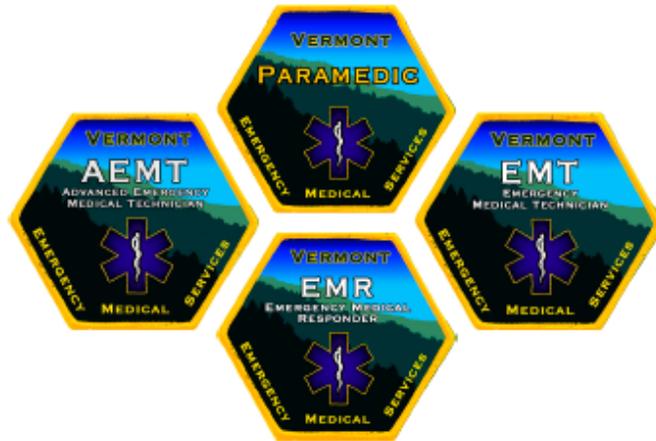




Vermont Statewide  
**Emergency Medical Services**  
Protocols

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# Rapid Sequence Intubation Course Manual

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***Note:** the information contained in this resource manual serves as guidance from VT EMS on the subject of RSI education. It is not intended to take the place of comprehensive initial or continuing education, and is designed to be used in conjunction with other educational resources.*

*As a reminder, an RSI program requires the direct involvement of the District Medical Advisor (DMA) and the approval of the Department of Health. Instruction/delivery of this educational material is under the medical oversight of the DMA, but it is recommended to have instructors that have extensive experience with RSI (i.e., emergency department physicians, anesthesiologists, etc.).*

**Introduction:**

Securing and maintaining an airway is a paramedic's highest priority when caring for critically ill or injured patients. When required, advanced airway interventions must be performed quickly and efficiently by an experienced individual with the goal of establishing a definitive airway while minimizing any possible complications. Vermont EMS has established a Rapid Sequence Intubation (RSI) program which offers an advanced technique using medications to facilitate intubation. In order to be performed successfully, it requires an experienced provider with a thorough understanding of the indications, contraindications and pharmacology of RSI medications. This course manual will discuss the recognition of airway compromise and management as well as the proper use of RSI medications and clinical skills with the goal of developing a paramedic's confidence and competence to successfully and safely perform RSI in the pre-hospital setting.

**Rapid Sequence Intubation (RSI) Credentialing Process**

In order to ensure the RSI program operates at a safe and efficient level VT EMS has stringent requirements for paramedics who wish to complete the credentialing process.

The following are required to be credentialed as a RSI paramedic:

- Actively practicing as paramedic for a minimum of the last 2 years
- Documented a minimum of 5 successful field intubations within the last 2 years. This is beyond any intubations performed as a student. In addition, 16 documented training intubations within the last 2 years obtained in the operating room and/or high fidelity simulation lab and/or airway course.
- Successfully complete the VT RSI course which includes: Airway Assessment, RSI Pharmacology, Rescue Airway, Putting it all Together, Malignant Hyperthermia, Documentation and QA/QI, Skills Lab, and Simulation Lab. The District Medical Advisor has the option to require a written exam.

Once the requirements are met the District Medical Advisor credentials the provider. The credential must be renewed every 2 years. The renewal process will require:

- $\geq 2$  successful prehospital RSIs per quarter
    - No further recertification
  - $< 2$  successful prehospital RSIs per quarter
    - Demonstrate 2 RSI intubations in the SimLab or other practical setting per quarter
- AND**
- Challenge SimLab (or other equivalent practical) final practical scenarios with oversight of the District Medical Advisor.
- OR**
- Complete VT EMS RSI training modules/SimLab program

**Rapid Sequence Intubation (RSI) Assistant Credentialing Process**

The role of the RSI Assistant is to assist the credentialed RSI paramedic with airway management and monitoring.

The following are required to be credentialed as a RSI assistant:

- Actively practicing as an AEMT or non-RSI credentialed paramedic
- Successfully complete the following portions of the VT RSI course: Rescue Airways, Putting it all Together, Malignant Hyperthermia, Documentation and QA/QI, and the associated Skills Lab and Simulation Lab.

Once the requirements are met the District Medical Advisor credentials the provider. There is no renewal process necessary for the RSI Assistant.

Please note that having the RSI Assistant credential does NOT add to a provider's scope of practice. An AEMT or non-RSI paramedic may not exceed their scope of practice when assisting in a RSI procedure.

**RSI Course Curriculum:***Objectives*

To assess, objectively measure, and demonstrate competence in the skill of rapid sequence intubation (RSI) using simulated patient care scenarios.

To increase participant comfort and knowledge of indications, contraindications, medications, and procedures used during RSI.

To enforce and practice the medical decision making and procedural skills utilized during RSI through experiential learning.

*Course Structure*

Below is a course template. The VT RSI curriculum is approximately eight hours consisting of both lecture and practicals.

0800 Course and instructor introduction

0815 Introduction to the simulation equipment

0830 Presentation on **Airway Assessment**

0900 Skills Lab/BLS to ETT, Bougie, Difficult Intubations

0930 Observe a RSI in action (SIM instructor demonstration/discussion/video debriefing)

1015 Presentation on **RSI Pharmacology**

1115 Skills Lab/RSI Pharmacology/Simulation #1

1145 Lunch

1215 Presentation on **Rescue Airways**

1315 Skills Lab/Rescue Airways/Simulation #2

1345 Presentation on **Putting it all Together & Malignant Hyperthermia**

1430 Skills Lab/Putting it all Together/Simulation #3

1530 Presentation on **Documentation and QA/QI**

1530 Exam Simulation 1 & 2

1630 End

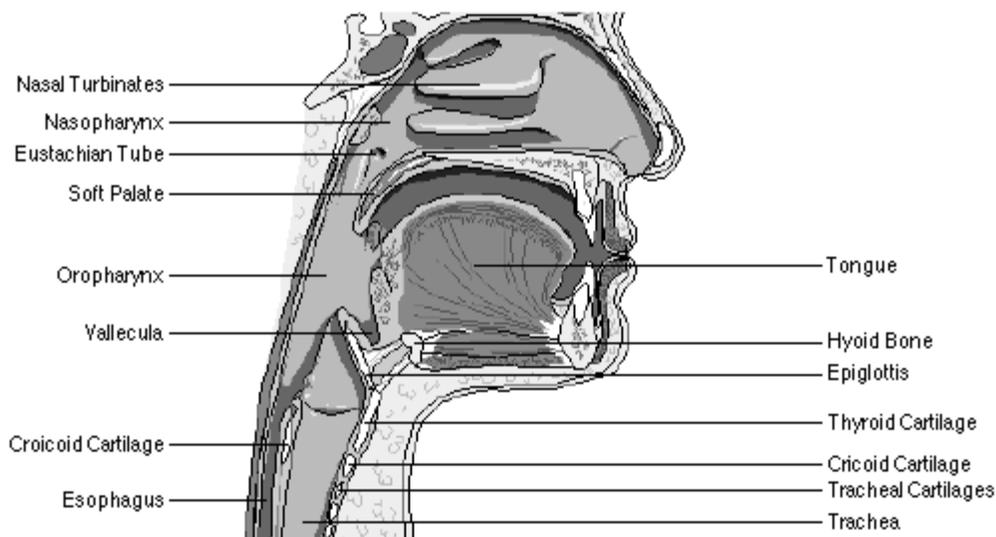
*\*This manual will outline what should be covered in the presentations. There are eight case studies on page 31 that should be used throughout the presentations. The simulation scenarios and the exam simulations are on page 32.*

**Airway Assessment:****Anatomy & Terminology Review**

The airway is divided into three regions, each with separate structures:

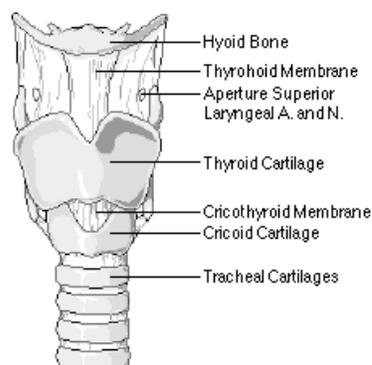
*Upper Airway*

The face and the facial skeleton are considered components of the upper airway. The upper airway heats, humidifies, and conducts air into the lower airways. Problems can arise from obstructions, fractures, and soft tissue injuries.

*Middle Airway*

The middle airway consists primarily of the larynx. It is fairly well protected, but is susceptible to injury. The larynx is comprised of cartilage and contains the vocal cords and because it is narrow edema, secretions, or foreign bodies can quickly cause problems.

