmt
4. Bougie
  - a. Effectiveness
  - b. Procedure (NWC EMSS)
  - c. Videoclips (now or later)
5. Demonstration
6. Practice
7. Return demo w/ skill evaluation

## Videos to Watch

A GSAHMS (3m)  
<https://www.youtube.com/watch?v=l2XFtIPL4Aw>  
B Crit-IO (5m)  
<https://www.youtube.com/watch?v=iJlwnET5NgY>  
C Hennepin EM (5m)  
<https://www.youtube.com/watch?v=H3OC07jan6Y>  
D Scott Weingart (2m)  
<https://www.youtube.com/watch?v=E7Lo1JD2Brk>  
E Morris (1m)  
<https://www.youtube.com/watch?v=UZox7FZZ80>  
F  
G alku (1m)  
[https://www.youtube.com/watch?v=u1cMT2nYT\\_8](https://www.youtube.com/watch?v=u1cMT2nYT_8)  
H Gaetanizhba (2m)  
<https://www.youtube.com/watch?v=8uNbLY43yzg>  
I Bougie PM Intern (1m)  
<https://www.youtube.com/watch?v=lx8i708Cv7g>



## Why the need for bougie-assisted ETI?



**"It is not enough to do your best;  
you must know what to do,  
and then do your best"**

W. Edwards Deming



## Why the need for bougie-assisted ETI?

Low ETI Success Rates  
+ Difficult Intubations  
= Poor Patient Outcome



## Why Low ETI Success Rates?

- Minimal initial education/practice
- Infrequent skill use
- Difficult conditions (pt & environment)
- Limited resources (drugs, equipment)



"Actually, you're my **second** patient if you count that cadaver in med school."



## ETI Experience



- **NWC EMSS**
  - EMS calls ~62,000/yr
  - PM's ~900
  - ETI = 280/yr (0.45% calls)
- **AHA recommends**
  - ETI x 6/yr (minimum) to maintain skill level
  - 900 PM's x 6 ETI/yr = 5,400 ETI's needed
- **NWC EMSS**
  - 280 ETI's ÷ 6 ETI/yr = skills for 47 PM's (5% of PM's)



## ETI Success

**A pilot model for predicting the success of prehospital endotracheal intubation.**

© Author information

### Abstract

**OBJECTIVES:** We sought to evaluate the success of prehospital, non-drug-assisted endotracheal intubation (ETI) performed by Virginia prehospital care providers and to develop a model designed to predict the probability of success of ETI.

**METHODS:** We conducted a retrospective observational study on prehospital, non-drug-assisted ETI (N = 4002) performed by Virginia prehospital care providers, from January 1, 2012, to December 31, 2012. Using descriptive statistics, we quantified patient, provider, and system characteristics. Success rates were calculated by provider certification level and number of ETI attempts. Procedure complications were evaluated for the entire cohort. Variables were recoded for modeling purposes. Univariate analyses using  $\chi^2$  tests were performed to identify candidate parameters to be included in the model. We performed a backward stepwise logistic regression to predict ETI success.

**RESULTS:** An overall success rate of 69.3% was found. Binary logistic regression revealed the following covariates associated with ETI success: community type, provider certification level, gender, age group, myocardial infarction, and ethnicity which were all significant ( $p < 0.05$ ) with a -2 log-likelihood value of 3705.574. This was the most parsimonious model evaluated and demonstrated good fit (Hosmer-Lemeshow test  $P = .646$ ) but poor discrimination (area under the receiver operating characteristic curve = 0.595).

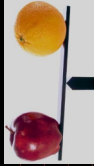
**CONCLUSION:** This study characterized prehospital ETI success using retrospective state data and found a low overall success rate. Binary logistic regression was performed to create a model and equation identifying a set of factors associated with ETI success.



