Six Essentials to Success

FIBEROPTIC INTUBATION

The "Open it up, line it up" approach

Proper patient evaluation increases the margin of safety.

Choose the appropriate fiberoptic intubation mode.

Your first step is to decide whether to do a fiberoptic intubation with the patient anesthetized or awake. Make your choice based on your ability to ventilate the anesthetized patient or your need to evaluate the awake patient after intubation. Once you've decided on anesthetized or awake, chose either the oral or nasal route.

Anesthetized Oral The only way to become skilled at fiberoptic intubations is to do a large number of them. However, the number of patients who must have fiberoptic intubation is relatively small. Therefore, you should consider doing fiberoptic intubations on the many ASA I and II patients who are normally intubated orally with a laryngoscope. You can justify using the fiberoptic bronchoscope because it is less traumatic to teeth and soft tissues and causes smaller increases in blood pressure than the laryngoscope. (The fiberoptic intubation does take a few seconds longer.)

You should also consider an anesthetized oral approach in patients whom you have anesthetized but cannot intubate using a laryngoscope.

- Practice anesthetized oral fiberoptic intubations until you are completely familiar with the equipment, setup and anatomy. Practice until you are thoroughly versed in manipulating the fiberoptic shaft and airway.
- Always establish effective mask ventilation and good oxygen saturation and limit each attempt to one minute.
- Try to practice with a skilled practitioner, who can use a TV monitor to guide you.

Do not do oral fiberoptic intubations on anesthetized patients in whom a rapid sequence intubation is indicated, e.g., patients with a full stomach, potential for gastric reflux and/or obesity.

Anesthetized Nasal An anesthetized nasal approach may be indicated in patients having operations in their oral cavity.

In addition, if the anesthetized oral approach proves unsuccessful because of a difficult airway found on laryngoscopy, you may need to resort to an anesthetized nasal approach.

Awake Oral You may consider using an awake oral approach in Mallampati Grade III and IV patients (Figure A). With these patients, the posterior pharyngeal wall is not visible and the thyromental distance is less than 7 cm.

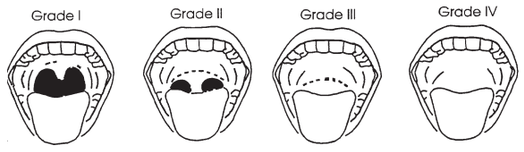

Figure A *Mallampati Grades* from C. M. Frerk *Anaesthesia* 46:1005-1008, 1991.

You can also use the awake oral approach in patients with unstable or abnormal necks, e.g., fat neck, no neck and/or neck abscesses.

Awake Nasal An awake nasal approach is indicated in patients undergoing an operation on the mouth and/or oral cavity.

A place for everything and everything in its place.

Set up the fiberoptic scope.

Place the bronchoscope and its cart on the left side of the patient. Why? Because the cables insert on the left side of the bronchoscope handle when the bronchoscope lever is on the under side (as it should be). Make sure all cables are free of loops.

- Use the TV monitor whenever possible. Place the video adapter on the bronchoscope handle and rotate the adapter so the picture from the fiberoptic tip is oriented correctly. Tighten the screw on the adapter.
- Lubricate the fiberoptic shaft with a small amount of silicone gel. Dab a bit of defogging solution on the shaft tip.
- Choose an appropriate endotracheal tube. Small tubes (6.0-6.5 mm for female patients and 7.0 mm for male patients) advance more easily. The smaller the gap between the shaft and tube wall the less likely the tube tip will hang up on the arytenoids (Figure H in Section 6). (The fiberoptic shaft diameters are approximately 3.5.-5.5 mm.)

Flexometallic tubes advance more easily than Rae tubes. Soften plastic tubes by placing them in a bottle of warm water.

- Slide the endotracheal tube up the full length of the shaft and gently secure it to the beveled end of the bronchoscope handle. Smear a little lubricant on the cuff and distal end of the endotracheal tube.
- Turn the light source on high when you start the intubation.
- *Optional*—Flow oxygen through the scope suction port to improve oxygenation and to displace secretions.

If done well, the difference between success and failure.

Prepare the awake patient.

Carefully explain the intubation procedure to the patient. Administer supplemental oxygen via nasal prongs. Give glycopyrrolate (.2–.3 mg IV) and sedate with 1–2 mg midazolam IV 30 minutes prior to topical anesthesia. Then before topical anesthesia, titrate fentanyl 50 to 250 µg IV. Keep the patient responsive!

If the patient is to have a nasal endotracheal tube, apply oxymetazoline (Afrin) to the nasal passages, and inject 2–3 cc of 2% viscous lidocaine into a nostril.

Topical anesthesia:

Trans-oral trickle This approach can be used any time but is especially useful if for some reason (fat neck, neck abscess or neck deformity) you cannot do a transtracheal injection. Use it to minimize coughing or to avoid sticking a needle in the patient's neck.

Figure B

Remember, have a drying agent on board! While you are in the holding area, fill a 10-cc syringe with 2% or 4% lidocaine and attach a 14-gauge plastic catheter. Place the patient in the sitting position and have them tilt their head back. Holding the patient's tongue with a gauze pad, very slowly trickle lidocaine in .1–.2 cc increments in the back of the throat (Figure B). Time the injection of each increment to coincide with inspiration. Pause for a minute after the first 2 cc but continue to hold the tongue to prevent swallowing. Total lidocaine dose should not exceed 3–4 mg/kg.* Reduce the dose if the patient has impaired liver function.