The rigid laryngeal structures are the hyoid bone, thyroid cartilage, cricoid cartilage, and arytenoid cartilage. Inferior to the cricoid cartilage are tracheal cartilages. The cricoid cartilage is a complete ring and can be used to prevent passive reflux of the stomach using cricoesophageal pressure (Sellick's Maneuver). BURP (backward, upward, rightward pressure) should be considered if the trachea is an anterior anatomic position.

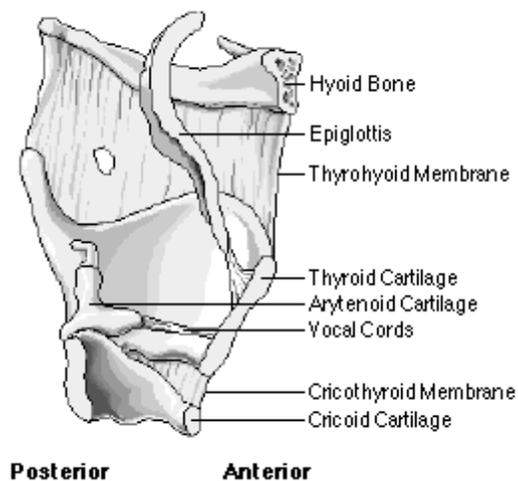


### Laryngeal Cartilages

The cricothyroid artery is a small branch of the superior thyroid artery. It travels along the inferior border of the thyroid cartilage and becomes smaller as it reaches the midline.

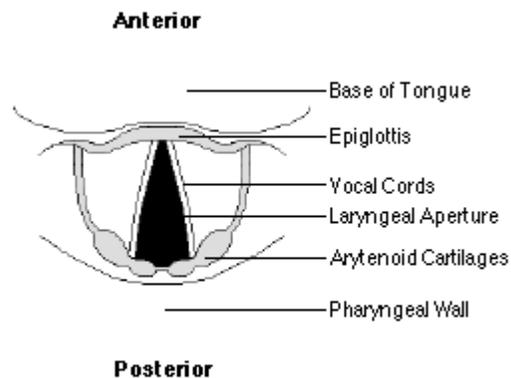
Cricothyroid puncture in the midline, inferior to the membrane above the cricoid cartilage, is least likely to produce bleeding.

The large superior and inferior thyroid arteries supply the thyroid gland. The gland is highly vascular. A pyramidal lobe may extend to the hyoid bone. Puncture below the cricoid cartilage has increased risk of bleeding. Palpate the puncture site carefully and avoid any masses.



### Laryngoscopic View

The view during laryngoscopy is variable. Under ideal circumstances the epiglottis, arytenoid cartilages and nearly the entire vocal cords will be visible.



### *Lower Airway*

The lower airway begins at the trachea as it exits the neck and enters the chest. It consists of c-shaped cartilage rings held together by elastic-muscle tissue posteriorly, divides into the right and left mainstem bronchi and continues to the lung tissue.

### **Indications**

One of the basic functions of a paramedic is to ensure a patent airway. A paramedic must be able to rapidly identify patients at risk and determine the most appropriate method to manage the airway.

When determining the best method for maintaining an airway, consider the following:

- Is the patient at risk for a positional obstruction or aspiration?
- Is there inadequate oxygenation and/or ventilation?
- Is the patient's condition expected to deteriorate?

### **Airway Assessment**

#### *Difficult Airway Prediction*

One of the most important factors when considering RSI is predicting the difficulty of an airway. There are three different dimensions of airway difficulty:

- Difficult to oxygenate
- Difficult to intubate
- Difficult to perform a cricothyroidotomy

Being able to predict a difficult airway will help the paramedic decide what interventions and techniques to use for securing the airway.

#### *Anatomic Clues to a Difficult Airway*

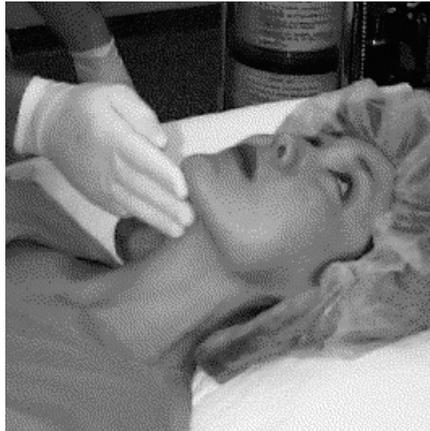
Visualizing the airway can be difficult in patients with the following features:

- Beards or facial hair
- Short, fat neck
- Morbidly obese patients
- Facial or neck trauma
- Broken teeth (can lacerate balloons)
- Dentures (should be removed)
- Large teeth
- Protruding tongue
- A narrow or abnormally shaped face

*Physical Examination of the Airway (3-3-2-Rule)*

1. The mouth should be able to accommodate a width of 3 fingers, incisor-to-incisor, and top to bottom. The tongue should be normal sized.
2. There should be a 3-finger distance from the tip of the chin to the hyoid bone (see picture).
3. There should also be a 2-finger distance from the top of the thyroid cartilage to the hyoid bone.

Any patient whose dimensions are smaller than 3-3-2 will probably present an intubation challenge.

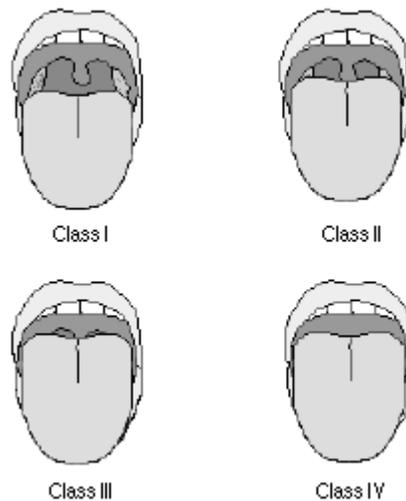
*Mallampati Classification*

The Mallampati classification relates tongue size to pharyngeal size. This test is performed with the patient in the sitting position, the head held in a neutral position, the mouth wide open, and the tongue protruding to the maximum. The subsequent classification is assigned based upon the pharyngeal structures that are visible:

- Class I – Visualization of the soft palate, fauces, uvula, and anterior and posterior pillars
- Class II – Visualization of the soft palate, fauces, and uvula
- Class III – Visualization of the soft palate and the base of the uvula
- Class IV – Soft palate is not visible at all

The classification assigned by the paramedic may vary if the patient is in the supine position (instead of sitting). If the patient phonates, this falsely improves the view. If the patient arches his or her tongue, the uvula is falsely obscured.

A Class I and Class II view correlates well with a laryngoscopic view Grade I and II, and suggests relative ease of intubation. Class III and Class IV view suggest a poor laryngoscopic view, which may result in a difficult for failed intubation.



### *Laryngoscopic View Grading*

- Grade 1 – Full aperture is visible
- Grade II – Lower portion of the cords visible
- Grade III – Epiglottis only visible
- Grade IV – Epiglottis not visible

Grade III and Grade IV are rare. If you frequently see Grade III or Grade IV, consider revisiting your technique. A severe Grade III or Grade IV view with failed endotracheal intubation occurs in 0.05-0.35% of patients.



### *Cervical Spine Mobility*

Patients with decreased c-spine mobility may be difficult or impossible to intubate in the field. As a rule, the patient should be able to extend their neck 35° or greater to allow the maximal laryngoscopic view.

Suspected c-spine injury and immobilization also make it difficult to get a good laryngoscopic view. Additionally, the application of Sellick's Maneuver or BURP has the potential of causing

motion to the unstable segment. Still, it is important to use cricoid pressure/BURP when performing RSI on these patients.

#### *Airway Obstruction*

Any type of airway obstruction, whether from a foreign body, trauma, tumors, or edema will make intubation difficult or impossible even if the patient has no other difficult airway indicators.

**RSI Pharmacology:*****Atropine***

Dose	0.02 mg/kg minimum of 0.1 mg, maximum of 0.5 mg IVP
Action	Inhibits actions of acetylcholine on smooth muscles, secretory glands and CNS.
Indications	Pediatric patients with bradycardia, after succinylcholine administration
Onset	Immediate
Duration	4 – 6 hours
Precautions	Tachycardia, flushing, nausea, vomiting

***Lidocaine***

Dose	1.5 mg/kg IVP
Action	Suppresses the cough reflex. Helps mitigate potential increases in ICP, but must be given 3 minutes before intubation.
Indications	Patients with suspected increased intracranial pressure (ICP) (e.g., traumatic brain injury, seizures, suspected intracranial hemorrhage)
Onset	2-3 minutes
Precautions	Can cause seizures, bradycardia, and/or heart block, especially if given rapidly.

