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 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 / 15 mm

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 felt

20. What is an indication the bougie is in the esophagus?
A. Clicking/vibration sensation felt
B. No clicking or vibration sensation 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

---

Northwest Community EMS System - Continuing Education – January 2015
Bougie-Assisted Endotracheal Intubation (ETI) - Post-Test Study-Questions – page 1
24. When inserting the bougie, the PM feels resistance/hold-up ~30cm at teeth, what does that indicate?  
A. Placement in the trachea  
B. Placement in the esophagus  
C. Placement in either trachea or esophagus  

25. When inserting the bougie the PM does NOT feel 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  

26. When inserting the bougie, the PM is able to insert it to 60 cm @ teeth without any resistance, what does that indicate?  
A. Placement in the trachea  
B. Placement in the esophagus  
C. Placement in either trachea or esophagus  

27. What causes the clicking/vibration sense that may be felt when the bougie is correctly placed?  
A. Tracheal rings  
B. Esophageal sphincters  
C. Passage over the vocal cords  
D. Rubbing against the epiglottis  

28. At what depth should the bougie be positioned, prior to advancing ET tube over bougie?  
A. ~10 cm @ teeth  
B. ~25 cm @ teeth  
C. ~40 cm @ teeth  
D. ~60 cm @ teeth  

29. Who should place the ET tube on the bougie?  
A. Assistant  
B. Intubator  

30. What should be done, when advancing the ET tube over the bougie?  
A. Laryngoscope should be removed from mouth  
B. Laryngoscope should be lifting tongue off posterior pharynx  
C. Laryngoscope can either be removed from or left in the mouth  

31. What should be done if intubator forgets to keep laryngoscope in place?  
A. Advance ET tube over bougie without laryngoscope in place  
B. 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?  
A. Intubator should take over control of ET tube  
B. 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?  
A. Intubator should maintain control of/hold on bougie  
B. Assistant should take over control of/hold on bougie  

34. How should the ET tube be advanced into glottis opening over the bougie?  
A. Insert straight in  
B. Rotate ET tube counter-clockwise  

35. What is a sign of a possible difficult intubation?  
A. Thin neck  
B. Class I mallampati score  
C. Need for in-line intubation  
D. Grade I Cormack-Lehane view  

36. What is a sign of a possible easy intubation?  
A. Thin neck  
B. Class IV mallampati score  
C. Need for in-line intubation  
D. Grade IV Cormack-Lehane view  

37. On an apneic pt, what should be done prior to beginning BVM ventilation?  
A. Start an IV/IO  
B. Insert oral/nasal airway  
C. Attach pt to ECG monitor  
D. Obtain pulse oximetry reading  

38. How is an oral airway correctly sized?  
A. Tip of nose to angle of jaw  
B. Corner of mouth to earlobe  
C. Front of teeth to angle of jaw  
D. Corner of mouth to angle of jaw  

39. When sizing nasal airways, which is more important?  
A. Length  
B. Diameter  

40. How should an oral airway be inserted in both adult & ped's pts?  
A. Using a tongue blade  
B. Insert upside down & rotate in place  

41. Should capnography be attached to BVM prior to placement of an advanced airway?  
A. No  
B. Yes  
C. Only if pt is in cardiac arrest  
D. Only if RQP/ITD is being used  

42. How long should pts be preoxygenated prior to advanced airway placement?  
A. 1 minute  
B. 3 minutes  
C. Only until O2 sat is 100%  
D. Only until O2 sat is 94-98%  

43. How quickly/slowly should the bag be squeezed to deliver one breath?  
A. Quickly, as fast as possible  
B. Over 1 second  
C. Over 2-3 seconds  
D. Slowly over 6 seconds  

44. What is a correct rate to ventilate an adult pt with asthma/COPD?  
A. Once every 3 seconds  
B. Once every 5 seconds  
C. Once every 6 seconds  
D. Once every 10 seconds  

45. What is a correct rate to ventilate an adult pt (without asthma/COPD)?  
A. Once every 2 seconds  
B. Once every 4 seconds  
C. Once every 6 seconds  
D. Once every 10 seconds  

