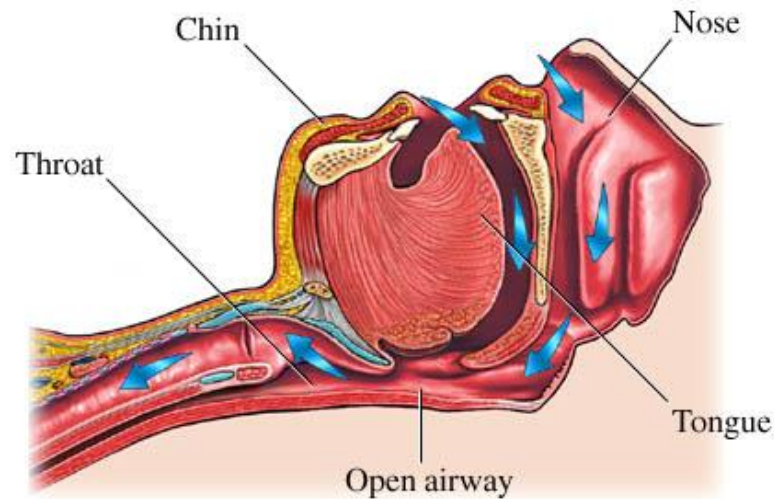




Airway Management In Difficult Situation



Apirak Thewaritrueangsri, MD

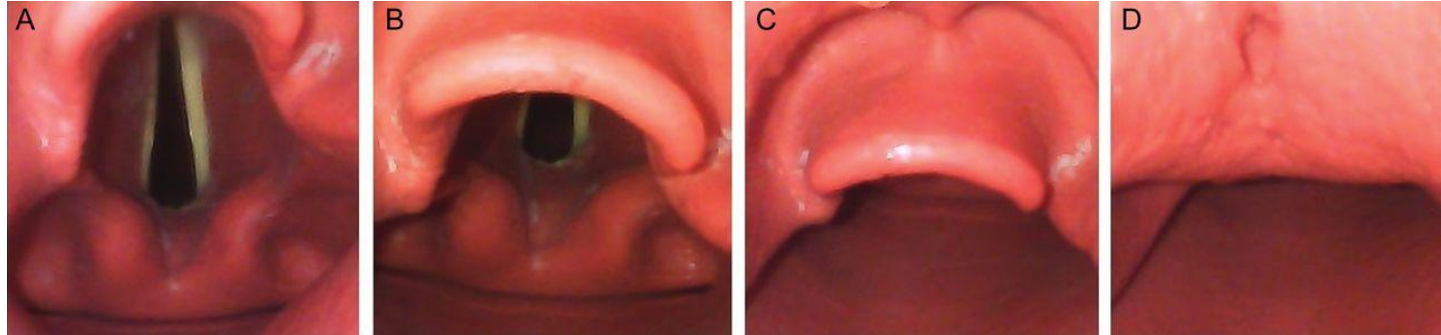
Rawee Jongkongkawutthi, MD

Department of anesthesiology
Naresuan University



What is the problem?

- Uncooperative patient
- Can't see vocal cord
 - Laryngeal view grade $> I$
 - Obscured by Secretion / Blood / Mass
- Seen vocal cord, but can't insert endotracheal tube into vocal cord
 - Can't control tip of ETT to vocal cord
 - Vocal cord edema
- Limited mouth opening or neck movement





Classification Of Difficult Airway



Difficult airway

- The clinical situation in which anticipated or unanticipated difficulty or failure is experienced by a physician trained in anesthesia care



Difficult airway

- The clinical situation in which anticipated or unanticipated difficulty or failure is experienced by a physician trained in anesthesia care



Difficult Facemask Ventilation.

Difficult Laryngoscopy.

Difficult Supraglottic Airway Ventilation.

Difficult or Failed Tracheal Intubation.

Difficult or Failed Invasive Airway.



Classification

- **Difficult Facemask Ventilation**
- Difficult Supraglottic Airway Ventilation.
- Difficult laryngoscopy
- Difficult or Failed Tracheal Intubation
- Difficult or Failed Invasive Airway

Inadequate mask seal

Excessive gas leak

Excessive resistance to the ingress or egress of gas.



Classification

- Difficult Facemask Ventilation
- **Difficult Supraglottic Airway Ventilation.**
- Difficult laryngoscopy
- Difficult or Failed Tracheal Intubation
- Difficult or Failed Invasive Airway

Difficult supraglottic airway placement

Supraglottic airway placement requiring multiple attempts

Inadequate supraglottic airway seal

Excessive gas leak

Excessive resistance to the ingress or egress of gas.



Classification

- Difficult Facemask Ventilation
- Difficult Supraglottic Airway Ventilation.
- **Difficult laryngoscopy**
- Difficult or Failed Tracheal Intubation
- Difficult or Failed Invasive Airway

It is not possible to visualize any portion of the vocal cords after multiple attempts at laryngoscopy.



Classification

- Difficult Facemask Ventilation
- Difficult Supraglottic Airway Ventilation.
- Difficult laryngoscopy
- **Difficult or Failed Tracheal Intubation**
- Difficult or Failed Invasive Airway

Tracheal intubation requires multiple attempts or tracheal intubation fails after multiple attempts.



Classification

- Difficult Facemask Ventilation
- Difficult Supraglottic Airway Ventilation.
- Difficult laryngoscopy
- Difficult or Failed Tracheal Intubation
- **Difficult or Failed Invasive Airway**

Anatomic features or abnormalities reducing or preventing the likelihood of successfully placing an airway into the trachea through the front of the neck.



Difficult airway

- A quick assessment of congenital or acquired *anatomic defects*

Facial, **H**ead, or **N**eck trauma,
Oral bleeding, **R**egurgitated gastric contents,
Frothing of the mouth



Neck mobility, **B**eard, **O**besse, **N**o teeth , **E**lderly,
Sleep apnea/snoring, **R**estricted mouth opening, **O**bstuction,
Distorted airway, **S**tiff lungs or c-spine surgery,
Mass, **T**hyromental distance





Guidelines for Management of the Difficult Airway



2022 American Society of Anesthesiologists Practice Guidelines for Management of the Difficult Airway*

Jeffrey L. Apfelbaum, M.D., Carin A. Hagberg, M.D.,
Richard T. Connis, Ph.D., Basem B. Abdelmalak, M.D.,
Madhulika Agarkar, M.P.H., Richard P. Dutton, M.D.,
John E. Fiadjoe, M.D., Robert Greif, M.D.,
P. Allan Klock, Jr., M.D., David Mercier, M.D.,
Sheila N. Myatra, M.D., Ellen P. O'Sullivan, M.D.,
William H. Rosenblatt, M.D.,
Massimiliano Sorbello, M.D.,
Avery Tung, M.D.

ANESTHESIOLOGY 2022; 136:31–81

ABSTRACT

The American Society of Anesthesiologists; All India Difficult Airway Association; European Airway Management Society; European Society of Anaesthesiology and Intensive Care; Italian Society of Anesthesiology, Analgesia, Resuscitation and Intensive Care; Learning, Teaching and Investigation Difficult Airway Group; Society for Airway Management; Society for Ambulatory Anesthesia; Society for Head and Neck Anesthesia; Society for Pediatric Anesthesia; Society of Critical Care Anesthesiologists; and the Trauma Anesthesiology Society present an updated report of the Practice Guidelines for Management of the Difficult Airway.

(Anesthesiology 2022; 136:31–81)

HIGHLIGHTS BOX

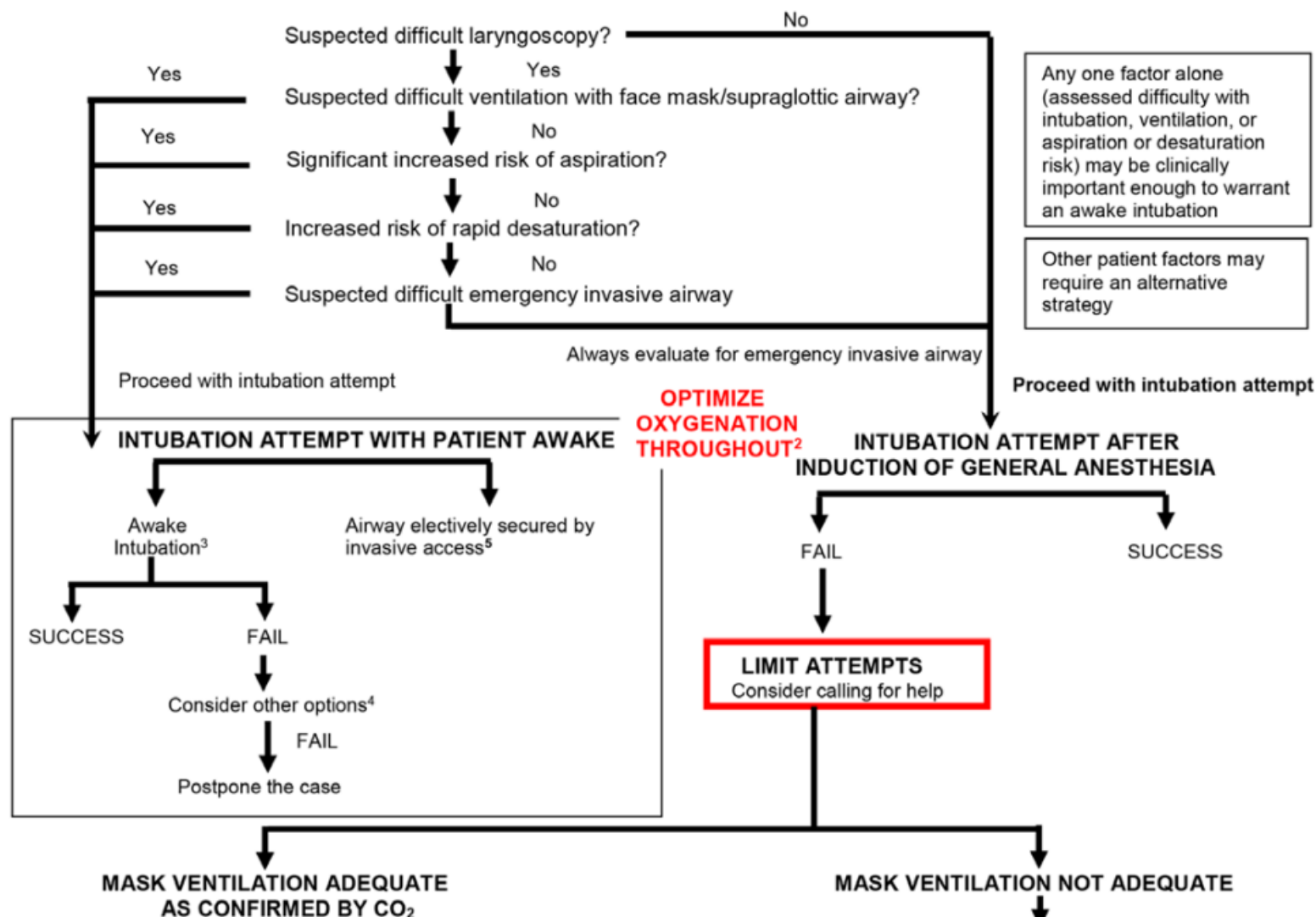
These updated guidelines:

- Replace the “Practice Guidelines for Management of the Difficult Airway: A Report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway,” adopted by the American Society of Anesthesiologists in 2012 and published in 2013.¹
- Specifically address difficult airway management. The guidelines do not address education, training, or certification requirements for



ASA DIFFICULT AIRWAY ALGORITHM: ADULT PATIENTS

Pre-Intubation: Before attempting intubation, choose between either an awake or post-induction airway strategy. Choice of strategy and technique should be made by the clinician managing the airway.¹



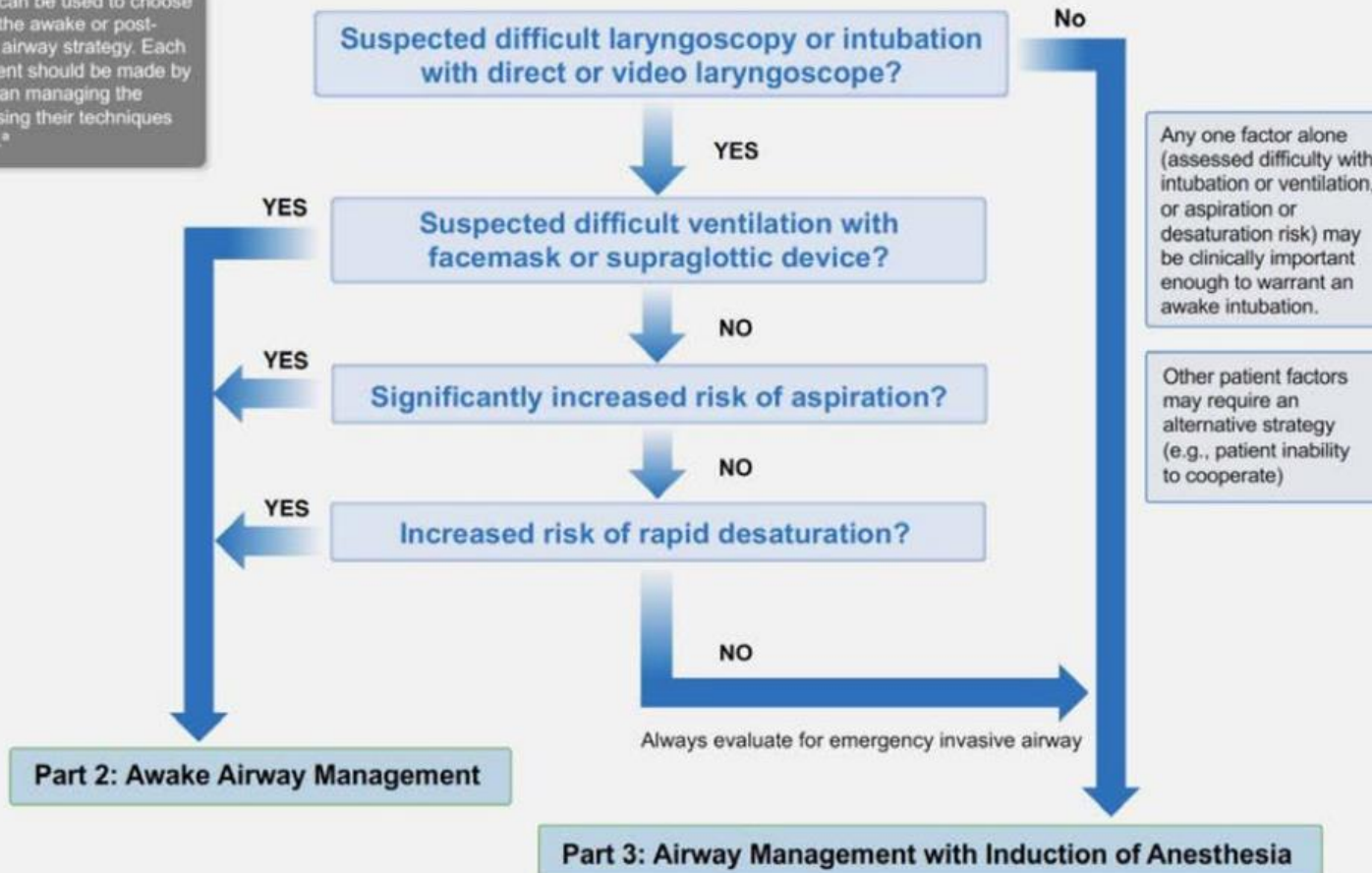
Guidelines for Management of the Difficult Airway