***Etomidate (Amidate)***

Dose	0.3 mg/kg IV
Action	The exact mechanism of action of etomidate is not known. It is thought to enhance the action of GABA (Gamma-amino butyric acid), the principal inhibitory neurotransmitter in the CNS, by interacting with the GABA-A receptor
Indications	Sedation for RSI
Onset	30-60 seconds

Duration	7-10 minutes, dose dependent
Interactions	Sedative effect of etomidate may be accentuated by concomitant use of barbiturates, alcohol or narcotics.
Side effects	Pain at injection site, muscle twitching, hypoventilation may occur (especially with rapid injection), laryngospasm, hiccups

### *Fentanyl (Sublimaze)*

Dose	1-2 mcg/kg IVP, maximum 100 mcg per single dose
Action	Binds with opiate receptors in the CNS, altering both perception of and emotional response to pain through unknown mechanism.
Onset	1-2 minutes, often immediate
Duration	30- 60 minutes
Interactions	Consider reducing dose of Fentanyl to ½ of the normal dose if taking any of the following drugs: <ul style="list-style-type: none"><li>• Any CNS depressants</li><li>• Alcohol</li><li>• MAO inhibitors</li><li>• Hypnotics</li><li>• Other Narcotics</li><li>• Tricyclic Antidepressants</li></ul>
Side effects	Respiratory depression, chest wall muscle stiffening (dose-dependent), hypotension, sedation (CNS depressant), and nausea/vomiting
Reversal	Naloxone, 0.04-2 mg IV (you do not want to block all opiate receptors, start with 0.04 mg IV and titrate dose)

***Ketamine***

Dose	2 mg/kg IV
Action	Produces dissociative anesthesia. Blocks NMDA receptor.
Indication	Sedative used in rapid sequence intubation
Onset	IV 30 sec
Duration	Approximately 20 min
Interactions	May increase respiratory depression if given along with opioids
Side effects	At recommended dose patent airway and normal pharyngeal-laryngeal reflexes are retained. May cause emergent reactions: HTN, tachycardia, increased airway secretions, and laryngospasm.
Precaution	Any patient with active cardiac ischemia or a question of active cardiac ischemia, ketamine is not recommended

***Lorazepam (Ativan)***

Dose	0.05 mg/kg IVP
Action	Enhances the inhibitory effects of GABA receptors on chloride channels in central nervous system, hyperpolarizing membrane. Induces sleep, decreases anxiety, and impairs memory retention.
Indications	Post-RSI sedation, seizures
Onset	5 minutes
Duration	6-8 hours, dose dependent

***Midazolam (Versed)***

Dose	0.1 mg/kg IV (0.05 mg/kg IV for patients in shock)
Action	Sedative/hypnotic
Indications	Post-RSI sedation, seizures

Onset	1 – 2 minutes
Duration	15 – 20 minutes for single dose
Precautions	In the prehospital setting, hypotension with midazolam was found to be dose related and thus should be used cautiously in patients with hypovolemia or traumatic brain injury, or both.

### ***Propofol***

Dose	5-80 mcg/kg/min infusion
Action	Sedative/hypnotic
Indication	Post-intubation sedation
Onset	30-45 sec
Duration	20-75 min (dose dependent duration, dissipation is function of drug redistribution from CNS)
Interactions	Administration with lidocaine and opioids can increase the risk of respiratory depression; however this is likely not that relevant in the intubated patient
Side effects	Arterial hypotension, apnea, bronchospasm, bradycardia, involuntary movements
Precaution	Patients with an allergy to eggs, egg products, soy, or soybeans, propofol is not recommended

### ***Rocuronium (Zemuron)***

Dose	1mg/kg IVP – Requires on-line medical control
Action	Blocks cholinergic receptors on motor endplate, does not result in muscle depolarization, no fasciculations observed. Subsequent nerve impulse transmission inhibited.
Onset	Within 1 minute
Duration	Typically 45-60 minutes after a single dose
Indications	RSI, long-term paralysis after RSI
Contraindications	Known hypersensitivity

Side effects	Respiratory paralysis, malignant hyperthermia, rhabdomyolysis. Increased intracranial, intragastric, and intraocular pressure. No fasciculations.
Precaution	It is imperative that patients are sedated prior to being paralyzed. Be cognizant not to give a long acting paralytic when they have only received a short-acting sedative
Special Considerations	Consider use of sedative or analgesic to decrease cardiovascular side effects. Eye care to prevent desiccation, abrasions.

### *Succinylcholine (Anectine)*

Dose	1.5 mg/kg IV immediately after sedation
Action	Succinylcholine has the briefest duration of action of all neuromuscular blocking agents. Like non-depolarizing blockers, depolarizing drugs also bind to the nicotinic M receptors for acetylcholine. However, because they cause an initial depolarization of the muscle membrane, they often lead to fasciculations prior to inducing paralysis.
Onset	< 1 minute
Duration	5-10 minutes
Side effects	Hypotension, bradycardia, dysrhythmias, initial muscle fasciculations, excessive salivation, malignant hyperthermia (rare), allergic reaction
Contraindications	Extensive burns or crush injuries > 24 hours old, known or suspected hyperkalemia, history of malignant hyperthermia, denervation syndrome in which atrophy is present

#### IV Special Considerations

- Pre-medicating with lidocaine may blunt any increase in intracranial pressure.
- Neuromuscular blocking agents will produce respiratory paralysis. Therefore, intubation and ventilatory support must be readily available.
- Carefully monitor the patient and be prepared to resuscitate.
- Brain or spinal cord injury may prolong effects.
- Children are not as sensitive to succinylcholine on a weight basis as adults and

may require higher doses.

- Succinylcholine has no effect on consciousness or pain.
- Patients with myasthenia gravis may require a double dose
- Will not stop neuronal seizure activity.

### ***Vecuronium (Norcuron)***

Dose            0.1 mg/kg IVP – Requires on-line medical control for post-intubation paralysis

Actions        Blocks cholinergic receptors on motor endplate, does not result in muscle depolarization, no fasciculations observed. Subsequent nerve impulse transmission inhibited.

Indications    RSI post-intubation paralysis, if needed

RSI Contraindications    Known hypersensitivity

Side Effects    Respiratory paralysis, malignant hyperthermia, rhabdomyolysis. Increased intracranial, intragastric, and intraocular pressure. No fasciculations.

Precaution    It is imperative that patients are sedated prior to being paralyzed. Be cognizant not to give a long acting paralytic when they have only received a short-acting sedative

Special Considerations    Consider use of sedative or analgesic to decrease cardiovascular side effects. Eye care to prevent desiccation and abrasions.

**Rescue Airways:**

An option for this section is LearnEMS/CentreLearn courses A403 and A404 for non-visualized airways.

Purpose: It is vital that the prehospital crew be confident, comfortable, and competent with the rescue airways approved for their level of licensure. This will be a review of backup airway devices (rescue airways), including but not limited to: BVM, LMA, King, and Combitube.

The Basics (See VT Protocols 5.0, 5.1A, 5.1P, 5.2, 5.5, 5.12):

Most difficult airways will still be manageable using basic airway maneuvers.