## Premier EMS ETI (99% success rate)

### How do they do it?

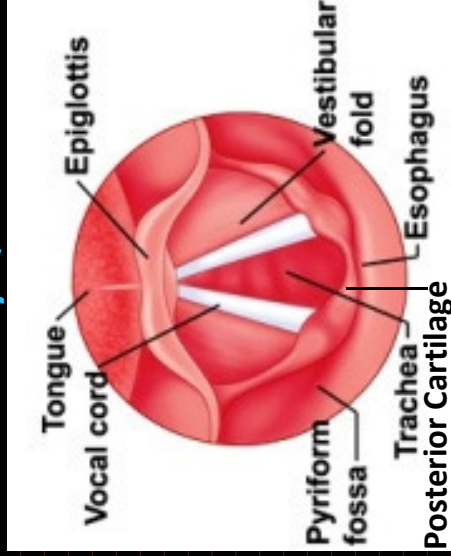
- King County, WA
- Seattle EMS
- 7,523 pts intubated (2006-2011)
  - 18,000 ALS/46,000 BLS
  - 74 PM's on 7 amb
- Overall success 99%
- CE minimum 50 hr/yr
  - >12 ETI/yr required
- w/ paralytics
- PM education
- Bougie used in 19%
  - >2500 hr / 1 year
  - 16 students/class
  - 36 ETI's / 800 IV's



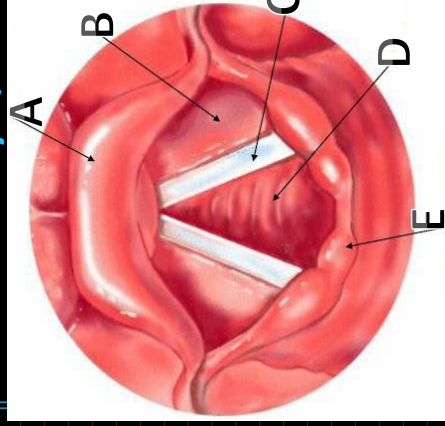
## Future of Advanced Airway???



