

- Consider use of vasoconstrictors to reduce nasal bleeding:
  - ♦ Cocaine 4%—maximum dose 200 mg, potential for abuse, concern for tachycardia and dysrhythmia
  - ♦ Phenylephrine—may be added to local anesthetic solutions (e.g., 1 mL of 1% Neosynephrine may be added to 3 mL of 2% lidocaine to make a 0.25%/1.5% solution, respectively)
  - ♦ Vasoconstrictor sprays such as oxymetazoline (Afrin®): two puffs in each nostril prior to bringing patient to OR, and two puffs again after 5–10 minutes
 

All vasoconstrictors have a potential for systemic absorption and severe hypertension. **DO NOT USE BETA-BLOCKERS** to treat vasoconstrictor-induced hypertension: risk of heart failure, pulmonary edema, and death!
- ▶ Most practitioners use a combination of topicalization and transtracheal block. Glossopharyngeal and superior laryngeal nerve blocks are rarely used nowadays

## REFERENCES

For references, please visit [www.TheAnesthesiaGuide.com](http://www.TheAnesthesiaGuide.com).

# CHAPTER 53

## Awake Fiber-Optic Intubation

Arthur Atchabahian, MD

### NASAL VERSUS ORAL INTUBATION

Advantages of nasal intubation	Disadvantages of nasal intubation
<ul style="list-style-type: none"> <li>• Easier, as the path is straighter from nasopharynx to glottis</li> <li>• Less gagging as minimal contact with tongue base</li> <li>• Patient cannot bite tube/bronchoscope</li> </ul>	<ul style="list-style-type: none"> <li>• Potential for epistaxis (avoid, e.g., in pregnant patients)</li> <li>• Risk of sinusitis if kept in place for &gt;48 h</li> </ul>

### PREPARATION

- Patient must be given a complete explanation of the entire procedure, to enhance cooperation, and to allay anxiety
- Adequate IV access
- Check equipment; all medications, including emergency medications, immediately available
- Backup airway access devices (LMAs, cricothyrotomy kits) should be immediately available
- Obtain knowledgeable help if available
- Surgeon informed, available for surgical airway if needed:
  - ▶ In some especially difficult cases, the neck might be prepped, and the surgeon gowned, ready to secure a surgical airway if needed

**SEDATION**

- Adequate sedation is important to minimize anxiety and hemodynamic swings
- However, avoid excessive sedation leading to airway obstruction and hypoventilation, which could be catastrophic in patients with difficult/impossible mask/airway
- Use small amounts of midazolam (1–2 mg) to provide amnesia
- A dexmedetomidine infusion, starting at 4  $\mu\text{g}/\text{kg}/\text{h}$ , until eye closure and visible relaxation, and then decreased to 1.5–2  $\mu\text{g}/\text{kg}/\text{h}$ , provides adequate sedation with little or no respiratory depression or obstruction:
  - Monitor for bradycardia; reduce infusion rate if needed