- Position
- OPA/NPA
- BVM
- Suction

The Need for Oxygen:

- 0-1 minute: cardiac irritability
- 0-4minutes: brain damage not likely
- 4-6 minutes: brain damage possible
- 6-10 minutes: brain damage very likely
- >10 minutes: irreversible brain damage

Oxygen and Carbon Dioxide Exchange:

- Oxygen rich air is inhaled to alveoli
- Oxygen exchanged at the alveolocapillary level
- Perfusion to the capillary beds
- Oxygen/Carbon dioxide exchange at the cellular level
- Perfusion from capillary beds
- Carbon dioxide exchanged at the alveolocapillary level
- Carbon dioxide exhaled

Assessment:

- LOC
- Respiration quality
- Pulse quality
- Respiratory rate
- Pulse rate

- SPO2
- EtCO2
- Blood pressure
- GCS

#### Inadequate Breathing:

- Fast or slow rate
- Irregular rhythm
- Abnormal lung sounds
- Reduced tidal volume
- Use of accessory muscles
- Cool, pale, diaphoretic, cyanotic skin

#### BLS Interventions:

- Head tilt chin lift
- Jaw-thrust (if suspect cervical spine injury)
- OPA
  - Keeps tongue from blocking oropharynx
  - Eases suctioning
  - Used with BVM
  - Patients without gag reflex
- NPA
  - Maintains patency of oropharynx
  - Patients with gag reflex
  - Should not be used with head trauma
- BVM
  - Ventilation adult: 8-10 breaths per minute, approximately one breath every 6-8 seconds
  - Ventilation pediatric: 12-20 breaths per minute, approximately one breath every 3-5 seconds
  - Problems: inattentiveness, poor mask seal, poor ventilator ability, varying ventilatory rates, varying expiration rates, varying tidal volumes, often excessive airway pressure, often hyper-ventilation – *mastering the BVM overcomes these obstacles*
  - Use of a PEEP valve
  - BVM one & two person skill
  - *BVM is the most essential intervention in RSI.*
- Suctioning

**Oxygen:**

- Non-rebreathing mask
  - Up to 90% at 15 L
- Nasal cannula
  - 24-40% at 1-6 L
- BVM
  - 21% atmosphere
  - Up to 100% at 15 L with reservoir

**Gastric Distention:**

- Air fills the stomach from too forceful or too frequent ventilations
- Airway may be blocked and ventilations are re-routed to stomach
- Decreased lung capacity
- May cause patient to vomit

**Airway Obstructions:**

- Tongue
- Vomit
- Blood, clots, traumatized tissue
- Swelling
- Foreign objects

**CPAP (See VT Protocol 5.4):**

- Spontaneously breathing patient in moderate to severe respiratory distress due to congestive heart failure/pulmonary edema, asthma/COPD, pneumonia, submersion injury or Undifferentiated Respiratory Distress, concurrent with the following signs and symptoms:
  - Oxygen saturation <94%
  - Respiratory rate >25
  - Retractions or accessory muscle use

**Bougie**

- See VT Protocol 5.6

**King-LT:**

- See VT Protocol 5.7

**Combitube**

- See VT Protocol 5.3

**LMA Insertion:**

- See VT Protocol 5.8

### **Putting it all Together & Malignant Hyperthermia:**

Purpose: To familiarize with the RSI procedure, recognize when to and when not to perform RSI, and to anticipate including having a back-up plan (See VT Protocol 7.1).

To intubate or not to intubate – 6 questions to ask:

1. Can the patient maintain an airway?
2. Can the patient protect this airway?
3. Is the patient appropriately ventilating?
4. Is the patient appropriately oxygenating?
5. Is the patient's condition likely to deteriorate?
6. Is the scene appropriate: safety, moving the patient while apneic?

RSI Definition: RSI is the near-simultaneous administration of neuromuscular blocking agents and sedative-hypnotic drugs in order to facilitate oral intubation of a patient with the least likelihood of trauma, aspiration, hypoxia, and other physiologic complications.

RSI Indication: Immediate severe airway compromise where respirator arrest is imminent including:

- Decreased consciousness and loss of airway reflexes
- Failure to protect airway against aspiration
- Decreased consciousness that leads to regurgitation of vomit, secretions or blood
- Failure to ventilate
- End result of failure to maintain and protect airway
- Prolonged respiratory effort that results in fatigue or failure, as in status asthmaticus or severe COPD
- Failure to oxygenate (i.e., transport oxygen to pulmonary capillary blood)
- Diffuse pulmonary edema
- Acute respiratory distress syndrome
- Large pneumonia or air-space disease
- Severe pulmonary embolism

Examples of RSI Indications:

- Conditions requiring oxygenation/ventilation control or positive pressure ventilation:
  - Traumatic brain injury with ALOC
  - Severe thoracic trauma (flail chest, pulmonary contusions with hypoxemia)
  - Clinical condition expected to deteriorate
- Unconscious or ALOC with potential for actual airway compromise or vomiting
- A patient has:

- A clenched jaw that an oral airway cannot be inserted or inability to ventilate with a BVM
- An absent gag reflex where the patient is unable to protect their airway
- An active gag reflex, however the patient is unable to protect their own airway due to copious vomiting, bleeding, facial trauma or other airway obstructing mechanism

#### Contraindications:

- Contraindications to rapid sequence intubation (RSI) are relative. Circumstances exist where neuromuscular blockade is undesirable due to the high likelihood of intubations or mechanical ventilation failure. Depending on clinical circumstances, particular sedative or neuromuscular blocking agents may be relatively contraindicated due to the risk of potential side effects.

#### Relative Contraindications:

- Spontaneous breathing with adequate ventilation and oxygenation
  - Ability to maintain an effective airway by less invasive means
- Operator concern that both intubation and BVM ventilation may not be successful due to: patient anatomy, facial trauma, airway obstruction
  - Total upper airway obstruction, which requires a surgical airway
  - Total loss of facial/oropharyngeal landmarks, which requires a surgical airway
- Anticipated “difficult” airway, in which endotracheal intubation may be unsuccessful, resulting in reliance on successful bag-valve-mask (BVM) ventilation to keep an unconscious patient alive
- The “crash” airway, in which the patient is in an arrest situation, unconscious, and apneic
  - In this scenario, the patient is already unconscious and may be flaccid; further, no time is available for pre-oxygenation, pre-treatment, or induction and paralysis
  - BVM ventilation, intubation, or both should be performed immediately without medications
- Operator unfamiliarity with the medications used
- The patient is a candidate for CPAP

#### Asthma & COPD

- These patients complicate the traditional RSI approach due to the difficulty encountered when mask ventilating
- Alveolar hyperinflation secondary to underlying pathophysiology must be considered and adequate passive ventilation time ensured
- Tidal volumes should be reduced-,initially-, to reduce the likelihood of barotrauma and air trapping

## The 7 P's:

1. Preparation
2. Preoxygenation
3. Premedication
4. Sedate, then Paralyze
5. Pass the tube
6. Proof of placement
7. Post intubation care

## Preparation:

- Assess the risks
  - MOANS (mask seal, obesity or obstruction, age > 55, no teeth stiff)
  - LEMONS (look externally, evaluate 3-3-2, Mallampati score, obstruction, neck mobility, scene and situation)
  - DOA (disruption or distortion, obstruction, access problems)
    - If you can't bag and can't cric, they are DOA
- Prepare the equipment
  - Equipment is present, opened, and ready for use
  - Adequate BVM, Oxygen sources, suction
  - 2 laryngoscope handles
    - **District Medical Advisors should strongly consider encouraging the use of video assisted laryngoscopy for first pass intubation attempts due to the favorable safety and success profile**
  - Assortment of blades
  - Assortment of ET tubes, stylette, syringe
  - 1-2 secure IV lines
  - All pharmaceutical agents needed for the procedure
  - Back-Up plan and rescue airway devices
  - Oximetry and Capnography monitoring
  - Monitor the Patient
    - Cardiac monitor – dysrhythmias
    - Blood Pressure monitoring – hypo/hypertension
    - Pulse-oximetry – hypoxia
    - Waveform Capnography – hypo/hypercarbia
- Always have a Back-Up plan
  - Plan A
    - Different size blade, type of blade, position of the patient/provider
    - Hockey stick bend in ETT or directional tip ETT
    - Use of video laryngoscopy



- Succinylcholine – relaxes the patient’s muscles

#### Paralyze:

- Once induction medications are administered apply Cricoid pressure/Sellick’s maneuver/BURP with constant vigilance for necessary interventions (suctioning, hypoxia, etc.)
- Paralytic medications administered

#### Pass the tube:

- Intubation is performed when there is full relaxation of the airway muscles – about 90 seconds after Succinylcholine
- Suspected cervical injury – hold manual in-line axial stabilization (not traction)
- If intubation fails, maintain cricoid pressure & ventilate with BVM – after patient is re-oxygenated, reattempt or move to a different airway adjunct

#### Proof of placement:

- Objective
- Subjective
- Pulse Oximetry
- Waveform capnography

#### Post intubation care:

- Sedation assessment
- Possibility of post intubation hypotension and the need for presser agents

#### RSI Sequence Timeline:

- -5 minutes – Preoxygenation
- -2 minutes – Premedication
- -0 minutes – Cricoid pressure/Sellick’s maneuver/BURP, induction agent, paralytic
- +1 minutes – Intubation

#### Medication Sequence:

- Oxygen
- Lidocaine and/or Atropine
- Etomidate, or Ketamine, or Versed
- Cricoid Pressure/Sellick’s/BURP
- Succinylcholine
- Intubation
- Lorazepam, Midazolam, Fentanyl, or Propofol (CCP only)

- Rocuronium or Vecuronium (should not be routinely paralyzing patients after intubation) and only with on-line medical control