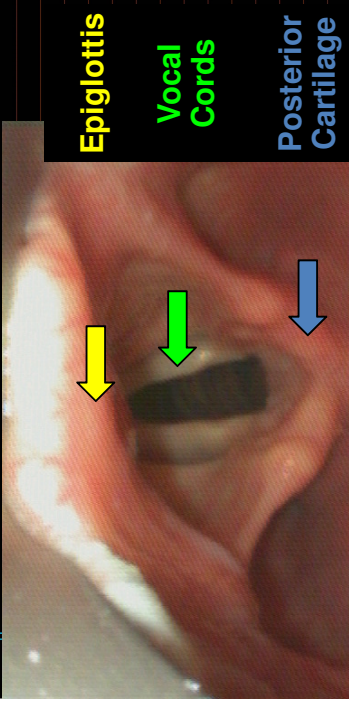
## ETI Anatomy Quick Review



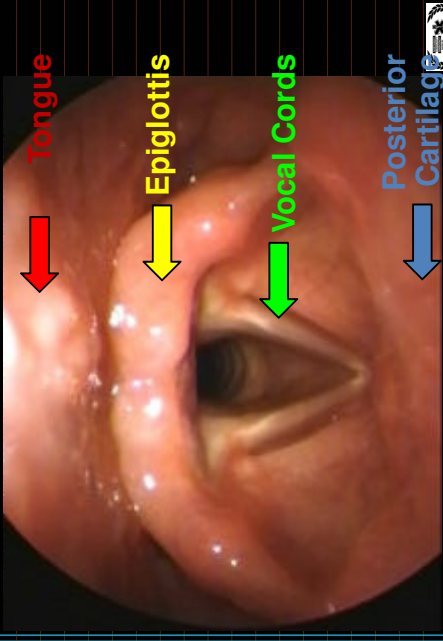
## ETI Anatomy Quick Review



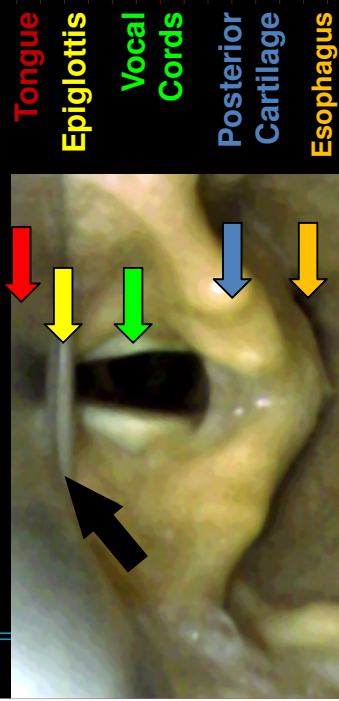
## ETI Anatomy Quick Review



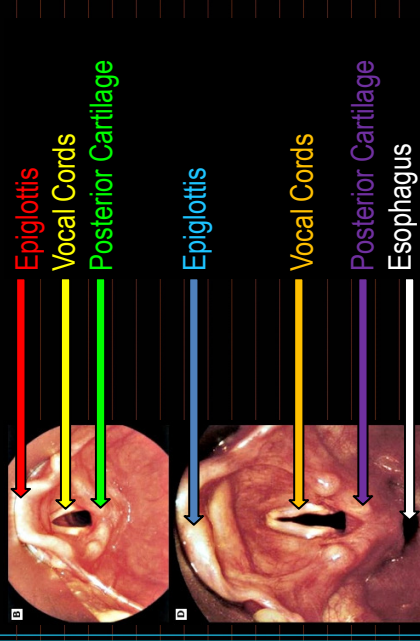
## ETI Anatomy Quick Review



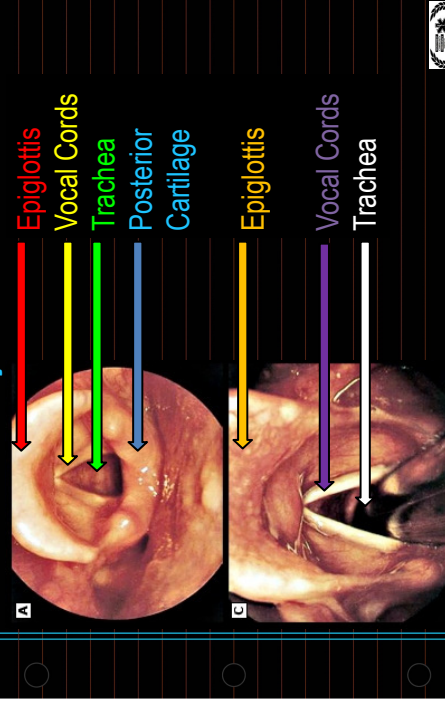
## ETI Anatomy Quick Review



## ETI Anatomy Quick Review

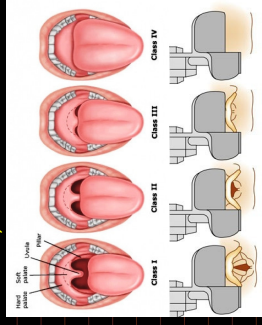


## ETI Anatomy Quick Review

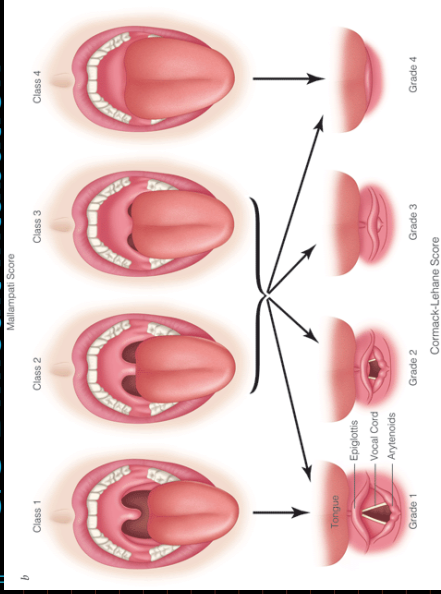


## S/S Difficult Intubation ???

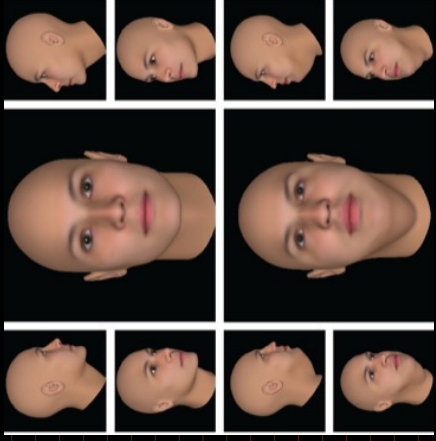
- Mass/obesity/swelling/trauma
- Secretions
- Mouth opening
- Neck mobility (flexion/extension)
- Neck length & thickness
- Dental overbite
- Thyromental distance
- Sternomental distance
- Mallampati
- Cormack Lehane



## S/S Difficult Intubation



## Difficult Intubation ???



## Alternatives



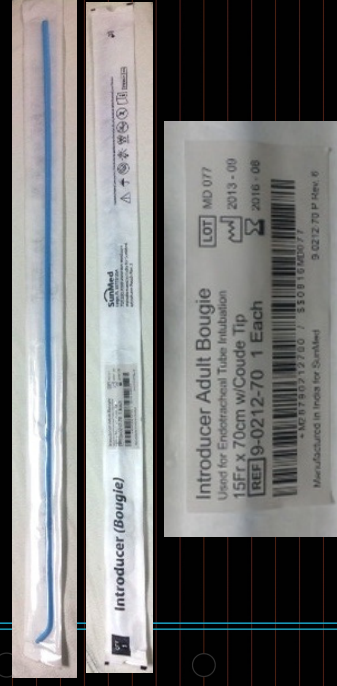