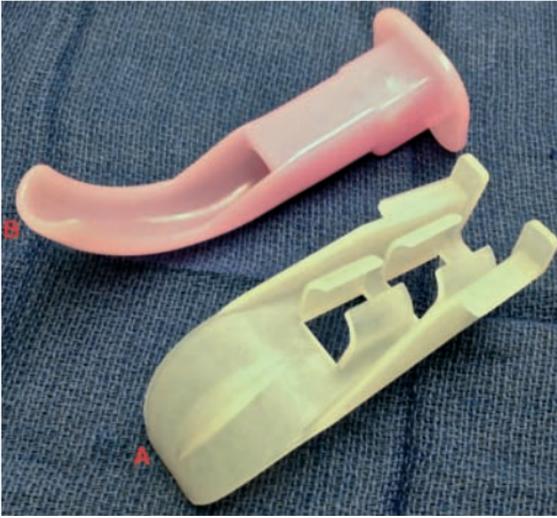
**AIRWAY PREPARATION TECHNIQUES**

- 100% O<sub>2</sub> by non-rebreather mask for at least 5 minutes
- Unless rate-dependent angina, antisialagogue (glycopyrrolate 0.2–0.4 mg IV), and, if indicated, metoclopramide (10 mg IV)
- Airway blocks (see Chapter 52) can be used depending on personal preferences:
  - Transtracheal block useful as other techniques do not topicalize trachea (below the cords)
  - Glossopharyngeal and superior laryngeal blocks less widely used currently; adequate topicalization and dexmedetomidine is usually sufficient
- For anticipated oral approach:
  - Patient is asked to swish, gargle, and spit out 3–4 mL lidocaine 4% several times, *or*
  - The oropharynx is sprayed with topical benzocaine/tetracaine preparations (e.g., Hurracaine; do not exceed 3 seconds of spraying; risk of methemoglobinemia with benzocaine)
  - 6 mL lidocaine 4% is nebulized using a handheld nebulizer
- For anticipated nasal approach:
  - Patient self-administers three puffs of a nasal vasoconstrictor (oxymetazoline 0.05% [Afrin<sup>®</sup>]) into each nostril
  - 5 mL of viscous lidocaine 2% is administered into each nostril; patient is asked to retain volume in nostrils as long as possible, and then asked to inhale and swallow the volume; this procedure is repeated for a second dose
  - 6 mL lidocaine 4% is nebulized using a handheld nebulizer

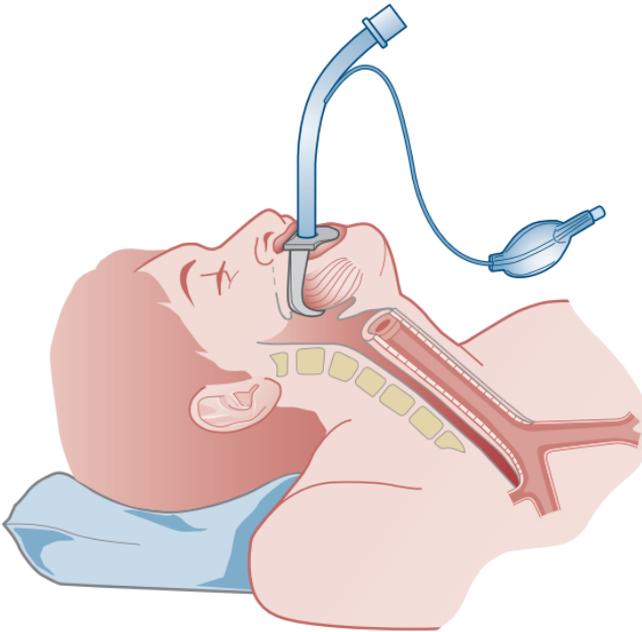
**TECHNIQUE FOR ORAL APPROACH**

- Patient positioned to maximize access to mouth, and to align the oral, pharyngeal, and laryngeal axes, thus placing the patient in a “sniffing” position:
  - Typically, the patient is positioned supine or semirecumbent, with the operator standing behind the head
  - Occasionally, for example, in the morbidly obese or for patients with neck masses, having the patient sitting up, with the operator standing in front of the patient, can facilitate the procedure and reduce airway obstruction
- Generously lubricate appropriately sized endotracheal tube (ETT), and position tube into a Berman oral airway, ensuring that the tube slides easily within the lumen of the airway:
  - An Ovassapian airway (see Figure 53-1) can also be used and has the advantage of being easier to extract from the ETT
  - With a Berman airway, the ETT connector will have to be disconnected in order to remove the airway
- Advance the ETT beyond the edge of the Berman airway and test the cuff, to ensure that placement of the tube into the airway did not disrupt integrity of the cuff, and then retract the tube into the airway until both tips are aligned
- Place Berman/ETT into midline of the mouth so that it fits comfortably and is well tolerated by the patient; supplemental oxygen may be administered via a nasal cannula. Suction oropharynx
- Advance the fiber-optic bronchoscope (FOB) through the lumen of the ETT, visualizing structures as it exits the tube. Additional lidocaine may be sprayed onto the mucosal surfaces as needed

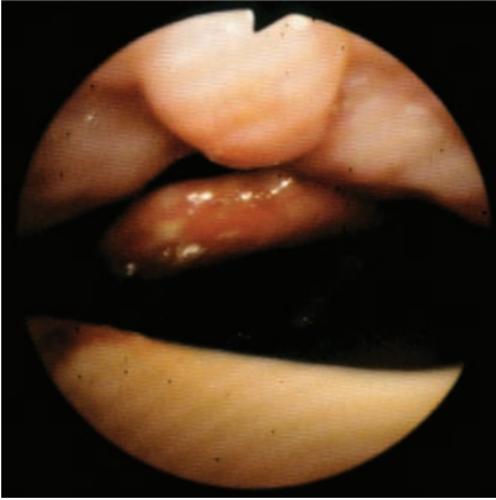
**FIGURE 53-1.** Ovassapian (A) and Berman (B) airways