DIFFICULT AIRWAY INFOGRAPHIC: ADULT PATIENTS

Part 1: Pre-Airway Management Decision Making Tool (planning)

This tool can be used to choose between the awake or post-induction airway strategy. Each assessment should be made by the clinician managing the airway, using their techniques of choice.*



Guidelines for Management of the Difficult Airway



Preoxygenation Technique

Rises in the alveolar O₂ fraction (FAO₂), reductions in the alveolar nitrogen fraction (FAN₂)

- Face mask
 - Deep Breathing
 - Rapid Breathing at FiO₂=1.0
 - Four Vital Capacities Method
- Transnasal Humidified Rapid Insufflation Ventilator Exchange (THRIVE)
- Oxygen cannula



Preoxygenation Technique

- Face mask
 - Deep Breathing
 - Rapid Breathing at $\text{FiO}_2 = 1.0$
 - Four Vital Capacities Method
- Transnasal Humidified Rapid Insufflation Ventilator Exchange (THRIVE)
- Oxygen cannula

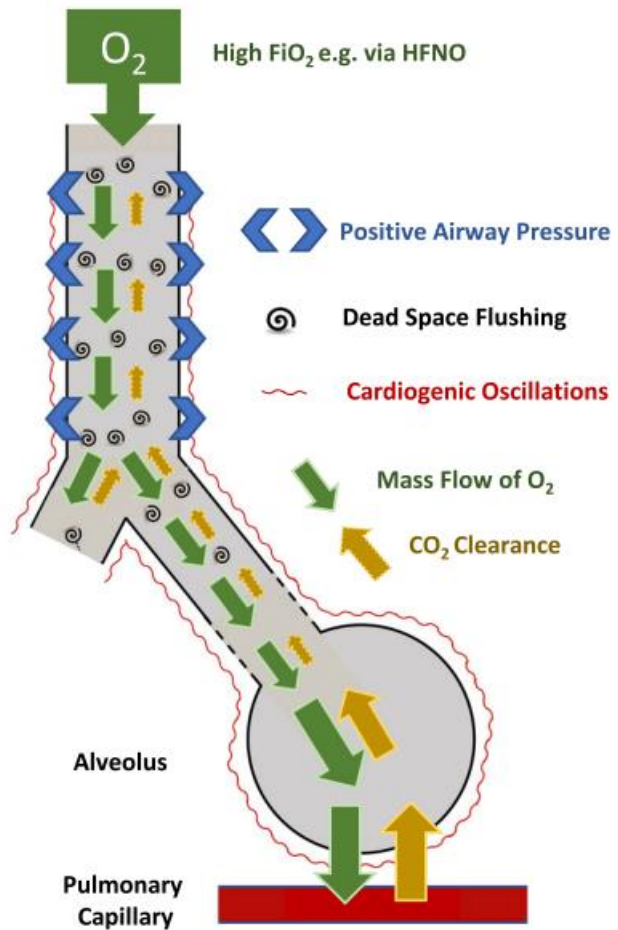


Preoxygenation Technique

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Transnasal Humidified Rapid Insufflation Ventilator Exchange (THRIVE)



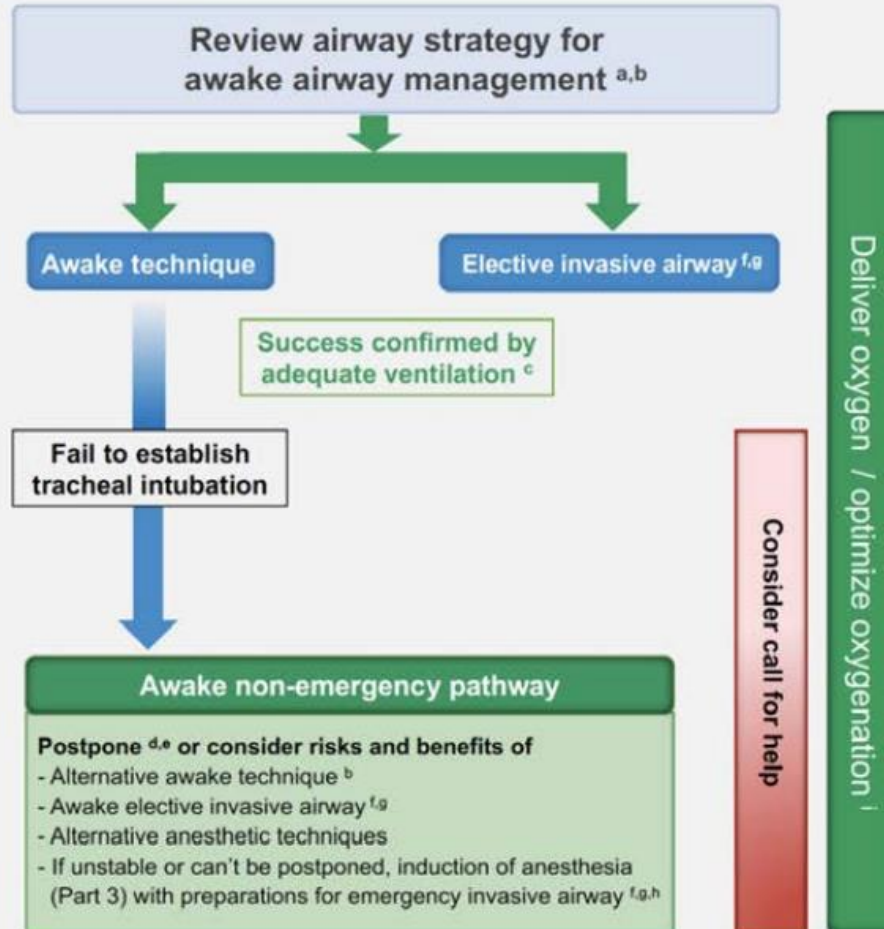


Preoxygenation Technique

- Face mask
 - Deep Breathing
 - Rapid Breathing at $\text{FiO}_2=1.0$
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Part 2: Awake Airway Management

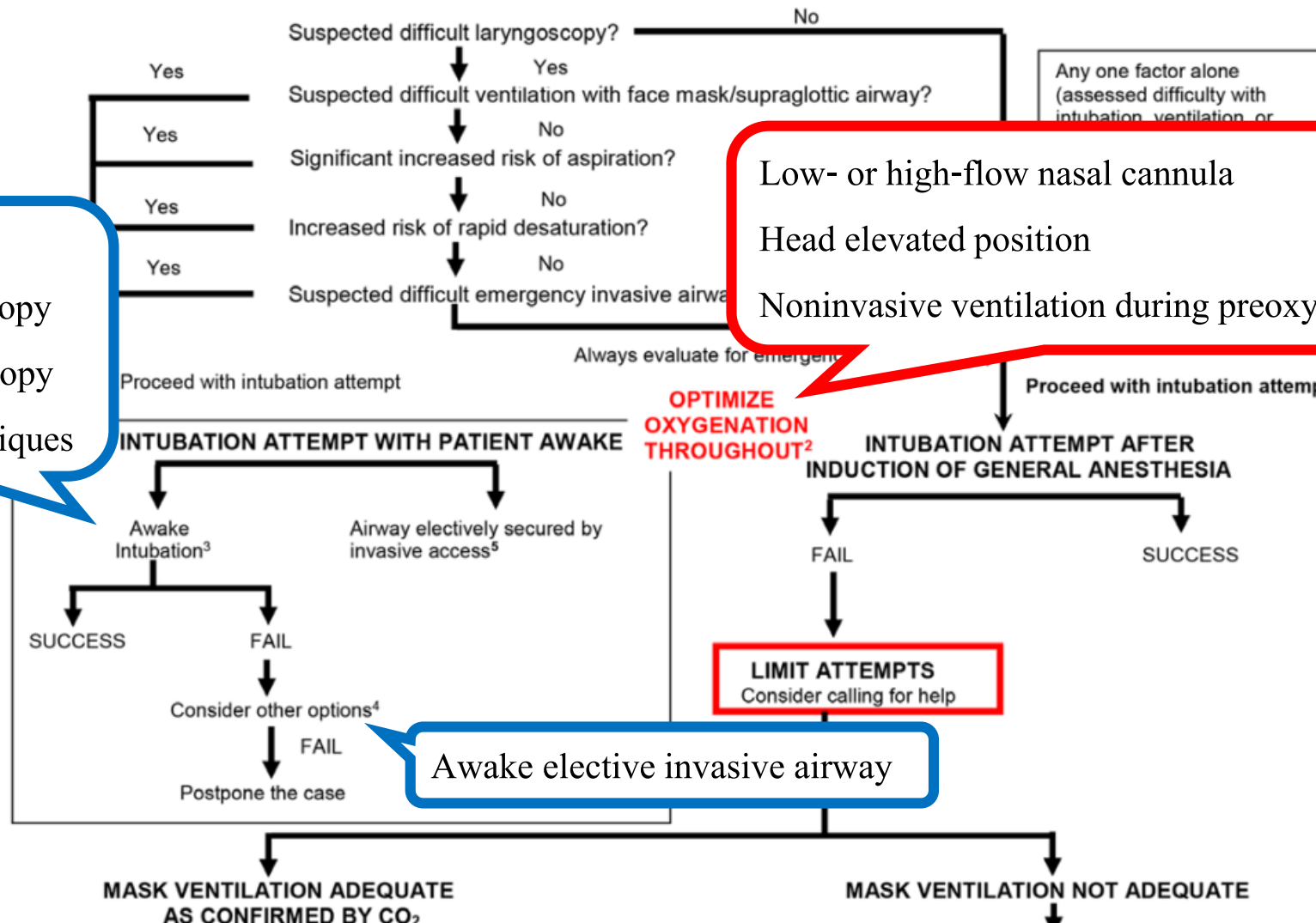


Guidelines for Management of the Difficult Airway



ASA DIFFICULT AIRWAY ALGORITHM: ADULT PATIENTS

Pre-Intubation: Before attempting intubation, choose between either an awake or post-induction airway strategy. Choice of strategy and technique should be made by the clinician managing the airway.¹



Guidelines

Management

of the Difficult Airway

Fiberoptic
Video laryngoscopy
Direct laryngoscopy
Combined techniques

Low- or high-flow nasal cannula
Head elevated position
Noninvasive ventilation during preoxygenation

Awake elective invasive airway

LIMIT ATTEMPTS
Consider calling for help



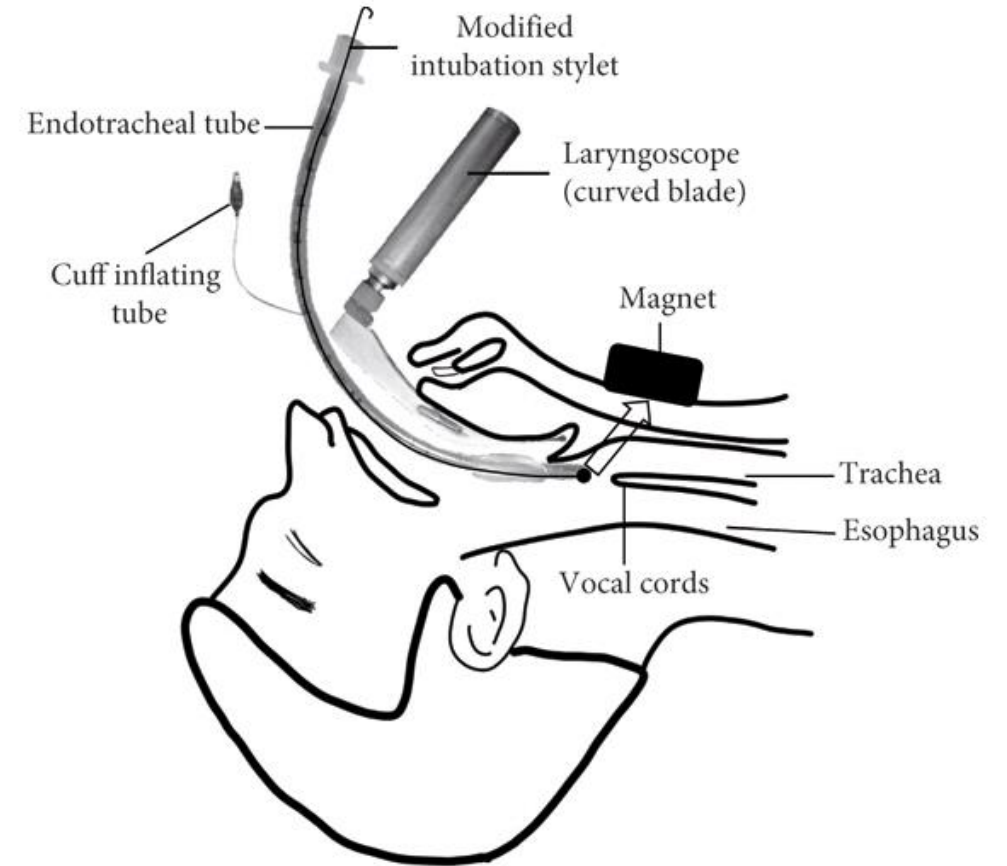
Establish secure airway

- Intubating stylets
- External laryngeal manipulation
- Video-assisted laryngoscopy
- Alternative laryngoscope blades
- Intubating supraglottic airway
- Combined techniques