46. When ventilating a pt with a BVM, how should a PM know when to stop squeezing the bag?  
A. When chest rise is seen  
B. When 350 mL has been delivered  
C. When 750 mL has been delivered  
D. When the PM has squeezed the bag entirely
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 pt's earlobe 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 pt's 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
Equipment
- Suction: connect Yankauer, 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: Lidocaine – per SOP
- Pain: Fentanyl - per SOP
- Drug-Assisted
  - Midazolam – per SOP
  - Etomidate – per SOP
- Benzocaine – whenever midazolam/etomidate used, unless CI

Pain: Fentanyl - per SOP
Benzocaine – whenever midazolam/etomidate used, unless CI
# Endotracheal Intubation (ETI) – Bougie Assisted

## 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

## Introduction

- This procedure is to supplement, not replace, the ETI procedure
- Refer to ETI procedure for additional details
- Compared to ET tube (ETT), the boogie’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)

## Contraindication

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
Continuing Education – Jan 2015
Bougie Assisted Intubation

Diana Neubecker RN BSN PM
EMSS In-Field Coordinator

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

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)

Videos to Watch
A GSAHEMS (3m)
https://www.youtube.com/watch?v=l2XF1PPL4Aw
B Crit-IQ (5m)
https://www.youtube.com/watch?v=iJlwvET5NgY
C Hennepin EM (5m)
https://www.youtube.com/watch?v=H3OC07jan6Y
D Scott Weingart (2m)
E Morris (1m)
F videos (1m)
https://www.youtube.com/watch?v=u1cMT2nY9T8
H caesarizkha (2m)
https://www.youtube.com/watch?v=8uNblY43yzg
I Bougie PM Intern (1m)
https://www.youtube.com/watch?v=Ix8l708Cv7g

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
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

- **King County, WA**
  - 7523 pts intubated (2006-2011)
  - Overall success 99%
  - RSI in 54% (1st attempt) w/ paralytics
  - Bougie used in 19%
- **Seattle EMS**
  - ~64,000 calls
    - 18,000 ALS/46,000 BLS
    - 74 PM's on 7 ambulances
  - CE minimum 50 hr/yr
    - >12 ETI/yr required
  - PM education
    - >2500 hr / 1 year
    - 16 students/class
    - 36 ETI's / 800 IV's

Future of Advanced Airway??

- Video laryngoscope that can also be used for direct laryngoscopy

ETI Anatomy Quick Review

- A: Epiglottis
- B: Vestibular Folds
- C: Vocal Cords
- D: Trachea
- E: Posterior Cartilage
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
Difficult Intubation

Not an Alternative

Bougie-Assisted ETI

Bougie
First described in 1949 by Sir Robert Macintosh (1897-1989), New Zealand born, 1st anesthesia professor outside the US.

**Bougie “Parts”**
- 60-70 cm Long
- 15 fr (Diameter)
- Centimeter (cm) Markings
- Disposable Single-Use
- Flexible w/ Shape Retention
- Coude (curved) Tip

**Bougie Effectiveness**

**NWC EMSS Bougie ETI Procedure**

- **Indications**
  - Anticipated difficult ETI (may use 1st attempt)
  - 2nd ETI attempt
- Visualization of either epiglottis or posterior cartilage

- **Contraindications**
  - Inability to visualize either epiglottis or posterior cartilage
  - Laryngeal or tracheal injury (can exacerbate trauma)

- **Caution**
  - 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

4. Visualization & Insertion
   a. Insert GENTLY: avoid forceful insertion – can cause tracheal trauma/perforation
   b. Epiglottis: 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 - most reliable method

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

**Esophagus**
- NO "hold-up" will advance beyond 40 cm

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

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

Once ETT cuff passes beyond vocal cords, while firmly holding ETT in place, carefully remove bougie.

Confirm, secure & reassess per ETI procedure.

Questions
Instructor Demo & Practice then Return Demo w/ Skill Evaluation.