## Not an Alternative



## Bougie-Assisted ETI



## Bougie



## Bougie “Parts”

60-70 cm Long

Centimeter (cm) Markings

15 fr (Diameter)

Disposable/Single-Use

Flexible w/ Shape Retention

Coude (curved) Tip



First described in 1949 by Sir Robert Macintosh (1897-1989)  
New Zealand born, 1<sup>st</sup> anaesthesia professor outside the US



## Bougie Effectiveness

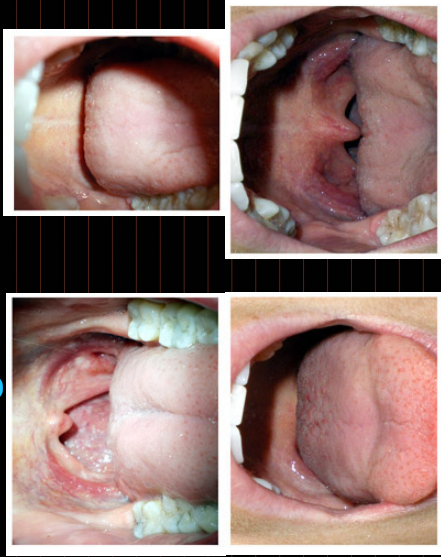


## NWC EMSS Bougie ETI Procedure

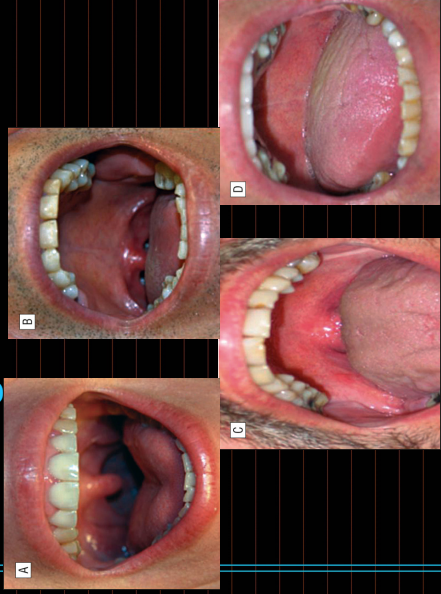
- **Indications**
  - Anticipated difficult ETI (may use 1<sup>st</sup> attempt)
  - 2<sup>nd</sup> ETI attempt
  - Visualization of either epiglottis or posterior cartilage
- **Contraindications**
  - Inability to visualize either epiglottis or posterior cartilage
- **Caution**
  - Laryngeal or tracheal injury (can exacerbate trauma)