**FIGURE 53-2.** Initial position for fiberoptic intubation: ETT inside airway

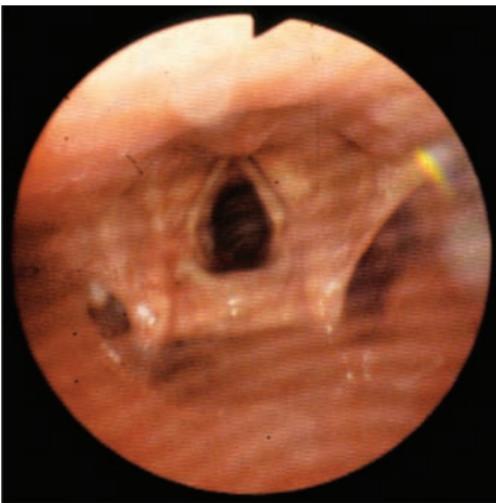


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**FIGURE 53-3. View of epiglottis**

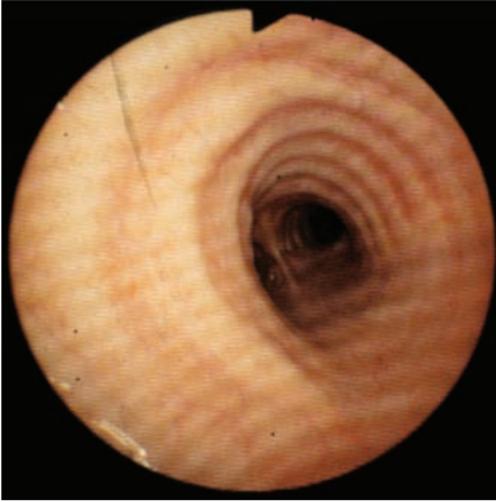
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- The FOB has to first go up (anterior) about 45° after exiting the airway, going under the epiglottis (see Figure 53-3) toward the vocal cords
- Identify glottic opening (Figure 53-4), and advance the tip of the FOB beyond the vocal cords into the trachea, identifying tracheal rings and carina (Figure 53-5) to confirm location
- The FOB has then to go down (posterior) about 45°, as the trachea has an anterior-to-posterior slope (Figures 53-6 and 53-7)

**FIGURE 53-4. View of glottic opening**

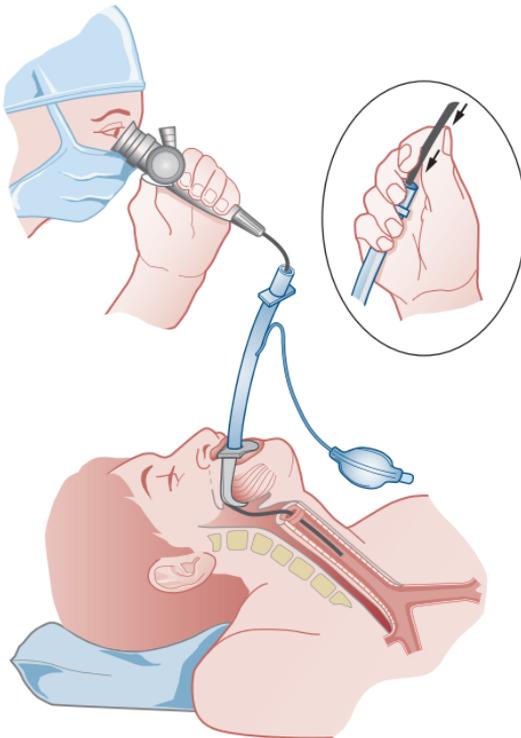
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**FIGURE 53-5. View of tracheal rings and carina**