Establish secure airway

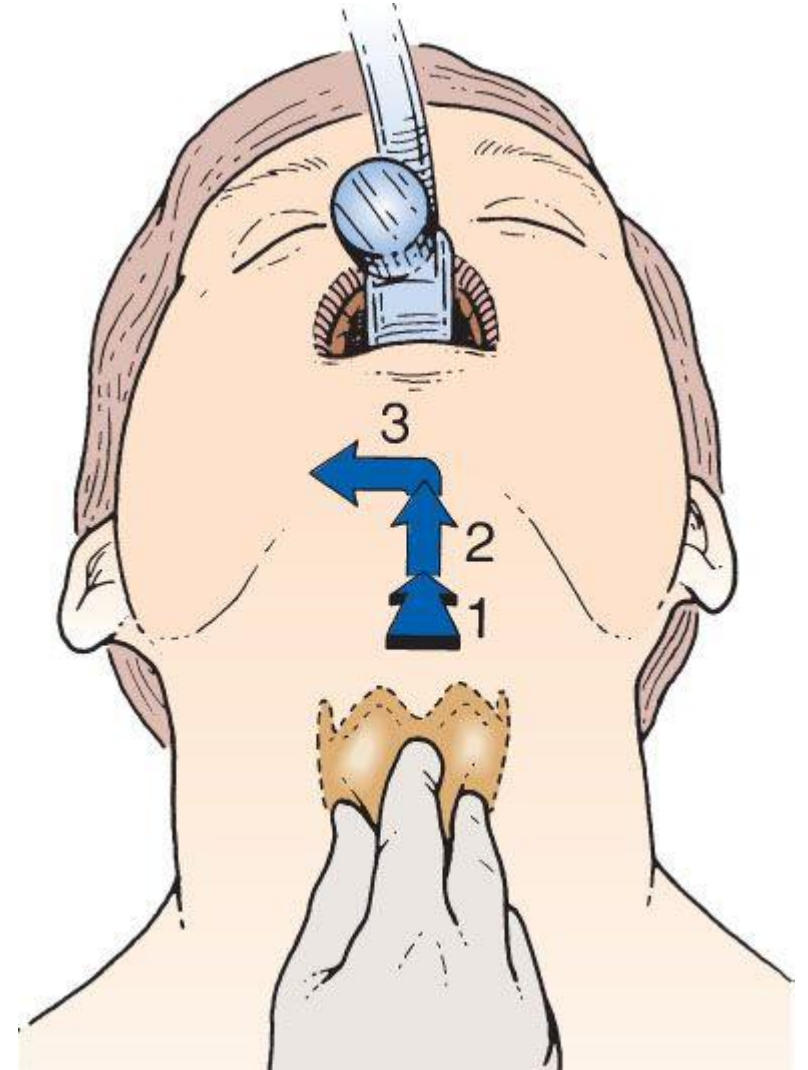
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Establish secure airway

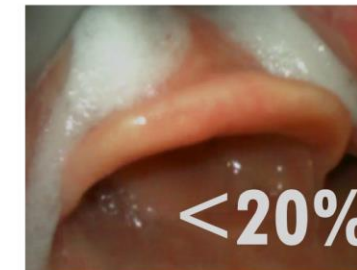
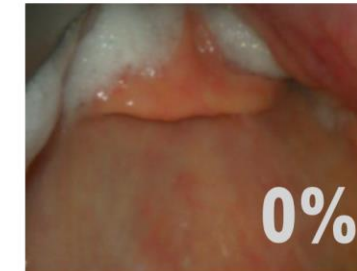
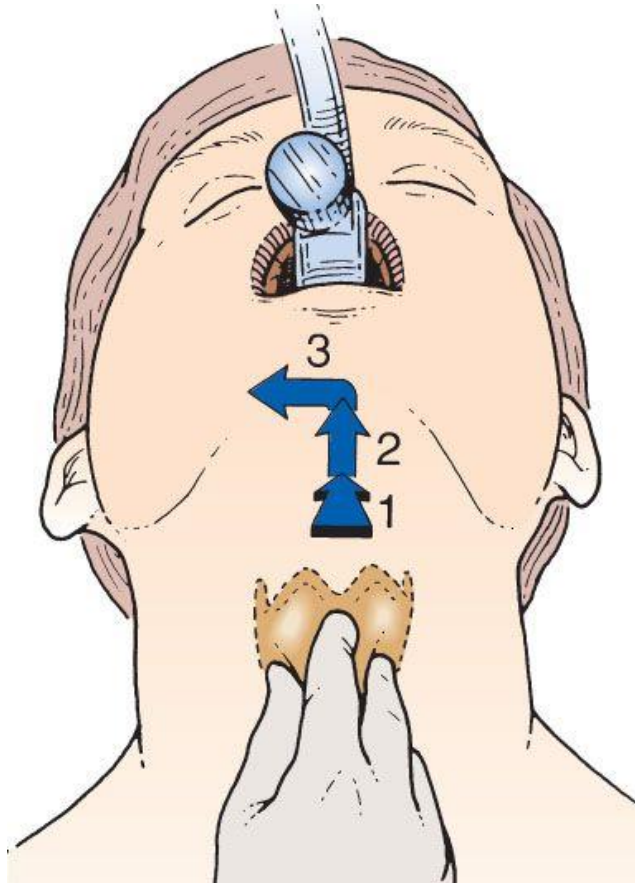
- Intubating stylets
- **External laryngeal manipulation (BURP maneuver)**
- Video-assisted laryngoscopy
- Alternative laryngoscope blades
- Intubating supraglottic airway
- Combined techniques



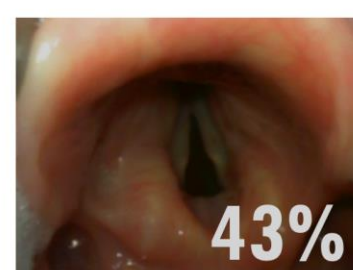
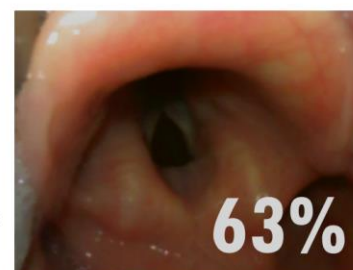
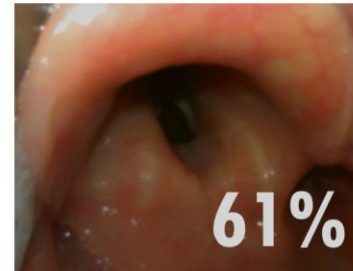


External laryngeal manipulation (BURP maneuver)

- B – Backward
- U – Upward
- RP – Rightward pressure



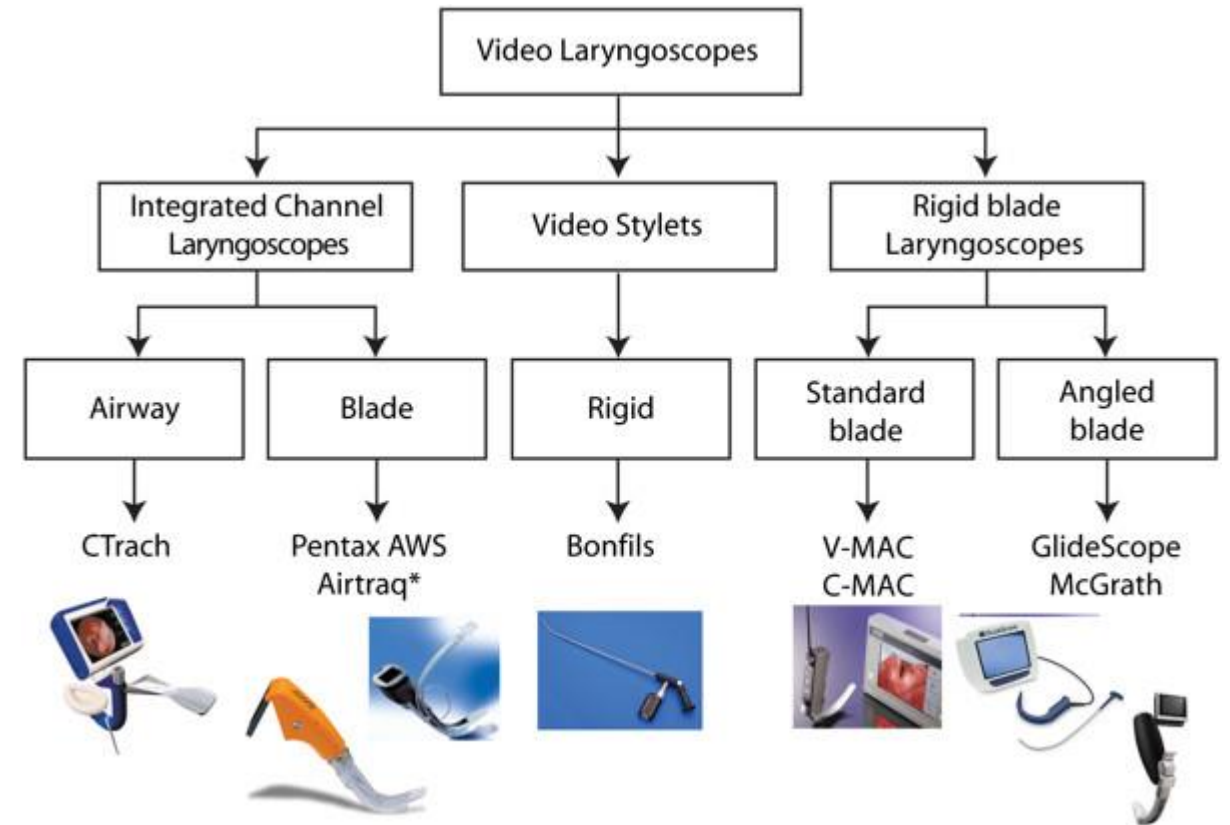
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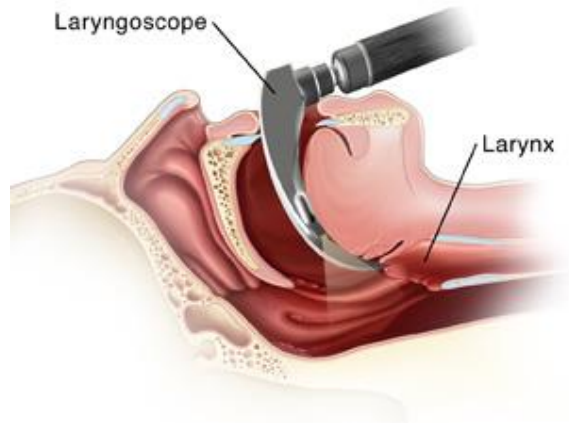
Establish secure airway

- Intubating stylets
- External laryngeal manipulation
- **Video-assisted laryngoscopy**
- Alternative laryngoscope blades
- Intubating supraglottic airway
- Combined techniques





Direct *VS* Video-assisted laryngoscopy





Video-assisted laryngoscopy

Indications and advantages

- Unnecessary to align airway axes (oral-pharyngeal-laryngeal)
- Improved glottic visualization, (limited mouth opening or neck mobility)
- Allows others to view the screen and/or help
- facilitate ETI (e.g., redirect cricoid pressure, acquire other airway devices)
- Less cervical manipulation
- Possible awake assessment/intubation
- Can provide an official record.

Disadvantages

- Difficulty in passing ETT despite improved glottic visualization (especially with angulated blade)
- Possible increased intubation time; variable learning curve
- Potential for false sense of security and lack of preparation for difficult airway
- Two-dimensional view with loss of depth perception;
- Obscured view by fogging and secretions on camera lens



Video-assisted laryngoscopy

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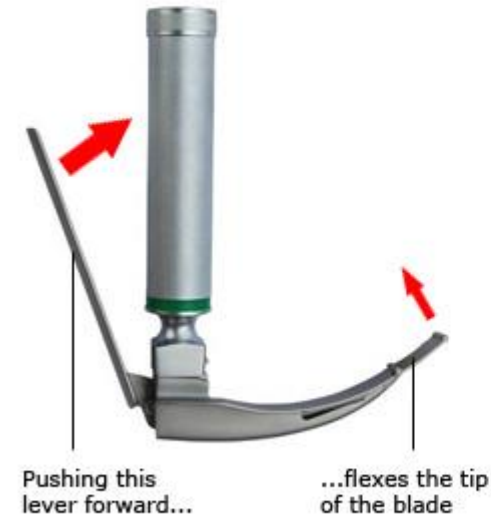
Establish secure airway

- Intubating stylets
- External laryngeal manipulation
- Video-assisted laryngoscopy
- **Alternative laryngoscope blades**
- Intubating supraglottic airway
- Combined techniques

Alternative laryngoscope blades

McCoy laryngoscope

The flexible tip helps view an anterior larynx by elevating the epiglottis



Miller laryngoscope blades

Straight blade (straight line view, better if poor mouth opening)





Establish secure airway

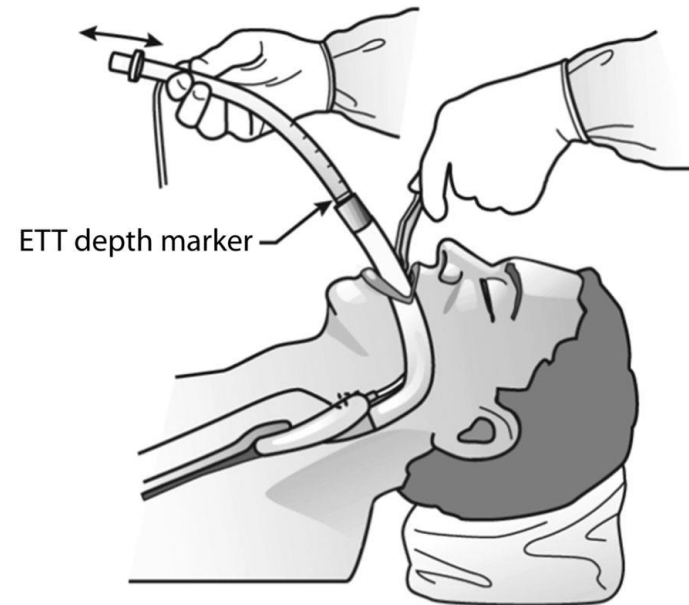
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Establish secure airway