Do No Harm - Failed airway discussion:

- Unable to intubate (including blind rescue devices) and unable to ventilate with a BVM and maintain an SpO<sub>2</sub> of > 90%
- Use of percutaneous cricothyrotomy

Malignant Hyperthermia:

- What is malignant hyperthermia?
  - An extremely rare autosomal dominant genetic disorders (approximately 1:50,000)
  - Hypermetabolism and extreme muscular rigidity are the hallmark findings
  - A rare complication of depolarizing paralytic agents, especially when combined with inhaled anesthetic gases
- What actually happens?
  - Excessive calcium release inside muscle cells
  - Dramatic increased muscle tone ensues
  - Heat is released during this process
  - Increased oxygen consumption and carbon dioxide production
  - Uncontrolled hyperthermia and cell death
- How severe is the reaction?
  - Untreated, mortality is 70%
  - Treated aggressively, the mortality can be reduced to 5%
  - **Malignant hyperthermia IS NOT an allergic reactions, and is therefore NOT treated as an allergic or anaphylactic reaction**
- How do I recognize malignant hyperthermia?
  - Very notable sustained muscular contractions
  - Hyperventilation
  - Hyperthermia
  - Flushing of the skin may occurs, although cyanosis can also ensue if the condition is worsening
- What can I do?
  - Manage the airway – malignant hyperthermia can cause masseter spasm (clenched jaw) and can therefore make managing the airway difficult
  - Cool the patient – cold packs, lower the temperature of the ambulance, IV fluid boluses
  - Identify malignant hyperthermia – alert receiving facility
  - Continue to care for the patient and underlying medical/surgical process that required the use of succinylcholine administration

- What will happen at the hospital?
  - Dantrolene sodium infusion
  - Aggressive cooling
  - Support electrolyte abnormalities and renal function

**Documentation and QA/QI:**

The hallmark of any good program is ongoing quality assurance. The agency and EMS District Medical Advisor will review all uses of RSI for appropriateness and adherence to the protocol.

***RSI Quality Management Qualifiers***

Purpose: The purpose of these qualifiers is to allow both an agency and EMS District Medical Advisor to determine whether they are capable and ready to implement a Rapid Sequence Intubation (RSI) program. As all should know, performing RSI is a low-frequency, high-criticality procedures with serious potential complications. Any agency that chooses to implement the program must:

- Have a quality management program in place that includes input from their District Medical Advisor.
- Produce documentation showing that the service's providers are competent in airway management including BLS management, endotracheal intubation, and rescue airways.
- Have rescue airway and CPAP program in place.
- Recognize other potential resources that might assist the agency with their RSI efforts.
  - Capnography, video laryngoscopy, CPAP, Bougie, etc.

**Qualifier Questions:**

- How does our quality management system work pertaining to airway management?
  - How do we monitor airway management at our agency?
  - How is our District Medical Advisor involved in airway quality management?
  - Do we provide quality feedback to our providers on all intubations?
  - Have we ever missed an esophageal intubation?
    - What would we do if such an event happened?
    - Do we have all the equipment necessary to prevent such an event?
  - How does our agency interact with our medical resource hospital in matters pertaining to airway management?
    - What resources will they provide?
    - Do we have access to an operating room or similar facility for remediation or training?
- How many patients, who need to be intubated, arrived at the hospital successfully intubated?
  - How many patients should have been intubated?
  - How many received rescue airway devices?
  - How many patients, who needed to be intubated, were:
    - In cardiac arrest?

- Live patients?
    - Could have qualified for RSI?
  - How many patients were nasally intubated?
  - How many of the patients were suffering from CHF?
    - Do we use CPAP?
- Are our providers competent in:
  - BLS airway management (BVM, suction, oral and nasal airways)
  - Rescue airways (supraglottic airways)
  - CPAP
  - Bougie
  - Waveform capnography
  - Endotracheal intubations
    - QA/QI process for all intubations
    - Quarterly trainings, simulation training, operating room time

### ***RSI Quality Management***

- Required review by EMS Unit's QA Committee/Officer of every post-RSI/ intubated, sedated and paralyzed patient call
  - Pharmacological agents used covered by protocol and/or waiver
  - Difficulties encountered
  - Thorough documentation
  - Written feedback to providers and DMA on if the RSI was indicated and appropriate
  - Scheduled review training, as needed
- Review by District Medical Advisor
  - Review all calls upon referral for issues with items A.-C. above
  - Remediation if necessary
- Minimum requirements for each post-RSI/ intubated, sedated and paralyzed patient IFT call entered in SIREN:
  - Minimum Procedure Data Elements
    - Time to patient
    - Patient age
    - Patient weight
    - Provider Impression
    - Protocol Used
  - Required Medication Documentation
    - Medication name(s)

- Dosages/infusion rates and route
- Response(s) to medication
- Authorization
- Complication(s) (if applicable)
- Minimum Narrative Documentation (see Best Practice samples)
  - Any Procedure performed
  - Ongoing Confirmation methods
  - Post care
    - Securing method
    - Tube location
    - Medications

**Simulation Scenarios/Case Studies:****Case Studies:**

1. 67 y/o female “code blue” – in asystole
  - a. RSI or not? Plan?
    - i. No. The patient will have no airway reflexes and standard ACLS is appropriate
2. 72 y/o female with history of fever, productive cough, and progressive dyspnea. Lethargic, perioral cyanosis with RR 34 and labored, HR 114, BP 117/76, O<sub>2</sub> sat 88%, lung sounds with scattered rhonchi
  - a. RSI or not? Plan?
    - i. First trial CPAP. If not improving, lethargy – consider RSI with medical control
3. 41 y/o female with c/o “asthma attacks” x20 minutes. Severe respiratory distress with RR 32, HR 127, BP 160/92, O<sub>2</sub> sat 78%, bilateral inspiratory and expiratory wheezes. Within 10 minutes becomes lethargic and RR slows
  - a. RSI or not? Plan?
    - i. First maximize other options – CPAP while awake, IM epinephrine, with last resort of intubation with a low tidal volume and prolonged expiratory phase
4. 46 y/o male with a history of ETOH and drug abuse. Presents with “had a seizure” per bystanders. Patient is responsive to pain, but does not follow commands or answer questions. RR 18, HR 109, BP 120/80, O<sub>2</sub> sat 86%. Within minutes, he has 2 episodes of vomiting and “gurgling respirations.”
  - a. RSI or not? Plan?
    - i. Yes, RSI to protect the airway. Also consider a benzodiazepine for seizure prophylaxis.
5. 25 y/o male with a gunshot wound to the abdomen. Patient is intoxicated, decreased LOC, minimal gag reflex. RR 8-10, HR 120, BP 100/80, O<sub>2</sub> sat 92%.
  - a. RSI or not? Plan?
    - i. Yes RSI unless able to BVM and it is short transport. Minimize scene time
6. 87 y/o male MVC, high speed, unrestrained. Patient gasping for air, able to talk, c/o right side chest pain. RR 32, HR 120, BP 186/92, O<sub>2</sub> sat 94%. Multiple deformities to the face and chin. Ecchymosis and swelling to neck and anterior chest. Large flail segment to anterior/lateral chest. Decreased breath sounds on the right. No stridor, but some gurgling in the throat.
  - a. RSI or not? Plan?
    - i. No, may worsen patient treatment if the patient develops a tension pneumothorax. Monitor for tension pneumothorax and be ready to

perform decompression. RSI would likely be difficult given the facial trauma

**Simulation Scenarios:**

1. 50 y/o custodian found unresponsive at work. History of poly-substance abuse. Jaw clenched, hyperventilating, hypertensive, ecchymosis on temple region.
  - a. Ideal Management: consider c-spine immobilization, blood sugar (run AMS protocol completely), successfully open airway and determine RSI needed, teeth clenched (cannot insert supraglottic airway), seizure may occur, difficult to ventilate.
2. Anaphylaxis with massive facial swelling. Key will be to treat anaphylaxis and NOT RSI.
  - a. Ideal Management: Support and treat hypersensitivity – DO NOT RSI
3. 45 y/o male found unresponsive at work in a local bank. Jaw clenched and some seizure activity, now post-ictal. Will require control of the airway.

Exam Simulation #1: 35 y/o male. Closed head injury after a fall from 30 feet. Unresponsive with blown pupil. Jaw clenched and apneic. Obviously deformed ankle fracture/dislocation. Otherwise no other obvious injury. Hypertensive and bradycardic.