## Bougie – Yes or No?



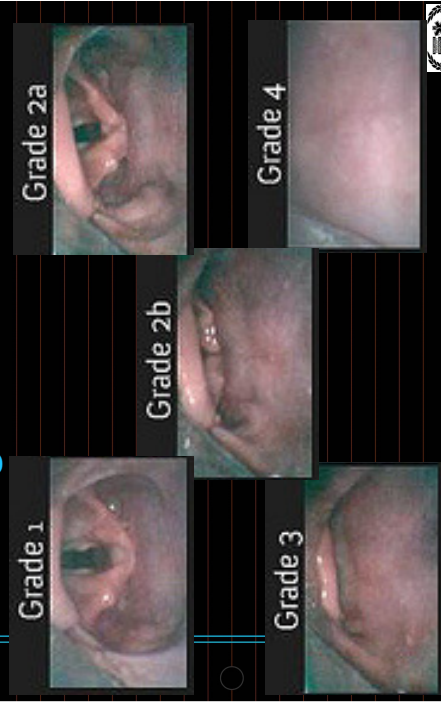
## Bougie – Yes or No?



## Bougie – Yes or No?



## Bougie – Yes or No?



## NWC EMSS Bougie ETI Procedure

1. Prepare pt & equipment per standard ETI procedure
2. Remove bougie from package
  - a. Note markings & orientation of upturned/coude tip
  - b. If needed, straighten bougie and curve distal end (~1" from tip) at 35-40° angle
3. Grip bougie w/ R hand @ 20-30 cm, like a pencil, w/ curved tip facing upward (laryngoscope in L hand)
  - *Caution: Minor rotation of bougie can significantly change orientation and location of tip and prevent placement and confirming clicking sensation (described below)*



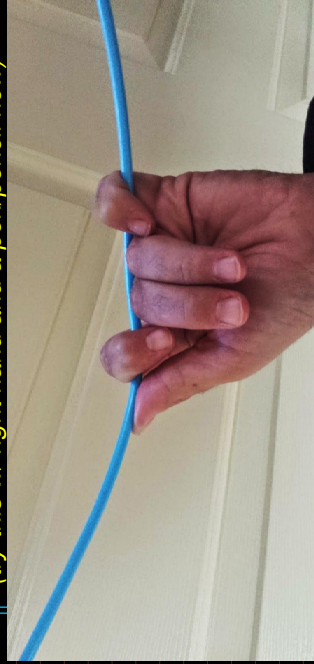
## NWC EMSS Bougie ETI Procedure

Grip bougie @ 25-30 cm like pencil w/ curved tip facing upward in R hand (laryngoscope L hand)



## NWC EMSS Bougie ETI Procedure

Alternate grip method - prevent rolling between fingers  
(try this w/ right hand and a pen/pencil now)



## NWC EMSS Bougie ETI Procedure

### 4. Visualization & Insertion

- a. Insert **GENTLY**; avoid forceful insertion – can cause tracheal trauma/perforation
- b. Epiglottitis: insert directed midline under epiglottis
- c. Posterior Cartilage: insert midline above posterior cartilage



## NWC EMSS Bougie ETI Procedure

5. Confirmation
  - a. Clicking/vibration sensation felt (60-95% cases) when bougie tip rubs against tracheal rings; note – to be felt, tip must be directed anteriorly
  - b. Bougie will stop advancing and resistance (“hold-up”) will be felt 25-40 cm at teeth because of distal airway narrowing (*most reliable*)
  - c. If inserted into esophagus: no clicking or vibration is felt and tip easily advances well beyond 40 cm