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- External laryngeal manipulation
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- **Intubating supraglottic airway**
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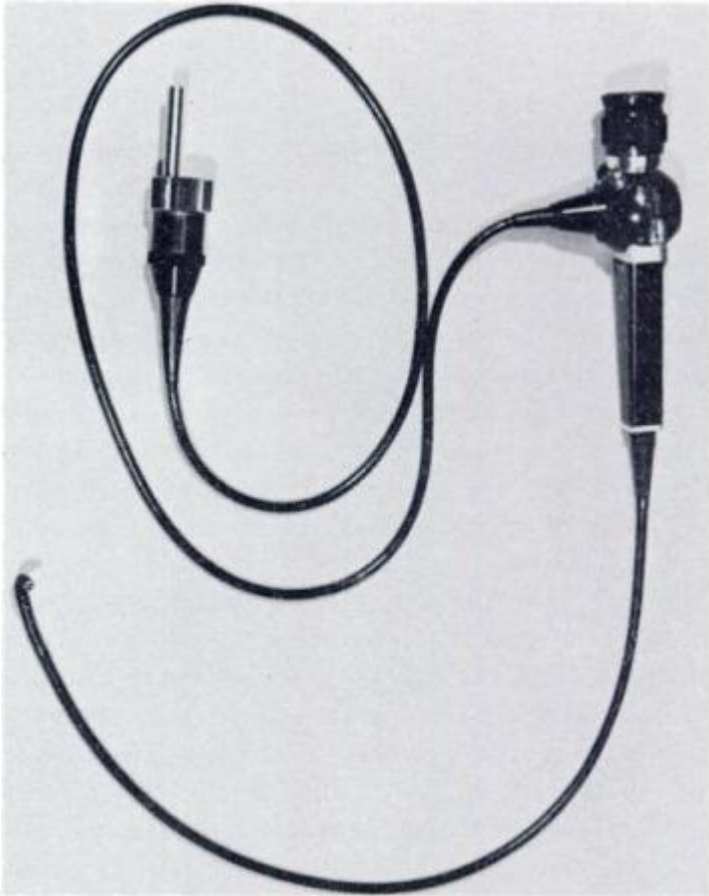
Establish secure airway

- Intubating stylets
- External laryngeal manipulation
- Video-assisted laryngoscopy
- Alternative laryngoscope blades
- Intubating supraglottic airway
- **Combined techniques**





Flexible Bronchoscope Intubation





Flexible Bronchoscope Intubation

- Both anticipated and unanticipated difficult airways
- Awake, sedated, and anesthetized patients.
- Orotracheal and nasotracheal routes
- Insulation of these fibers by a glass layer with a different optical density enables transmission by internal reflection of light



Flexible Bronchoscope Intubation

Indications and advantages

- Limited mouth opening
- Abnormal airway anatomy/mass obstructing direct visualization of vocal cords
- Unstable cervical spine
- Airway trauma requiring visualization of larynx and trachea prior to intubation
- Prone/Lateral position requiring rescue intubation

Contraindications and disadvantages

- Blood or secretion in the airway, severe maxillofacial injury
- Need for rapid control of the airway
- Clinician inexperienced
- Coagulopathy (risk of epistaxis)
- Allergy to local anesthetics
- Refusal or uncooperative patient



Flexible Bronchoscope Intubation

Indications and advantages

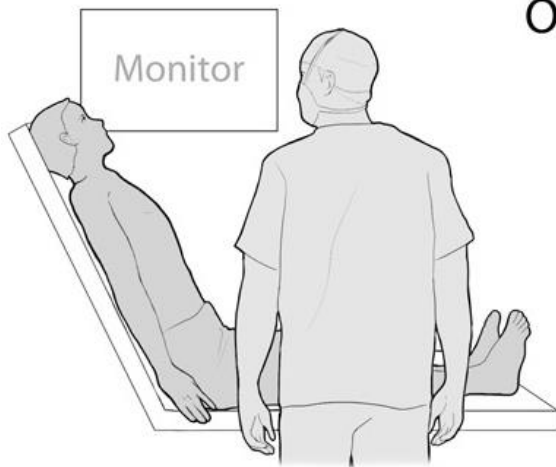
- Limited mouth opening
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Contraindications and disadvantages

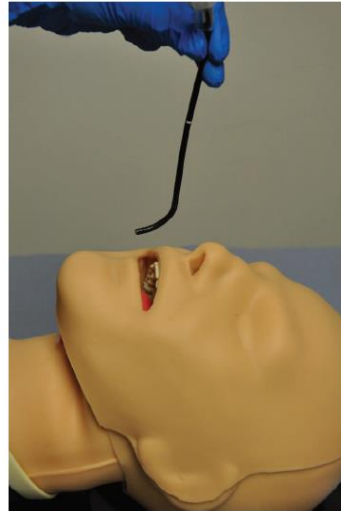
- Blood or secretion in the airway, severe maxillofacial injury
- Need for rapid control of the airway
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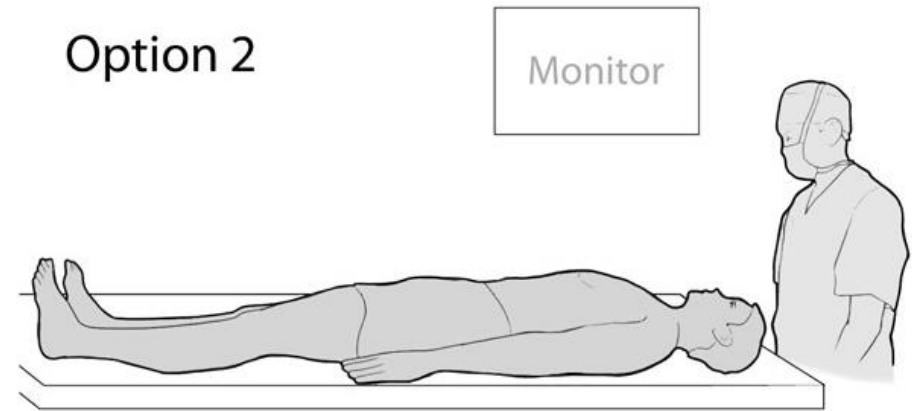
Positioning



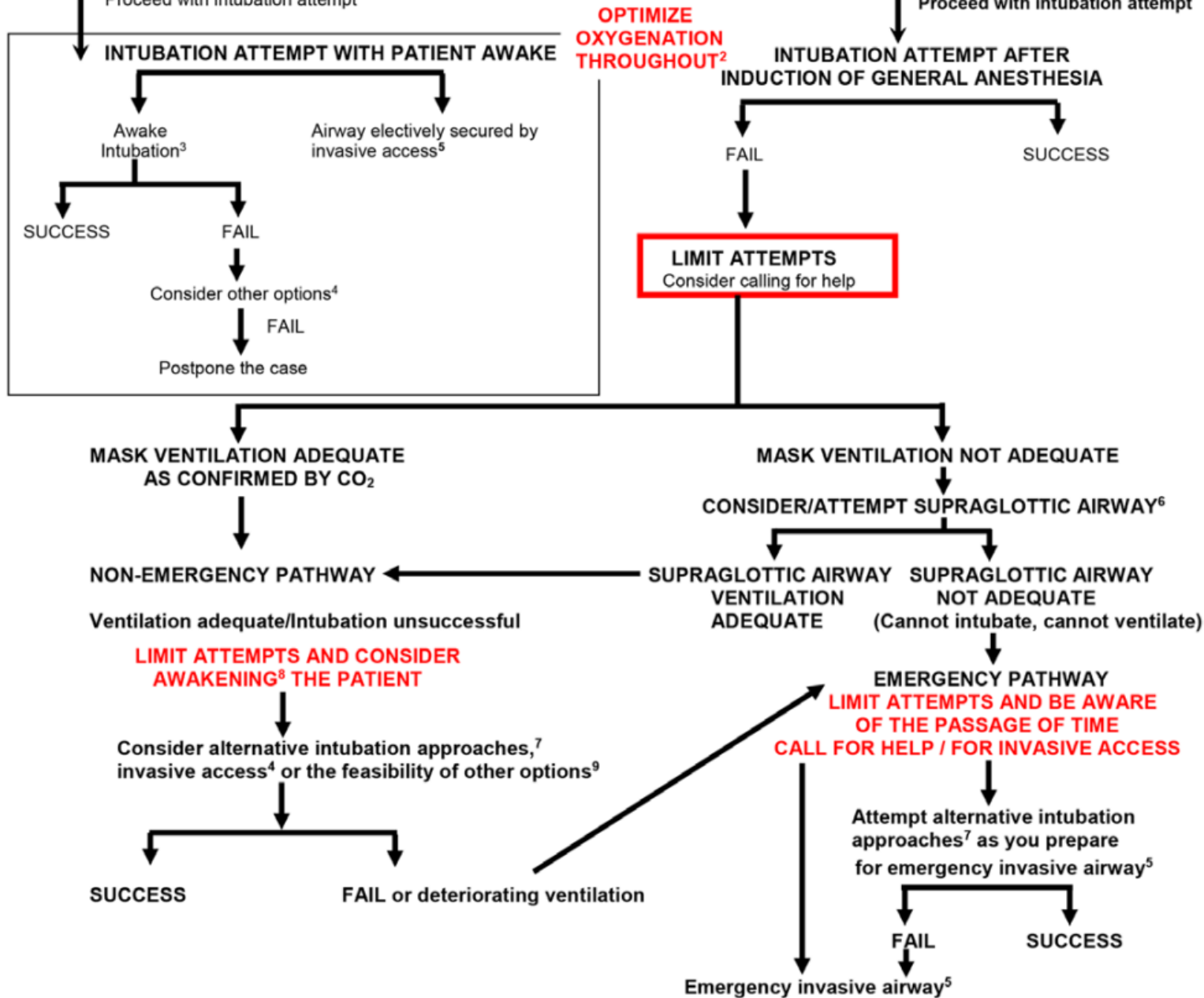
Option 1



Option 2



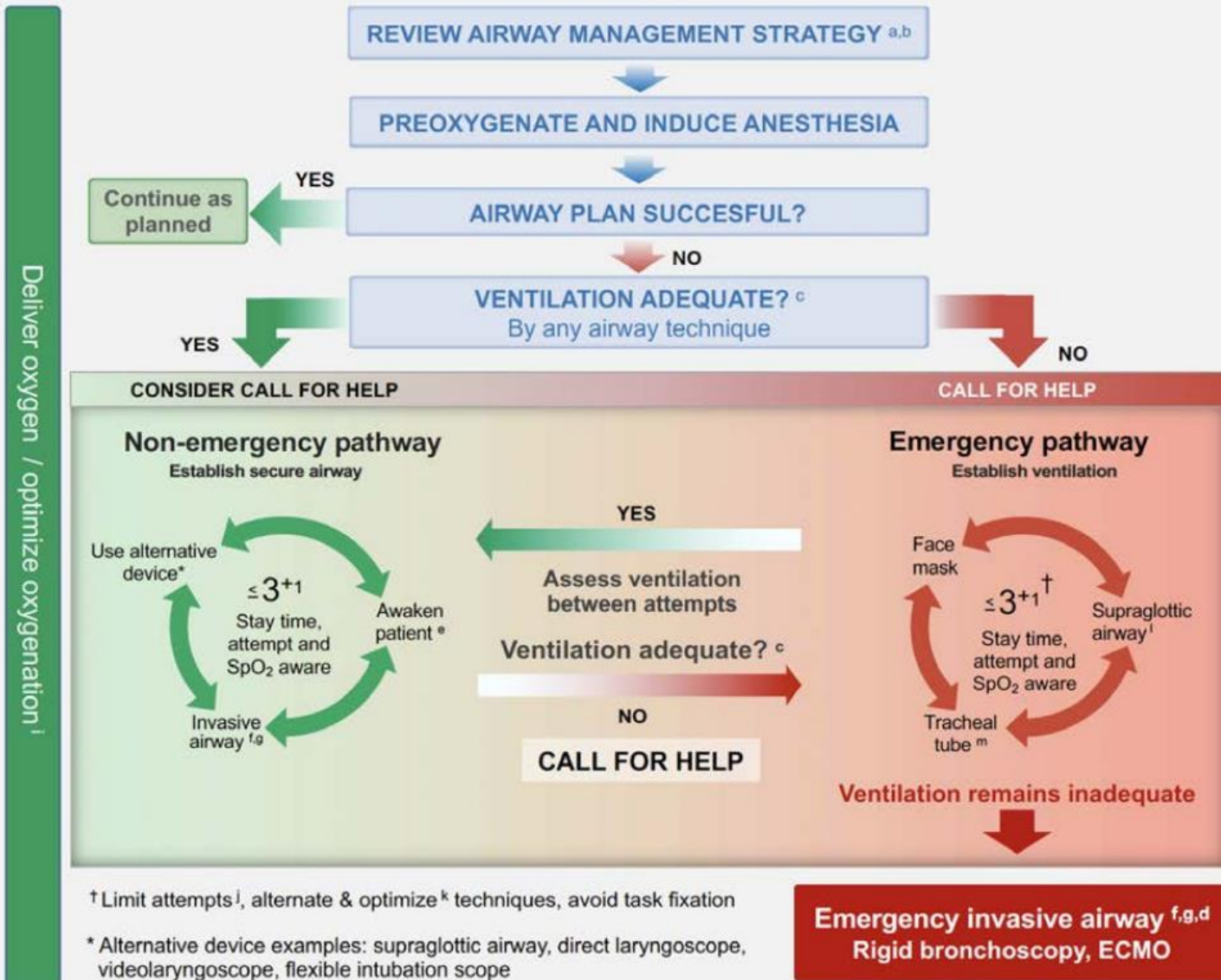
- ❖ Scope from the head of the bed, the tip of the scope is angulated up at an angle of 45°