Required elements: Full c-spine immobilization, complete primary survey, address airway crisis and airway, correct drug-dose-route, correct application of the 7 P's, appropriate neuroinduction utilized, BURP or Sellick's maneuver performed, ETT tube correctly placed and secured, confirmation appropriate and complete.

Exam Simulation # 2: 70 y/o male with uncompensated systolic congestive heart failure. Will not tolerate CPAP and now unresponsive and tachypneic. BP=115/60., HR=125 sinus tach. Saturations drop from low 90's to mid 80s over two minutes.

Required elements: Address airway crisis, correct drug-dose-route, correct application of the 7 P's, BURP or Sellick's maneuver performed, ETT tube correctly placed and secured, confirmation appropriate and complete.

Exam Remediation: 65 y/o male with ischemic cardiomyopathy and poor left ventricular function presents with flash pulmonary edema. Patient becomes unresponsive and apneic. ST elevation is present in inferior leads. Patient difficult to ventilate and unresponsive (cannot CPAP). Patient will go into ventricular tachycardia if ventilation/oxygenation not achieved promptly through intubation. Patient will have intense gag reflex if intubation attempted without inductions/paralysis.

**RSI Exam Checklist:**

	Points Possible	Point Awarded
Scene size up & BSI (scene information will be provided by the evaluator)	1	
Performs ABC's opens / suctions airway as needed. Attempts airway adjunct if	1	
Starts high-flow O2 by BVM or Non-Rebreather Mask as appropriate	1	
Verbalizes difficult airway assessment, 1 or 2 running IV's, vital signs, etc	1	
Indicates the need for RSI. Verbalizes any anticipated difficulties.	1	
Directs preoxygenation of the patient using a BVM or NRB as is appropriate for the	1	
May administer lidocaine at this time if appropriate.	1	
Laryngoscope: Selects and attaches blade, check light.	2	
Prepares BVM and connects to high-flow O2 if not previously done.	1	
ET tube: Selects appropriate size, checks cuff integrity, and properly inserts stylette.	1	
Suction: Prepares Yankauer suction, indicates suction is running.	1	
Backup Airways: Has backup airway adjuncts readily available.	1	
Medications: Selects appropriate medications, Draws up correct amount of each for patient's size.	2	
Administers lidocaine and/or atropine if indicated. Allows time and observes patient between medications	1	
Administers sedative/hypnotic	1	
Directs partner to hold cricoid pressure. Able to explain procedure to partner.	1	
Administers succinylcholine. Allows approximately 45 seconds for medications to take effect.	1	
Supports ventilations if not already being done.	1	
Intubates the patient using good technique. (Recognizes the need to stop and ventilates the patient if not successful after 30 seconds.)	1	
Selects appropriate backup airway adjunct if not successful after 2 attempts.	1	
Confirms tube placement by auscultation of lung sounds/gastric flush.	1	
Recognizes and immediately corrects esophageal or right main stem placement.	1	
Also uses waveform capnography to confirm tube placement.	1	
Secures tube.	1	
Provides post intubation care		

## Critical Criteria

- \_\_\_ Did not assess ABC's. Did not immediately correct airway problems.
- \_\_\_ Did not stabilize the C-spine of a trauma patient
- \_\_\_ Did not preoxygenate the patient
- \_\_\_ Did not call for cricoid pressure or releases cricoid pressure before the airway has been secured
- \_\_\_ Did not successfully intubate the manikin within 2 attempts
- \_\_\_ Did not verify tube placement
- \_\_\_ Did not prepare suction equipment
- \_\_\_ Administers incorrect dose of medication or gives medications in incorrect order

**RSI Education Checklist:**

Requirement	Date	Verifying Signature
Number of years as a paramedic?		
Documentation of at least 5 un-proctored endotracheal intubations on human, non-cadaver tissue.		
Completion of the Airway Assessment Module		
3 – 3 – 2 Assessment		
Mallampati Classification		
Laryngoscopic View Grading		
Completion of the Backup Airway Module		
Combitube		
King LD-T		
LMA		
Completion of the Pharmacology Module		
Atropine		
Lidocaine		
Etomidate (Amidate)		
Fentanyl (Sublimaze)		
Ketamine		
Lorazepam (Ativan)		
Midazolam (Versed)		
Propofol		
Rocuronium (Zemuron)		
Succinylcholine (Anectine)		
Vecuronium (Norcuron)		
Completion of the Malignant Hyperthermia Competency		
Completion of the Rapid Sequence Intubation Module (aka Putting it all Together)		
Successfully completion RSI SimLab (or equivalent practical) with the District Medical Advisor		Requires signature from Medical Director

**Vermont EMS Statewide Airway Protocols:****Airway Management****5.0****ASSESSMENT**

Each patient presents unique problems that cannot be fully outlined in any algorithm. As such, the provider must rely on thorough assessment techniques and consider each of the following:

**Airway Patency:** Assess for airway obstruction or risk of impending obstruction due to facial injuries, mass, foreign body, swelling, etc. Assess for presence/absence of gag reflex.

**Ventilatory Status:** Assess for adequate respiratory effort and impending fatigue/failure/apnea. Assess for accessory muscle use, tripod positioning, the ability of the patient to speak in full sentences. If available, assess quantitative waveform capnography.

**Oxygenation:** Any oxygen saturation <90% represents relatively severe hypoxia and should be considered an important warning sign. In addition to oxygen saturation, assess for cyanosis.

**Airway Anatomy:** Before attempting airway maneuvers or endotracheal intubation, especially with the use of RSI, assess patient anatomy to predict the probability of success and the need for backup device or technique.

- First, assess for difficulty of mask seal. Patients with facial hair, facial fractures, obesity, extremes of age, and pathologically stiff lungs (COPD, acute respiratory distress syndrome, etc.) may require special mask techniques or alternatives.
- Next assess for difficulty of intubation. Patients with a short neck, the inability to open their mouth at least three finger widths (or other oral issues such as a large tongue or high arched palate), less than three finger-widths of thyromental distance (or a receding jaw), reduced atlanto-occipital movement (such as in suspected c-spine injury), obesity or evidence of obstruction (such as drooling or stridor) may be difficult to intubate.

**DEVISE A PLAN**

1. Each patient will present unique challenges to airway management. Therefore, before any intervention is attempted, the provider should contemplate a plan of action that addresses the needs of the patient, and anticipates complications and how to manage them.
2. Airway management is a continuum of interventions, not an "all or none" treatment. Frequently patients may only need airway positioning or a nasal or oral airway to achieve adequate ventilation and oxygenation. Others will require more invasive procedures. **The provider should choose the least invasive method that can be employed to achieve adequate ventilation and oxygenation.**
3. Continually reassess the efficacy of the plan and change the plan of action as the patient's needs dictate.
4. In children, a graded approach to airway management is recommended. Basic airway maneuvers and basic adjuncts followed by bag-valve-mask ventilation are usually effective.



Procedure Continues

## 5.0 Airway Management



### BASIC SKILLS

Mastery of basic airway skills is paramount to the successful management of a patient with respiratory compromise. Ensure a patent airway with the use of:

- Chin-lift/jaw-thrust
- Nasal airway (contraindicated in head or facial trauma)
- Oral airway
- Suction
- Removal of foreign body.

Provide ventilation with a bag-valve-mask (BVM). Proper use of the BVM includes appropriate mask selection and positioning to ensure a good seal. If possible, utilization of the BVM is best accomplished with two people: one person uses both hands to seal the mask and position the airway, while the other person provides ventilation. If the patient has some respiratory effort; synchronize ventilations with the patient's own inhalation effort, when possible.

### ADVANCED AIRWAY SKILLS

Only after basic procedures are deemed inappropriate or have proven to be inadequate should more advanced methods be used. Procedures documenting the use of each device/technique listed below are found elsewhere in this manual.

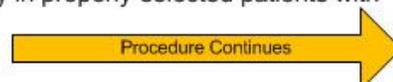
**ETT:** The endotracheal tube was once considered the optimal method or "gold standard" for airway management. It is now clear, however, that the incidence of complications is unacceptably high when intubation is performed by inexperienced providers or monitoring of tube placement is inadequate. The optimal method for managing an airway will, therefore, vary based on provider experience, emergency medical services (EMS) or healthcare system characteristics, and the patient's condition.

**Bougie:** All providers who attempt ETT placement should become intimately familiar with the use of a Bougie. It is the device used most often by anesthesiologists and emergency physicians for helping guide placement when a difficult airway is encountered.