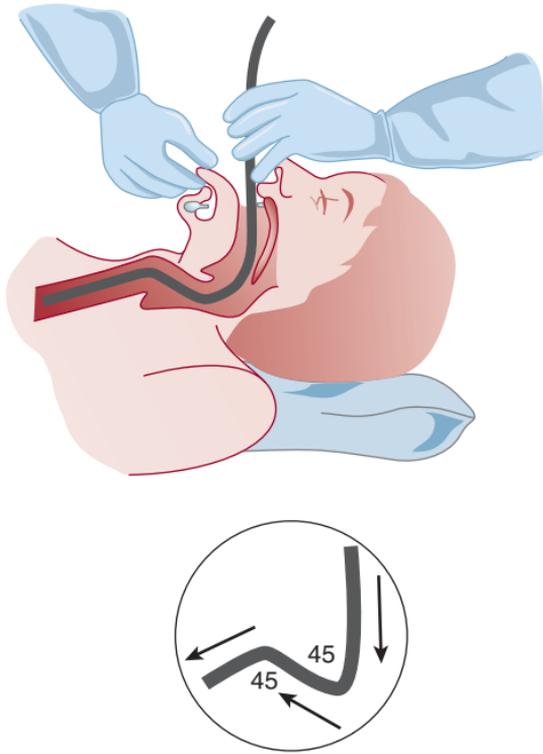


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**FIGURE 53-6. Orienting FOB downward (posterior)**

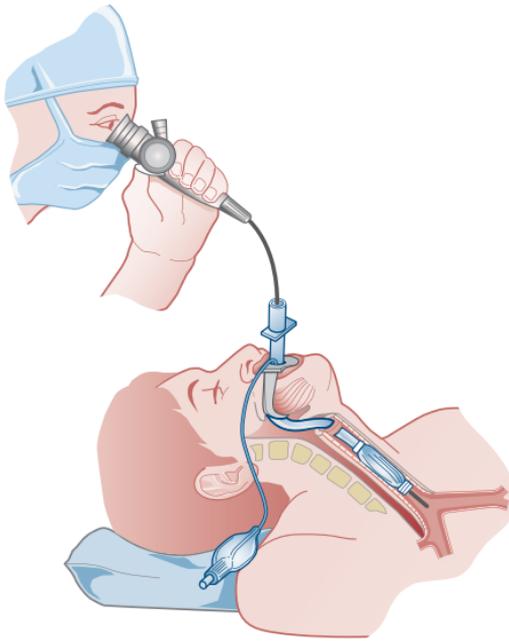


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**FIGURE 53-7. FOB direction changes for oral intubation**

- Using the FOB as a guide, slowly advance the ETT through the airway over the scope and into the trachea (Figure 53-8)
- The ETT is advanced blindly and the bevel can on occasion be caught on the larynx (arytenoid cartilages, vocal cords, etc)
  - ▶ In order to minimize that risk, the ETT should be rotated 90° counterclockwise (Murphy eye on top) so the bevel remains close to the scope
  - ▶ Alternatively, an ETT with a soft tip (ETT of the LMA Fastrach®) or a tapered tip (several models) can be used
- Position the ETT so that the carina can be visualized with the FOB through the ETT; confirm by lung auscultation and presence of CO<sub>2</sub>. Ideally, the ETT should be 3–6 cm from the carina
- When the endotracheal position of the ETT is confirmed, induce GA with IV drugs and connect ETT to circuit

**FIGURE 53-8.** Advancing ETT over FOB into trachea



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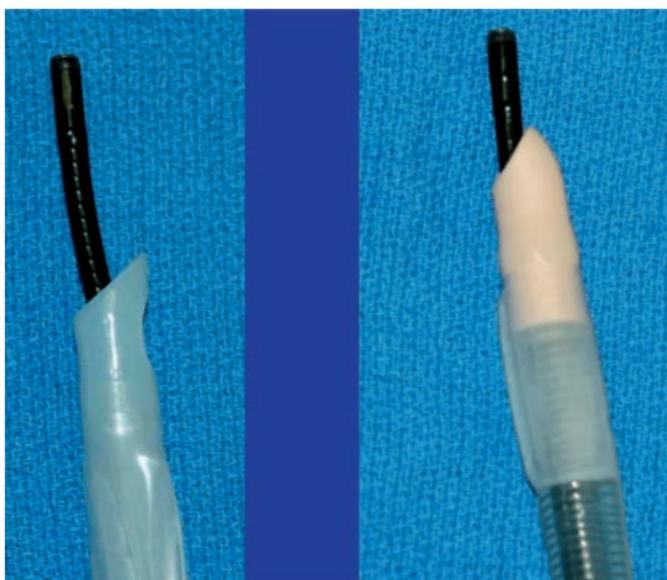
**FIGURE 53-9.** ETT bevel over FOB without (A; bevel at risk of getting caught on laryngeal structures) and with 90° counterclockwise rotation (B; bevel “railroading” on the scope)