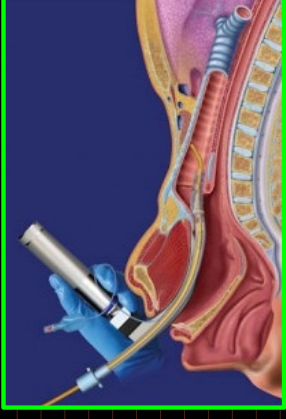
## Bougie Location

### Trachea

“Hold-Up” @ 20-40 cm  
Clicking/vibration sense

### Esophagus

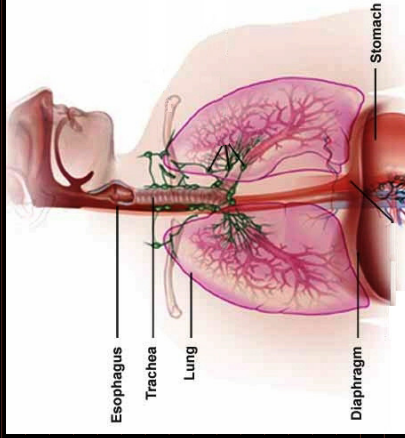
NO “hold-up”  
NO clicking/vibration sense



## Bougie Location - most reliable method

**Trachea**  
**Resistance**  
**(“hold-up”)**  
**felt 20-40 cm**  
**@ teeth**

**Esophagus**  
**NO “hold-up”**  
**will advance**  
**beyond 40 cm**



## Bougie Location

### Trachea

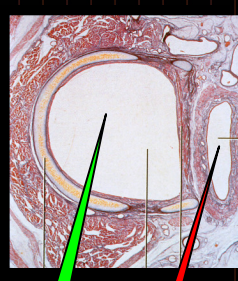
Clicking/vibration sensation felt (60-95% cases) when bougie tip rubs against tracheal rings; note – to be felt, tip must be directed anteriorly

Trachea w/ c-shaped tracheal rings

### Esophagus

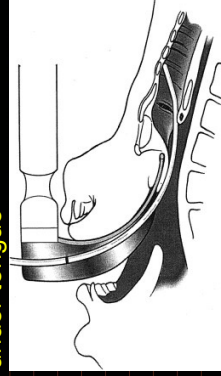
NO clicking/vibration is felt

Esophagus



## NWC EMSS Bougie ETI Procedure

6. Intubator maintains view with laryngoscope and firm hold onto bougie
  - a. Maintain bougie ~25 cm @ teeth
  - b. Keep laryngoscope in place to allow ETT to pass under tongue



## NWC EMSS Bougie ETI Procedure

7. Assistant advances ETT (w/ lubricated tip) into proper position
  - a. With bougie tip placed in trachea, assistant places ETT over bougie and advances ETT
  - b. As ETT reaches intubators fingers, assistant takes over hold on bougie - while intubator continues advancing ETT toward glottic opening
  - c. Counter-clockwise rotation of ETT facilitates insertion through vocal cords into larynx



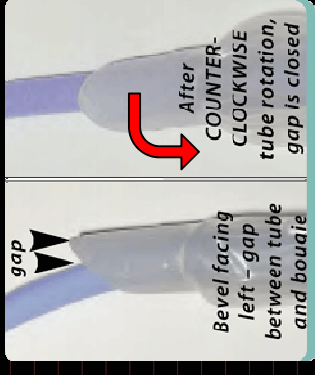
## NWC EMSS Bougie ETI Procedure

As ETT reaches intubators' fingers, assistant takes over hold on bougie while intubator continues advancing ETT toward glottic opening



## NWC EMSS Bougie ETI Procedure

Counter-clockwise rotation of ETT facilitates insertion through vocal cords into larynx



## NWC EMSS Bougie ETI Procedure

8. Once ETT cuff passes beyond vocal cords, while firmly holding ETT in place, carefully remove bougie
9. Confirm, secure & reassess per ETI procedure



# Questions

Instructor Demo & Practice  
then

Return Demo w/ Skill Evaluation