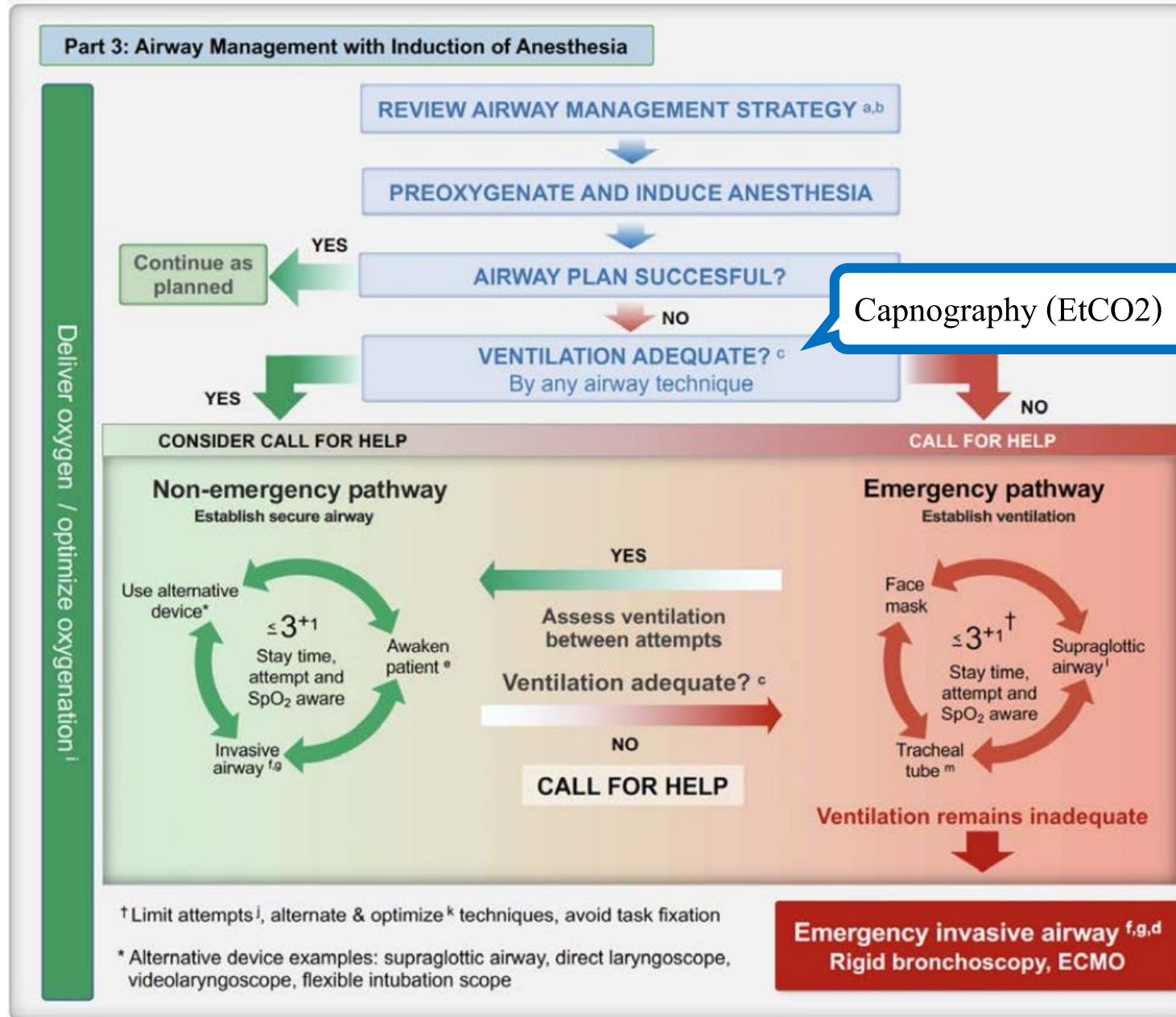
Guidelines for Management of the Difficult Airway



Part 3: Airway Management with Induction of Anesthesia



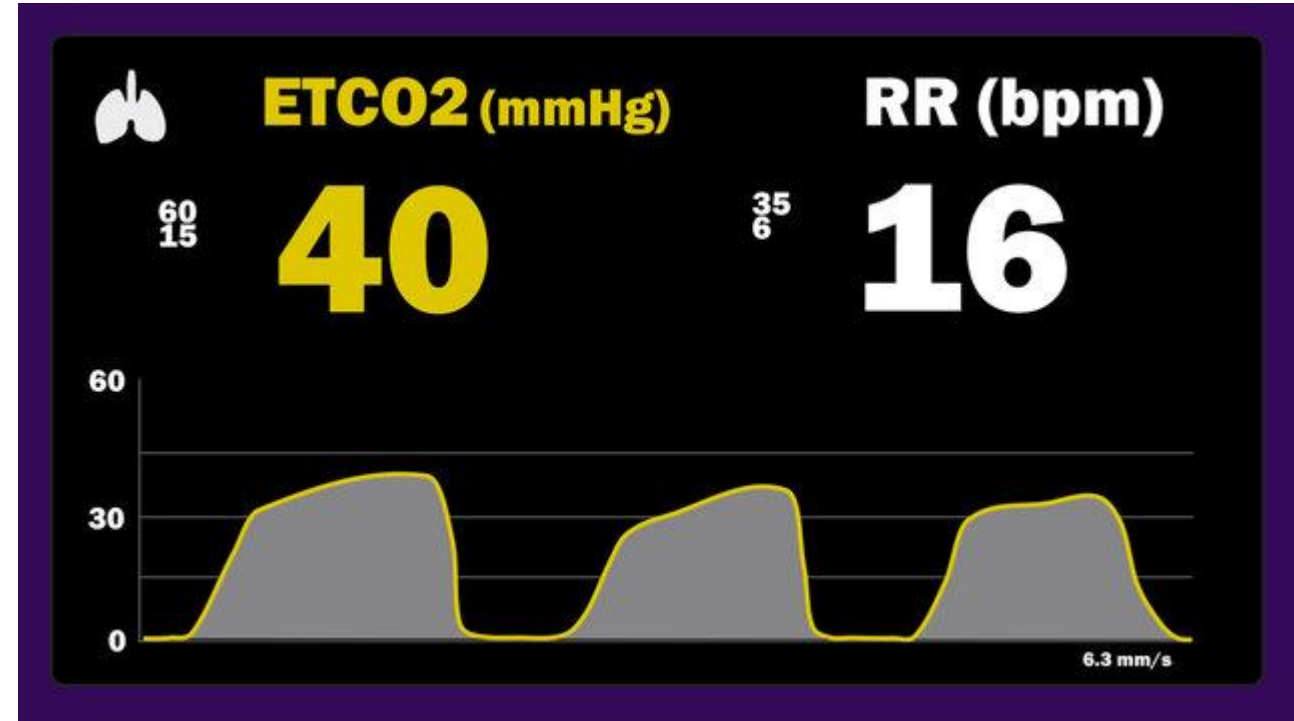
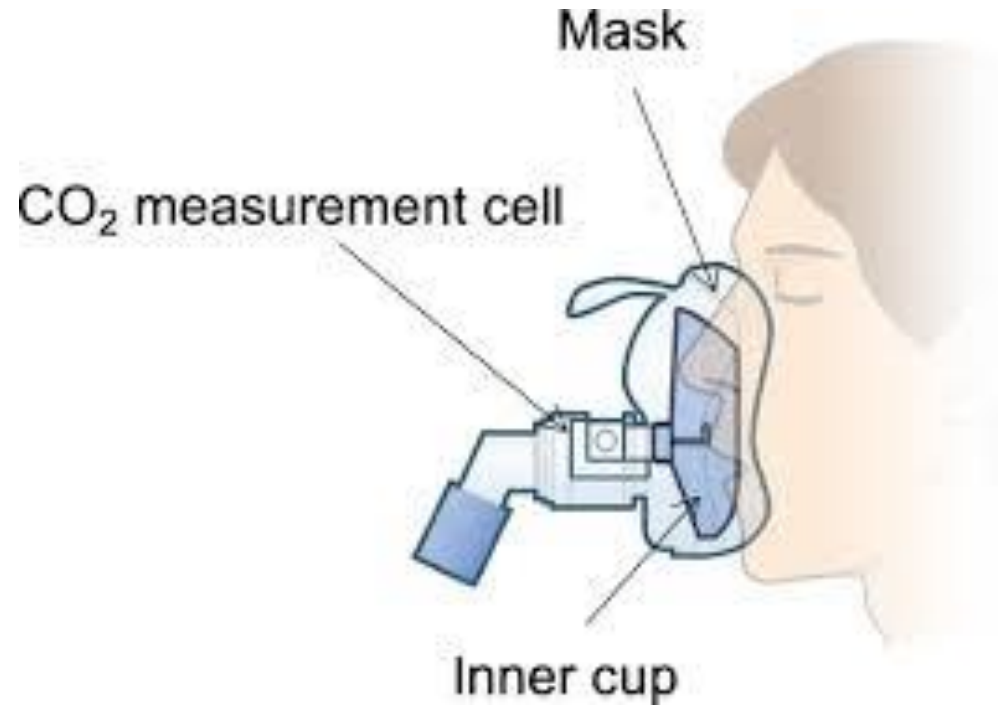
Guidelines for Management of the Difficult Airway

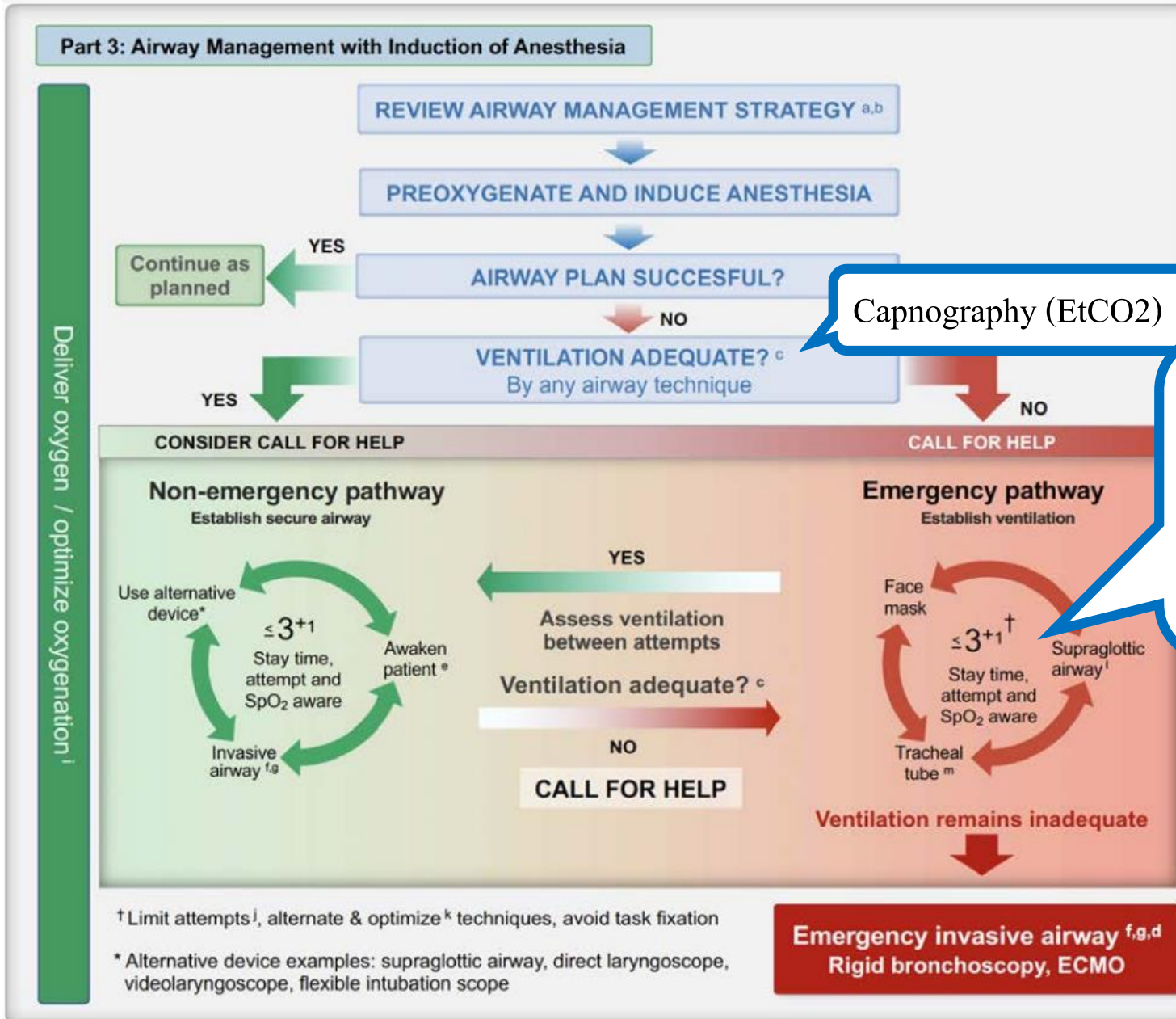


Guidelines for Management of the Difficult Airway



Capnography (EtCO₂)





Guidelines

for

Suction

Repositioning

Oral/nasal airway

Two-hand mask grip

Supraglottic airway

ement

Difficult

Airway



Establish ventilation

- Suction
- Repositioning
- Oral/nasal airway
- Two-hand mask grip
- Supraglottic airway