**Supraglottic Airways:** Utilization of supraglottic airways is an acceptable alternative to endotracheal intubation as both a primary device or a back-up device when previous attempt(s) at ETT placement have failed. Each device has its own set of advantages/disadvantages and requires a unique insertion technique. Providers should have access to, and intimate knowledge of, at least one supraglottic airway. Examples include:

- King LT
- Combitube/EasyTube
- LMA

**CPAP:** Continuous positive airway pressure (CPAP) has been shown to be effective in reducing the need for intubation and in decreasing mortality in properly-selected patients with acute respiratory distress.



# Airway Management

## 5.0

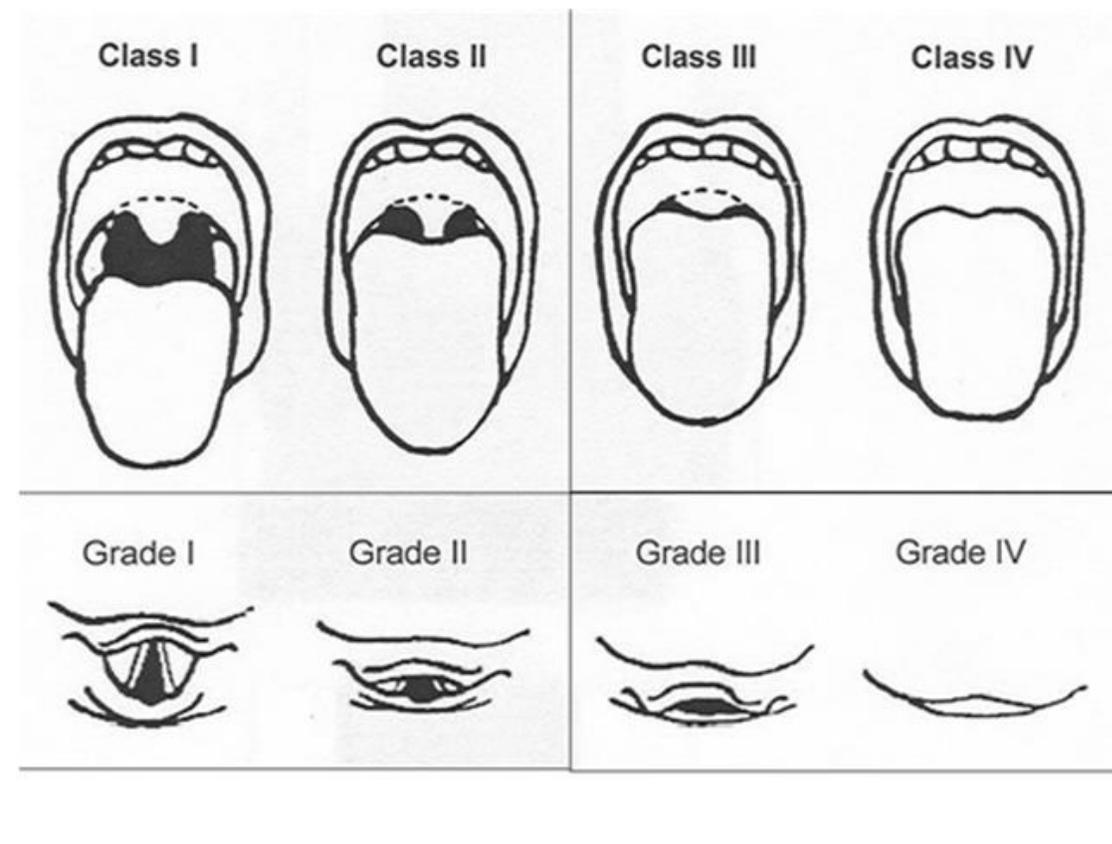


### DOCUMENTATION

All efforts toward airway management should be clearly documented and, at the minimum, should include the following:

- Pre/post intervention vital signs including oxygen saturation as well as capnography (if available).
- Procedures performed/attempted, including number of failed attempts and who performed each attempt/procedure.
- Size of device(s) placed, depth of placement (if applicable).
- Placement confirmation: methods should include auscultation, symmetrical chest wall rise, and quantitative waveform capnography, if available.

### Classifications for Oropharyngeal and Laryngoscopy Views



## 5.1A Airway Management – Adult

### EMT STANDING ORDERS

# E

- Routine Patient Care.
- Establish airway patency.
  - Open and maintain the airway.
  - Suctioning as needed.
  - Clear foreign body obstructions.
- Administer oxygen to maintain oxygen saturation  $\geq 94\%$ .
- Consider inserting an oropharyngeal or nasopharyngeal airway adjunct.
- If patient has a tracheostomy tube, follow the procedure for [Tracheostomy Care Procedure – Adult & Pediatric 5.13](#).
- For apnea or hypoventilation and decreased level of consciousness with possible narcotic overdose, administer naloxone. See [Poisoning/Substance Abuse/Overdose Protocol – Adult 2.17A](#).
- Assist ventilations with a bag-valve-mask device and supplemental oxygen as needed.

### ADVANCED EMT STANDING ORDERS

# A

- For adults in cardiac arrest: consider insertion of a supraglottic airway such as a King LT, Combitube or LMA. See procedures for [King LT 5.7](#), [Combitube 5.3](#), and [LMA 5.8](#).
- For adults in severe respiratory distress secondary to pulmonary edema, COPD, asthma, pneumonia, near drowning or undifferentiated respiratory distress, consider use of CPAP. See [CPAP Procedure 5.4](#).

### PARAMEDIC STANDING ORDERS

# P

- For impending respiratory failure with intact gag reflex or trismus: consider nasotracheal intubation. See [Nasotracheal Intubation Procedure 5.9](#)).
- For apnea/respiratory failure or impending respiratory failure with impaired or absent gag reflex: consider orotracheal intubation or supraglottic airway device. See [Orotracheal Intubation 5.10](#), [King LT 5.7](#), [Combitube 5.3](#) and [LMA 5.8](#)).
- For adults with severe airway compromise where respiratory arrest is imminent and other methods of airway management are ineffective: consider Rapid Sequence Intubation. See [Rapid Sequence Intubation Procedure 7.1](#)).
  - **Note: This procedure is only to be used by paramedics who are trained and credentialed to perform RSI in accordance with local Medical Direction policy and actively enrolled in an approved Vermont EMS RSI Program.**

## Airway Management – Pediatric 5.1P

### EMT/ADVANCED EMT STANDING ORDERS

- 
- Routine Patient Care.
  - Establish airway patency.
    - Open and maintain airway.
    - Suction as needed.
    - Clear foreign body obstructions.
    - Consider inserting an oropharyngeal or nasopharyngeal airway adjunct.
  - Administer oxygen to maintain oxygen saturation  $\geq 94\%$ .
  - If patient has a tracheostomy tube see [Tracheostomy Care Procedure – Adult & Pediatric 5.13](#).
  - For respiratory distress:
    - Administer high concentration oxygen (preferably humidified) via mask positioned on face or if child resists, held near face.
    - Attempt to keep oxygen saturation  $\geq 94\%$ ; increase the oxygen rate with caution and observe for fatigue, decreased mentation, and respiratory failure.
    - For children with chronic lung disease or congenital heart disease, ask caregivers about patient's history, including home oxygen level or patient's target oxygen saturation. Maintain target saturation, and contact **Medical Control** to discuss oxygenation and appropriate destination.
 

**Note:** Pulse oximetry is difficult to obtain in children. Do not rely exclusively on pulse oximetry. If child continues to exhibit signs of respiratory distress despite high oxygen saturation levels, continue oxygen administration.
  - For respiratory failure or for distress that does not improve with oxygen administration:
    - Assist ventilations with BVM at rate appropriate for child's age. Reference [Pediatric Color Coded Appendix A2](#).
    - If unable to maintain an open airway through positioning, consider placing an oropharyngeal or nasopharyngeal airway.
  - Determine if child's respiratory distress/failure is caused by a preexisting condition
    - For Allergic Reaction/Anaphylaxis, refer to the [Allergic Reaction/Anaphylaxis Protocol – Pediatric 2.2P](#).
    - For Asthma/Reactive Airway Disease/Croup, refer to the [Asthma/Croup/RAD Protocol – Pediatric 2.5P](#).

### PARAMEDIC STANDING ORDERS

P

- Consider an advanced airway if airway cannot be maintained through positioning.
- For apnea/respiratory failure or impending respiratory failure with impaired or absent gag reflex: consider orotracheal intubation or supraglottic airway device. See [Orotracheal Intubation 5.10](#), [King LT 5.7](#) and [LMA 5.8](#)).