*Mainland, P. et al. *Anesthesiology* A1026:81, 1994

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Topical anesthesia:

Transtracheal injection An alternative approach, especially for obese patients with excessive oral mucosa, is to use a 20-gauge plastic catheter and inject 4 cc of 4% lidocaine through the cricothyroid ligament. Then, while the patient inhales, spray the oropharynx with 4% lidocaine and allow 10 minutes for analgesia to take effect. Superior laryngeal nerve blocks can be done at this time, but they aren't needed if there is a good transtracheal injection and pharyngeal spray.

Note If the patient is awake prior to intubation, place a dental bite block between the teeth to one side (Figure C). Remember, one bite of the scope shaft costs about $2,000.


Figure C

Once on the operating room table, whether the patient is awake or to be anesthetized, elevate the head at least 8 cm. Lower the table as far as possible and/or stand on a lift. Your goal is to straighten the fiberoptic shaft and hence gain better control of the tip.

Create an open pathway from mouth to glottic opening.

4 Open up the airway.

While artificial airways are available to aid in exposing the cords, the **tongue pull method,** described here, does not require such an airway at all. **Use the tongue pull for both oral and nasal approaches.**


Figure D

- After a couple of deep breaths (you and the patient), suction the pharynx whether the patient is anesthetized or awake.
- If the patient is anesthetized, apply the suction tube to the tip of the tongue. Drag the tongue upward (Figure D).
- Ask the awake patient to stick out their tongue and breathe deeply through the mouth. Your assistant should grasp the tongue with one hand and with the other gently extend the head. Traction on the tongue should be toward the ceiling (Figure E). If the patient has jagged front teeth, avoid lacerating the tongue or frenulum linguae.


Figure E

- Instruct your assistant to monitor oxygen saturation while you are doing the intubation.

Know where that tip points before it disappears from view!

5 Line up the fiberoptic shaft.

Stand on a lift so that the fiberoptic bronchoscope shaft will be straight when you hold it above the patient. Hold the bronchoscope handle in your right hand with the thumb lever down. With your left hand, hold the bronchoscope shaft between the 3rd and 4th white rings or at a point 15 to 20 cm from the shaft tip.

- Look *at* the shaft, *not* through the eye piece. Position the shaft above the middle of the patient's mouth or nose at 90 degrees to the horizontal.
- Flex the tip of the shaft maximally and position the shaft so that the flexed tip points precisely down the middle of the neck (Figure F).


Figure F

- Now *straighten* the tip. Without tilting or bending or rotating the shaft even a tiny bit, insert the tip into the nose, or in an oral approach, exactly in the midline of the mouth and oropharynx until the tip hits the rear of the mouth (about 9 cm).
- *Now* carefully bring the eyepiece down to your eye or look at the TV monitor. Then slowly flex the tip of the shaft so you see the epiglottis or glottis. If you get "lost," withdraw the shaft completely and check the flexed tip orientation. If you get "lost" again, advance in the midline toward the darkest site, i.e. "head for the black."
- Advance the tip under the epiglottis until the cords come into view. If you find the tip off to one side of the glottis, rotate both shaft and handle until the tip is over the glottis.
- If there is no open space between the epiglottis and posterior pharynx, you can do two things: (1) have your assistant exert increase upward traction on the tongue, and (2) "burrow" underneath the epiglottis with the tip of the scope. If you are midline you'll see the glottic opening.
- If you are using the nasal route, insert the fiberoptic shaft before you advance the endotracheal tube. That way you will avoid having the tube provoke bleeding that will obscure your vision, and you will prevent the tube tip from "tunneling" under the mucosa.

Insert the fiberoptic shaft and endotracheal tube into the trachea.

6 Advance the shaft and tube.

In an **oral approach**, as you advance the fiberoptic scope tip through the glottic opening, straighten (extend) the tip so it faces directly down the trachea. If you don't, all you may see is the pink mucosa of the anterior tracheal wall after the tip passes the cords (Figure G).

- Advance the fiberoptic scope tip until you can just see the carina. If the patient is awake, don't advance the tip past mid-trachea because you may induce coughing.


Figure G

- Use your left hand to loosen the endotracheal tube connector from the bronchoscope handle.
- Now, grasp the endotracheal tube at its midpoint and rotate it 90 degrees counterclockwise so the Murphy eye is anterior.

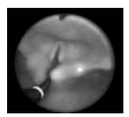
Figure H

This maneuver prevents the tube tip from hanging up on the right arytenoid. Hang-up occurs because the fiberoptic shaft falls posteriorly into the interarytenoid fissure (Figure H). If the tube still hangs up, rotate the tube another 90 degrees counterclockwise.

- Advance the endotracheal tube into the trachea over the bronchoscope shaft until the 22-cm or 23-cm mark on the tube is at the teeth.
- Withdraw the fiberoptic shaft and secure the endotracheal tube.
- With a **nasal approach,** the endotracheal tube generally hangs up on the epiglottis. To avoid this hang-up, rotate the tube 90 degrees *clockwise* as you advance it.

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