Establish ventilation

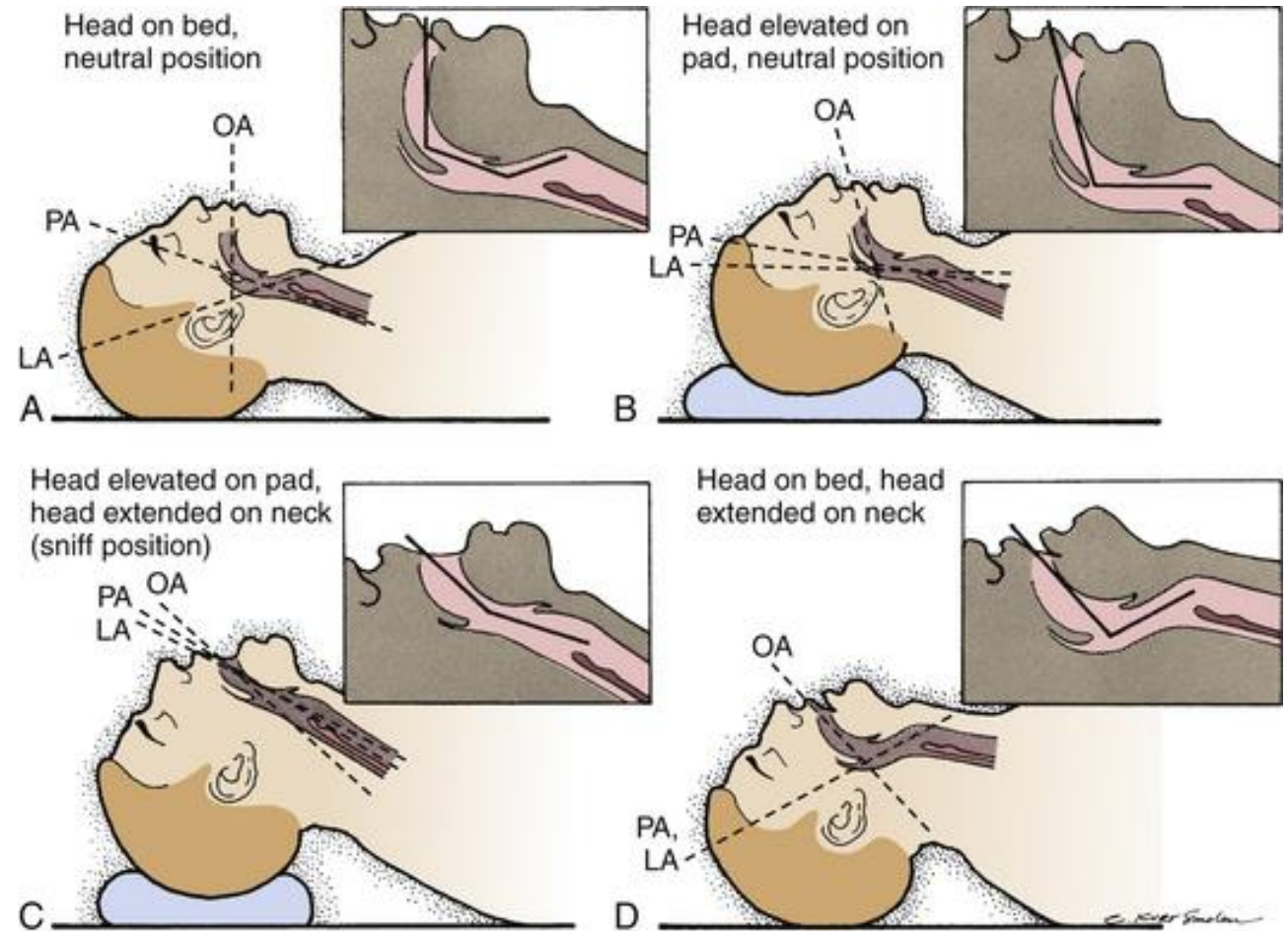
- **Suction**
- Repositioning
- Oral/nasal airway
- Two-hand mask grip
- Supraglottic airway





Establish ventilation

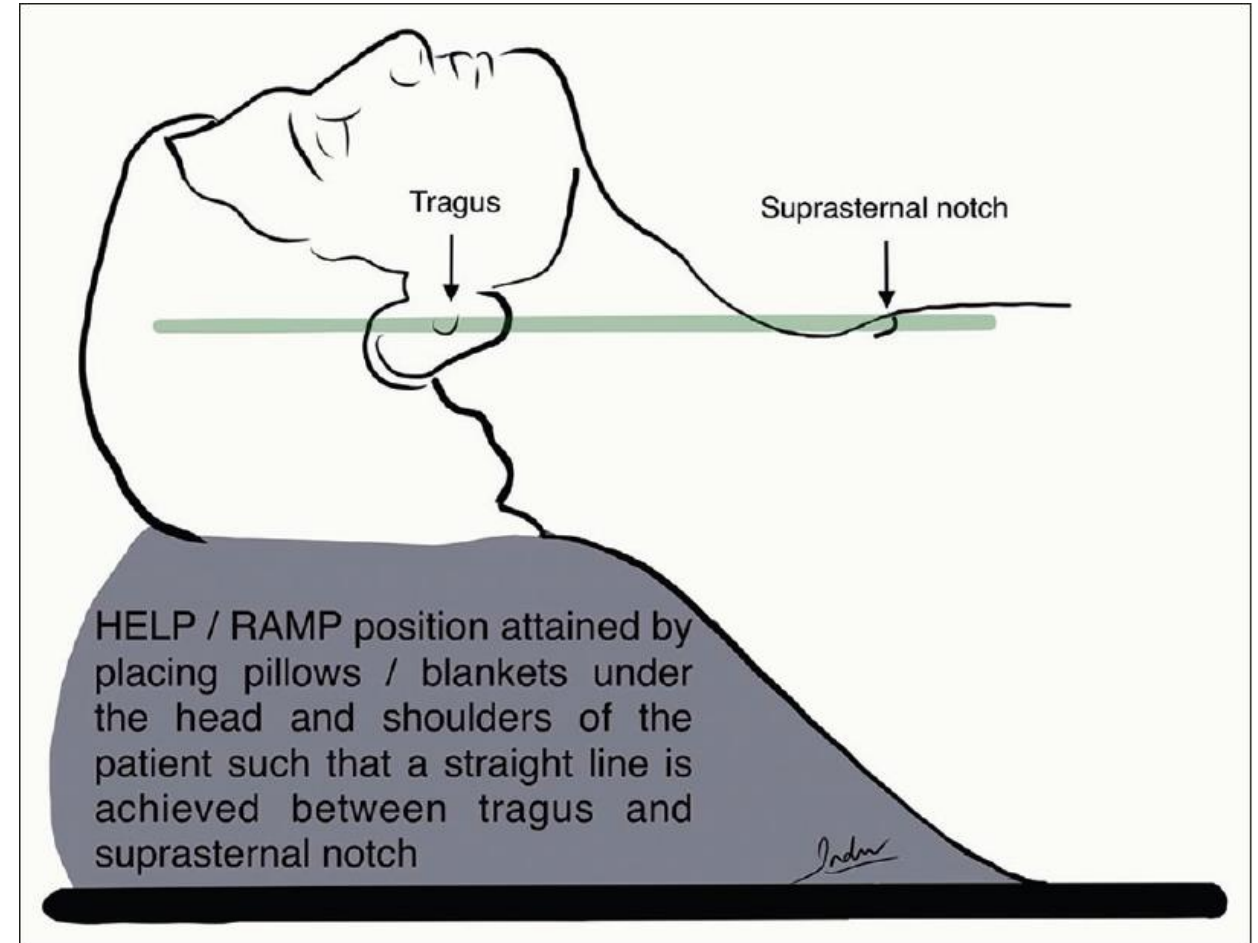
- Suction
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- Oral/nasal airway
- Two-hand mask grip
- Supraglottic airway





Establish ventilation

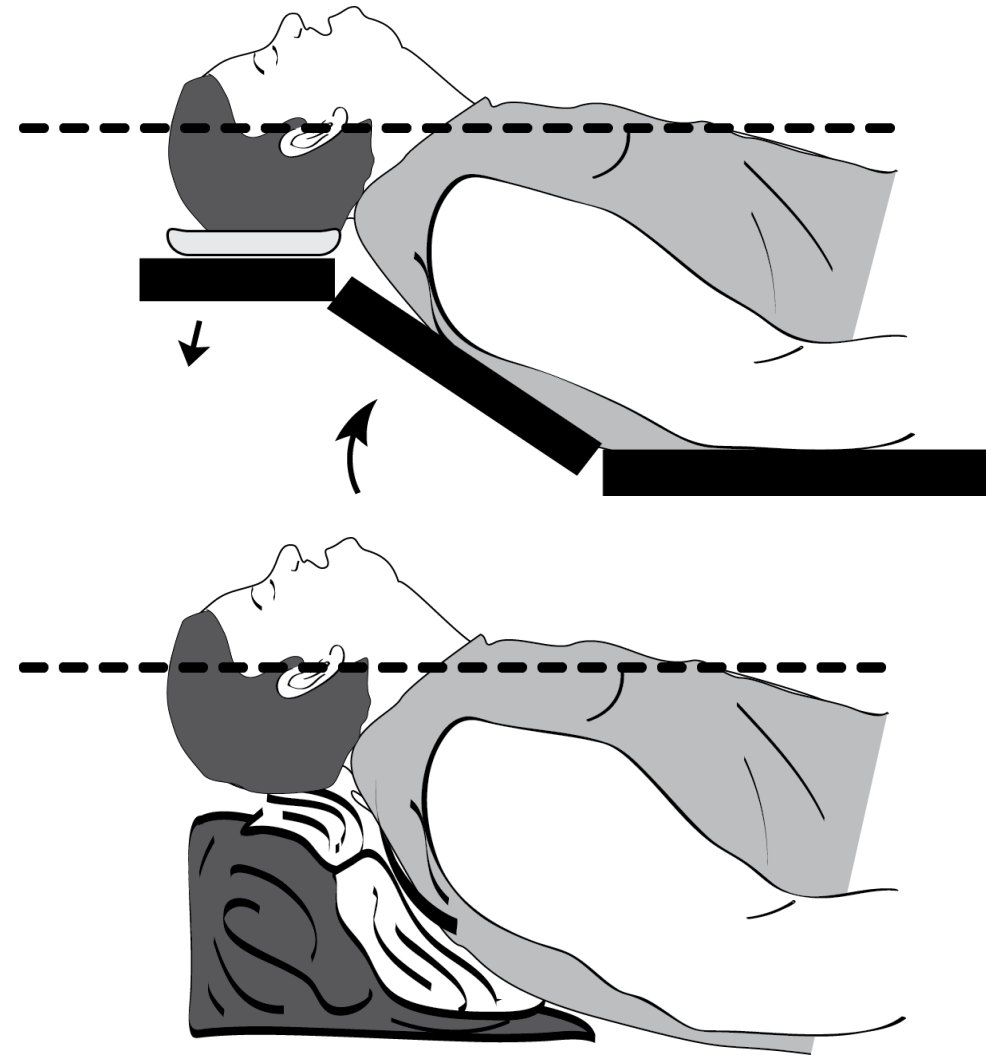
- Suction
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Establish ventilation

- Suction
- **Repositioning**
- Oral/nasal airway
- Two-hand mask grip
- Supraglottic airway





Establish ventilation

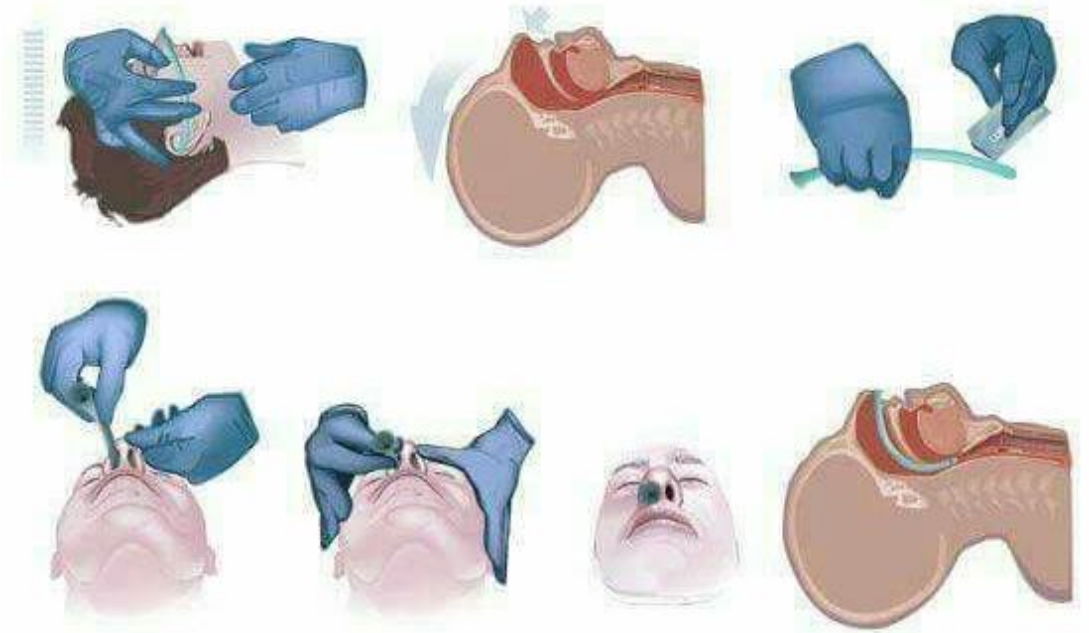
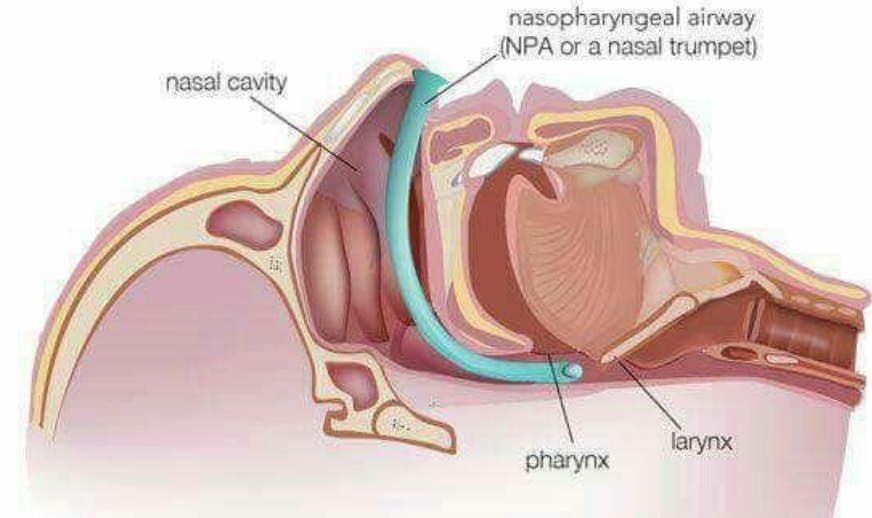
- Suction
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- **Oral/nasal airway**
- Two-hand mask grip
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Establish ventilation

- Suction
- Repositioning
- **Oral/nasal airway**
- Two-hand mask grip
- Supraglottic airway





Establish ventilation

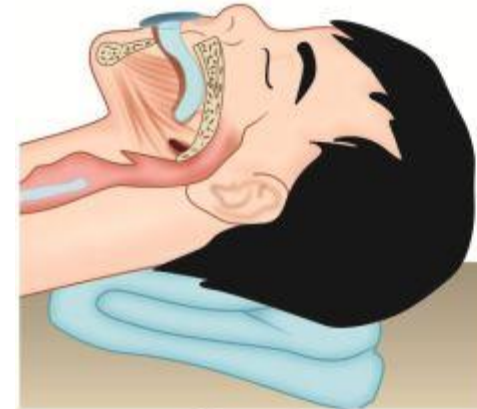
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- Supraglottic airway