A



B

**FIGURE 53-10. Soft tip versus tapered tip**

Endotracheal tubes over a 4.0-mm flexible bronchoscope. The tube designed for intubation through the LMA Fastrach (right) has a curved tip, which eases passage of the tube into the trachea. Reproduced from Longnecker DE, Brown DL, Newman MF, Zapol WM. *Anesthesiology*. Figure 35-26. Available at: <http://www.accessanesthesiology.com>. Copyright © The McGraw-Hill Companies, Inc. All rights reserved.

### TECHNIQUE FOR NASAL APPROACH

- Patient is positioned such that the head is in midline and in slight extension, and access to nostrils is unimpeded
- Generously lubricate two nasal airways (as large as the nostrils can accommodate) with viscous lidocaine, and place one airway into each nostril
- Select an appropriately sized ETT (conventional or nasal RAE preformed tube), preferably slightly smaller than the size of the nasotracheal airway placed earlier, and lubricate generously
- Remove the nasal airway from the side that provided the least resistance in placement, and provide supplemental oxygen through the other airway by nasal cannula
- Place ETT into nostril and slowly advance tube directing it posteriorly until a slight “give” is felt, indicating passage of the tube past the nasal turbinates
- Advance the FOB through the lumen of the ETT into the nasopharynx, and advance slowly, identifying structures leading to the glottic opening
- Identify glottic opening, and advance the tip of the FOB beyond the vocal cords into the trachea, identifying tracheal rings and carina to confirm location
- Using the FOB as a guide, slowly advance the ETT over the scope and into the trachea:
  - ▶ The ETT is advanced blindly and the bevel can on occasion be caught on the larynx (arytenoid cartilages, vocal cords, etc)
  - ▶ In order to minimize that risk, the ETT should be rotated 90° counterclockwise (Murphy eye on top) so the bevel remains close to the scope. Some authors, however, advocate rotating the ETT clockwise for nasotracheal intubation
  - ▶ Alternatively, an ETT with a soft tip (ETT of the LMA Fastrach®) or a tapered tip (several models) can be used

- Position the tube so that the carina can be visualized with the FOB through the ETT; confirm by lung auscultation and presence of CO<sub>2</sub>. Ideally, the ETT should be 3–6 cm from the carina
- When the endotracheal position of the tube is confirmed, induce GA with IV drugs and connect ETT to circuit

### ASLEEP INTUBATION

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- For a nasal approach, prepare nares as described above prior to induction
- Similar technique (nasal or oral) following preoxygenation and IV induction
- Suction pharynx before inserting FOB
- Have an assistant provide adequate jaw lift, as the tongue will fall back with the loss of muscle tone and occlude the pharynx

### REFERENCES

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For references, please visit [www.TheAnesthesiaGuide.com](http://www.TheAnesthesiaGuide.com).

## CHAPTER 54

# Retrograde Intubation

Arthur Atchabahian, MD

### INDICATIONS

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- Any difficult intubation in patients whose cricothyroid membrane can be located
- Especially suited for facial trauma (nasal intubation contraindicated)

### PATIENT PREPARATION IS KEY!

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- If possible, discuss all aspects of procedure with patient to enhance cooperation and to minimize anxiety
- However, often performed as an emergency procedure
- Use of an antisialagogue (glycopyrrolate) is strongly recommended
- Use of anxiolytics (midazolam, dexmedetomidine) is urged but not required
- Adequate topicalization of mucous membranes is also strongly recommended

### EQUIPMENT (SEE FIGURE 54-1)

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- 5 mL of 2% lidocaine in 10 mL syringe with 25 G needle
- Retrograde intubation access kit (if not available, this technique has been performed using a Tuohy needle and an epidural catheter):
  - *NB:* Some kits have a tube exchanger that allows insufflating oxygen; these exchangers have only one tapered end
- Magill forceps
- Appropriately sized endotracheal tube
- Viscous lidocaine for topicalization of mucous membranes and for lubrication