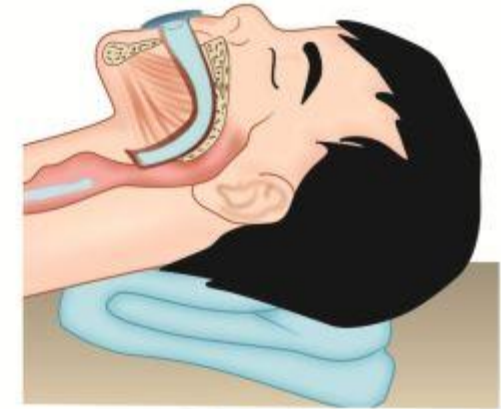


Establish ventilation

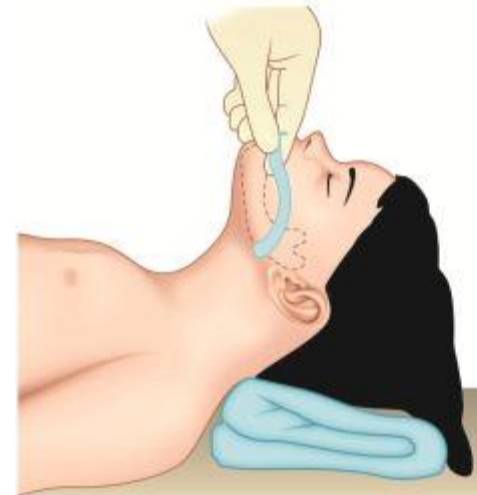
- Suction
- Repositioning
- **Oral/nasal airway**
- Two-hand mask grip
- Supraglottic airway



Short size



Bigger size



Proper size nasopharyngeal
airways



Proper position



Establish ventilation

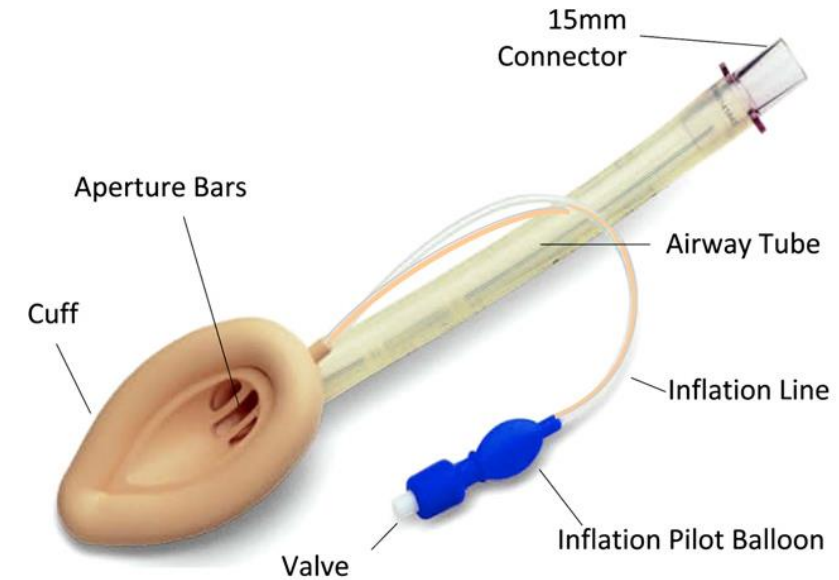
- Suction
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Establish ventilation

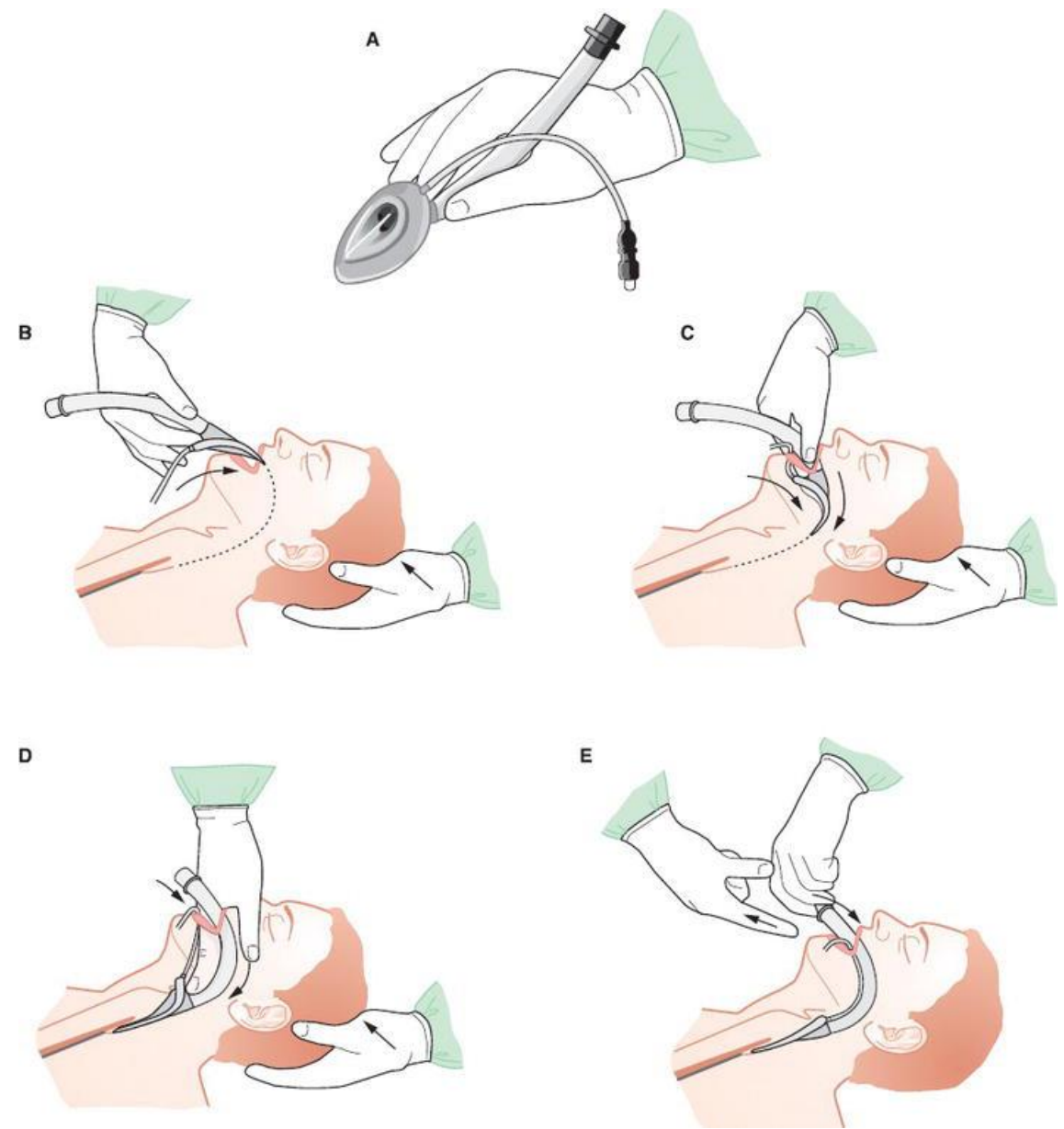
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Establish ventilation

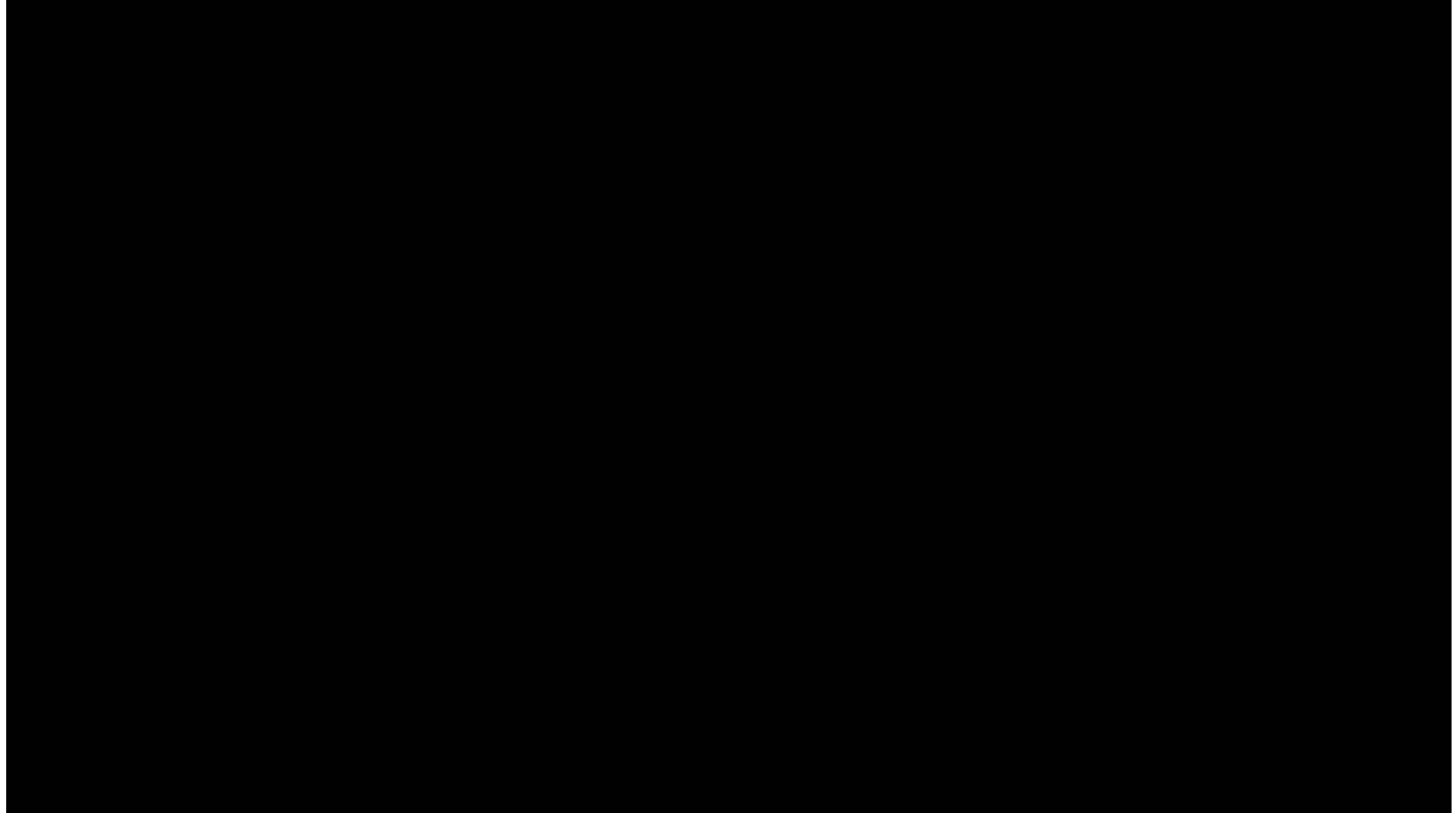
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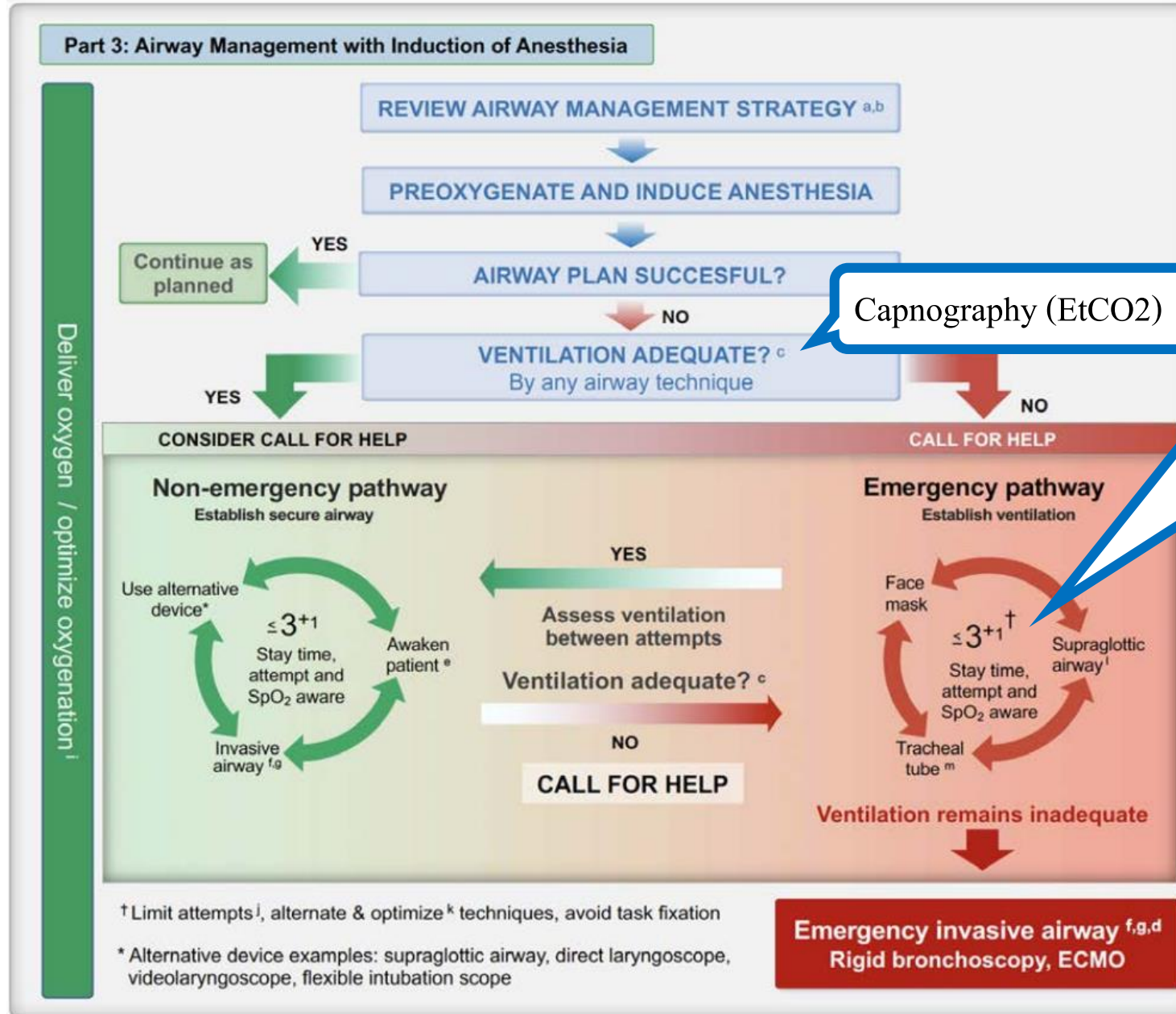


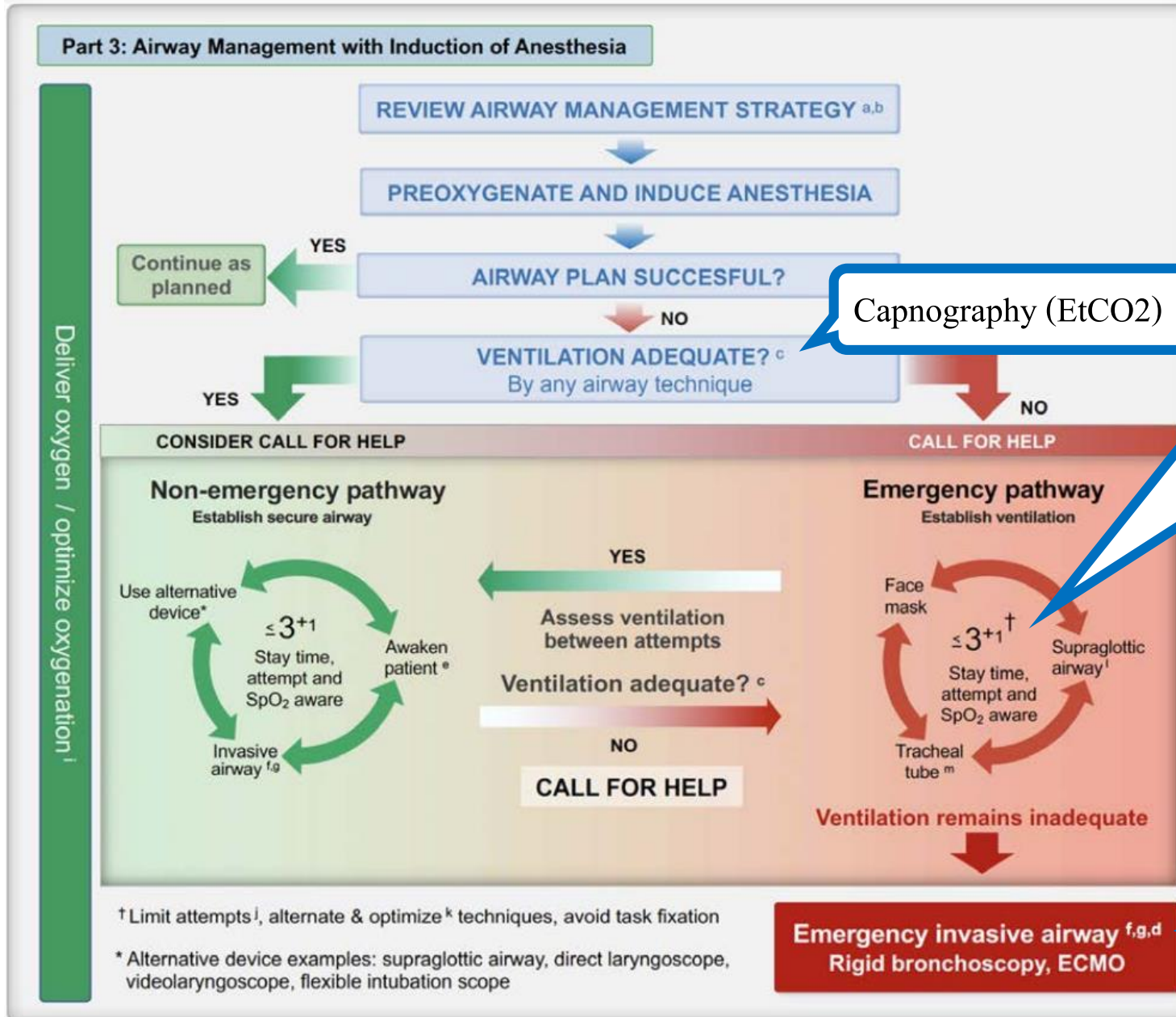


Establish ventilation

- Suction
- Repositioning
- Oral/nasal airway
- Two-hand mask grip
- **Supraglottic airway**



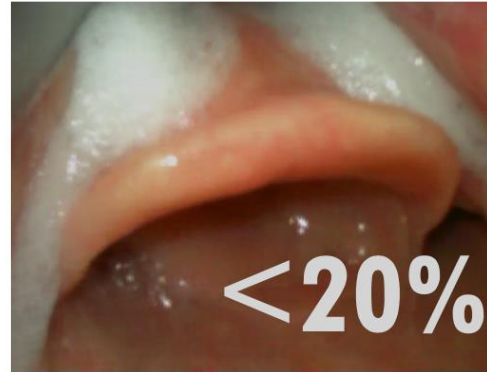
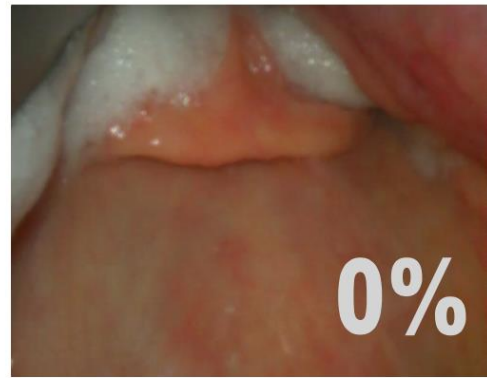






What is the problem?

- Uncooperative patient
- Can't see vocal cord
 - Laryngeal view grade $> I$
 - Obscured by Secretion / Blood / Mass
- Seen vocal cord, but can't insert endotracheal tube into vocal cord
 - Can't control tip of ETT to vocal cord
 - Vocal cord edema
- Limited mouth opening or neck movement





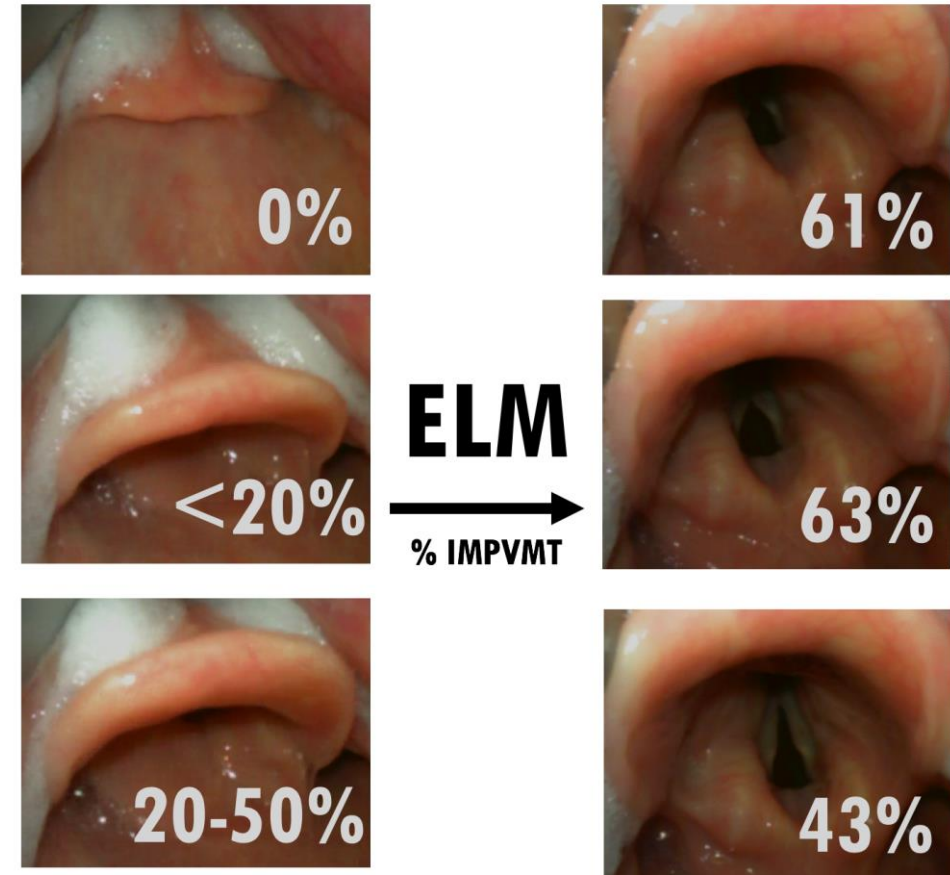
What is the problem?

- Uncooperative patient
 - Proper sedation
 - Rapid sequence induction



What is the problem?

- Can't see vocal cord **due to poor LV**
 - Appropriated position – Sniff position
 - BURP maneuver
 - Appropriated laryngoscope blades
 - Video laryngoscopy or combine techniques





What is the problem?

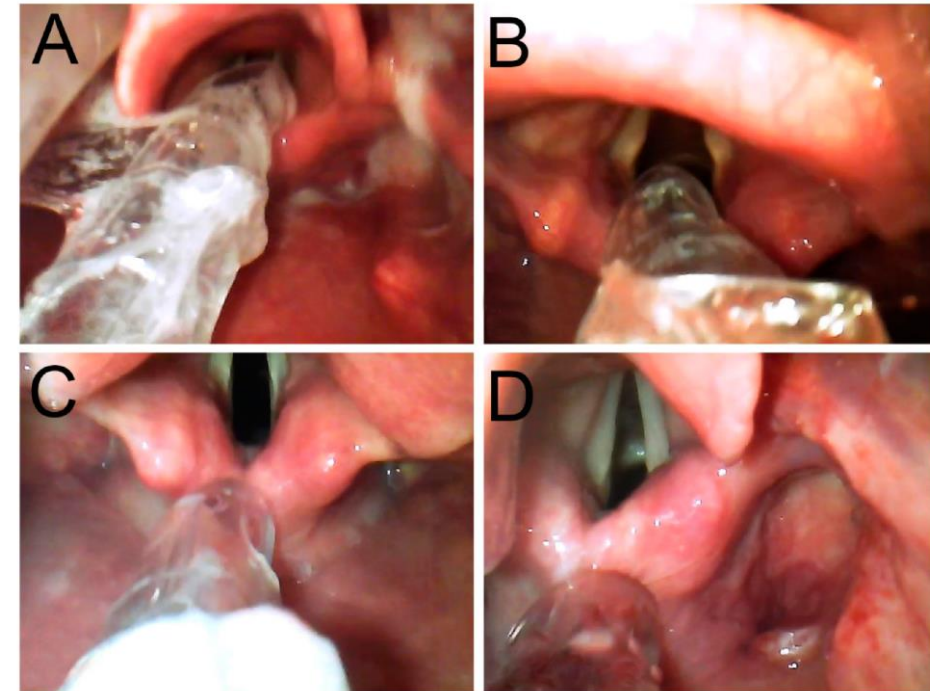


- Can't see vocal cord **due to obscured by Secretion / Blood**
 - Suction
 - Limit attempts
- Can't see vocal cord **due to obscured by large mass e.g. base of tongue tumor**
 - Limit attempts and consider calling for help
 - Consider role of fiberoptic or invasive airway by specialist



What is the problem?

- Seen vocal cord, but can't insert endotracheal tube into vocal cord
 - BURP maneuver
 - Intubating stylets with appropriated curve (correlation with laryngoscope curve blades)
 - Fiberoptic or combine techniques
 - Smaller endotracheal tube size





What is the problem?

- Limited mouth opening or neck movement -> Evaluation cause of limitation
 - Incorporating patient -> Sedation or induction
 - Pain -> Pain controller e.g. Fentanyl, Pethidine



What is the problem?

- Limited mouth opening or neck movement
 - Collar mask
 - Manual in line stabilization with video laryngoscopy

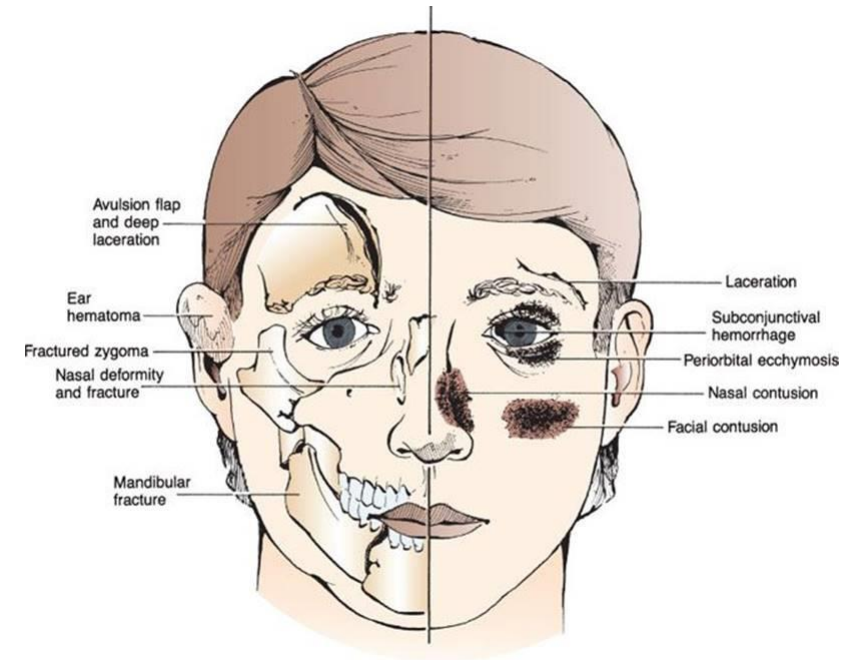


MILS during intubation – standing opposite to intubator



What is the problem?

- Limited mouth opening or neck movement
 - Anatomy defects
 - Limit attempts and consider calling for help
 - Consider role of fiberoptic or invasive airway by specialist





Take home messages

- Face mask ventilation is KEY for survival
- Limit attempts and consider calling for help