#### RESPIRATORY DISTRESS:

- Alert, irritable, anxious
- Stridor
- Audible wheezing/grunting
- Respiratory rate outside normal range for child's age
- Sniffing position
- Nasal flaring
- Head bobbing
- Neck muscle use
- Intercostal retractions
- Central cyanosis that resolves with oxygen administration
- Mild tachycardia

#### RESPIRATORY FAILURE:

- Sleepy, intermittently combative or agitated
- Respiratory rate  $< 10$  breaths per minute
- Absent or shallow respirations with poor air movement
- Severe intercostal retractions
- Paradoxical breathing
- Limp muscle tone
- Inability to sit up
- Cyanosis and/or mottled skin
- Bradycardia

## 5.2 Automated Transport Ventilator

### EMT/ADVANCED EMT STANDING ORDERS

#### INDICATIONS

- Resuscitative efforts:
  - Can only adjust rate, tidal volume, and adult vs. child setting if applicable.
- Any patient requiring ventilatory assistance in conjunction with advanced airway adjuncts.
- Any patient requiring ventilatory assistance in conjunction with basic airway maintenance.
- Any patient requiring ventilatory assistance in conjunction with manual airway maintenance.

#### CONTRAINDICATIONS

- Airway obstruction
- Resistance
- Poor lung compliance
- Pneumothorax – tension pneumothorax
- Pulmonary over-pressurization (blast injury, water ascent injury, etc.)
- Children less than 5 years of age or 16 kg (35 lbs) Check manufacturer's recommendations.

#### PROCEDURES

1. Determine that a need for the use of the automated transport ventilator (ATV) exists. Follow manufacturer's instructions for the device.
2. Assure that all tubing is free from kinks.
3. Determine the proper tidal volume setting. This is done by determining the patient's ideal weight (approx. weight for any physically fit patient having the same sex, height, frame) and multiplying it by 6-8 mL/kg. Begin with the lowest tidal volume limit.

MALE		
Height in Ft/In	6 mL/kg	8 mL/kg
5.0	314	418
5.1	320	426
5.2	328	437
5.3	341	455
5.4	355	474
5.5	369	492
5.6	383	510
5.7	397	529
5.8	410	547
5.9	424	566
5.10	438	584
5.11	452	602
6.0	466	621
6.1	479	639

FEMALE		
Height in Ft/In	6 mL/kg	8 mL/kg
5.0	286	382
5.1	293	390
5.2	300	400
5.3	314	406
5.4	328	438
5.5	342	456
5.6	356	474
5.7	370	493
5.8	383	511
5.9	397	530
5.10	411	548
5.11	425	566
6.0	439	585
6.1	452	603

Procedure Continues 

E/A/P

## Automated Transport Ventilator 5.2

← Procedure Continues

### EMT/ADVANCED EMT STANDING ORDERS

#### PROCEDURES (continued)

4. Set Breaths per Minute (BPM) control to rate of 8-15 per minute.
5. Check alarm by occluding the patient valve assembly outlet. The audible pressure limit alarm should sound as the ventilator cycles through the delivery phase.
6. Assess lung compliance and chest rise with a bag valve device. Tidal volume may be adjusted lower if poor lung compliance is found.
7. Attach the patient valve assembly to the airway device or mask used on the patient.
8. Assess the ventilation. Listen for bilateral lung sounds. Observe for proper chest rise. Chest rise should be symmetrical and patient condition should improve.
9. Count the number of complete ventilator cycles for a full minute. The number should be the same as the setting (+/-1).
10. Assess and manage the airway as you normally would for any patient with controlled ventilation.
11. If spontaneous breathing begins, it may be desirable to turn the BPM down as long as patient's spontaneous rate is 10-12 per minute.
12. Check oxygen cylinder pressure level frequently. This device will deplete a "D" cylinder rapidly.

E/  
A/  
P

#### SPECIAL CONSIDERATIONS

- Due to COPD, chest rise may not appear full. Do not increase tidal volume (TV) past upper TV limit.
- If lung sounds are absent or on one side only: rule out airway obstruction, improper tube placement, or pneumothorax, and check tidal volume ml/bpm settings.
- If chest expansion is not adequate, the rescuer should slowly increase tidal volume until chest expansion is adequate, or the uppermost limit (for the patient's ideal weight) is reached.
- If chest appears to over expand, decrease tidal volume.

Airway Procedure 5.2

## 5.3

## Combitube

## ADVANCED EMT STANDING ORDERS – ADULT IN CARDIAC ARREST ONLY

## PARAMEDIC STANDING ORDERS – ADULT

## INDICATIONS

- Inability to adequately ventilate a patient with a bag-valve-mask or longer EMS transports requiring a more definitive airway.
- Back-up device for failed endotracheal intubation attempt.
- Adult patient in cardiac arrest.

## CONTRAINDICATIONS

- Intact gag reflex
- Severe maxillofacial or oropharyngeal trauma.
- Patient less than 4 feet tall
- Allergy or sensitivity to latex (the pharyngeal balloon contains latex)

## RELATIVE CONTRAINDICATIONS

- Known esophageal disease (e.g. cancer).
- Ingestion of a caustic substance.
- Burns involving the airway.

## PROCEDURE

1. Choose correct size:
  - Standard Combitube: patient must be at least 5 feet tall.
  - Combitube SA (small adult): patient 4 feet to 5 1/2 feet tall.
2. Prepare Combitube
  - Test balloons
    - Proximal pharyngeal cuff (blue pilot balloon) – 100 mL
    - Distal esophageal cuff (white pilot balloon) – 15 mL
  - Lubricate device with water-soluble lubricant.
3. Preoxygenate and hyperventilate the patient, if time permits.
4. Grasp the patient's tongue and jaw with your gloved hand and pull anterior.
5. Gently insert the tube until the teeth (or gums) are between the printed rings.
6. Inflate cuff #1 (blue pilot balloon) with 100 mL of air.
7. Inflate cuff #2 (white pilot balloon) with 15 mL of air.
8. Ventilate taller blue tube (#1) with bag valve mask.
9. Auscultate for breath sounds and sounds over the epigastrium. Look for rise and fall of chest.
  - If breath sounds are present and epigastric sounds are absent, continue to ventilate through the blue tube. The tube is properly positioned in the esophagus. **Paramedic only:** In the case above you can aspirate stomach contents through the #2 white tube to relieve some gastric distention.
  - If breath sounds are absent and epigastric sounds are present, attempt to ventilate through the shorter white (#2) tube and assess for breath sounds and epigastric sounds. If breath sounds are present and epigastric sounds are absent, continue to ventilate through the white tube (#2); you have placed the tube in the trachea.
10. In addition to step #9, confirm appropriate placement with quantitative/waveform capnography if available.
11. Secure the airway with a commercial device. Apply a cervical collar.
12. Reassess tube placement frequently, especially after movement of the patient.
13. Document the time, provider, provider level and success for the procedure. Complete all applicable airway confirmation fields including chest rise, bilateral, equal breath sounds, absence of epigastric sounds and end-tidal CO<sub>2</sub> readings.

A/P

# Continuous Positive Airway Pressure (CPAP) <sup>5.4</sup>

## ADVANCED EMT STANDING ORDERS – ADULT INDICATIONS

- Spontaneously breathing patient in moderate to severe respiratory distress due to congestive heart failure/pulmonary edema, asthma/COPD, pneumonia, submersion injury or Undifferentiated Respiratory Distress, concurrent with the following signs and symptoms:
  - Oxygen saturation < 94%
  - Respiratory rate > 25
  - Retractions or accessory muscle use

## CONTRAINDICATIONS

- Cardiac or respiratory arrest/apnea
- Unable to follow commands
- Unable to maintain their own airway
- Agitated or combative behavior and unable to tolerate mask
- Vomiting and/or active GI bleed
- Respiratory distress secondary to trauma
- Suspicion of pneumothorax
- Facial trauma or impossible face seal
- Hypotension with SBP < 100 mmHg

# A

## PROCEDURE

1. **Ensure adequate oxygen supply for CPAP device.**
2. Explain procedure to patient. Be prepared to coach patient for claustrophobia or anxiety.
3. Place patient in upright position. Apply pulse oximetry, capnography and nasal capture device.
4. Choose appropriate sized device mask for patient, assemble the CPAP device, attach to oxygen supply and insure oxygen is flowing (follow manufacturers directions for preparation for your particular device).
5. Place mask over face and secure with straps until minimal air leak.
6. Adjust pressure to 5-10 cm H<sub>2</sub>O to effect for patient condition.
7. Recheck mask for leaks and adjust straps as needed to minimize air leaks.
8. Reassure anxious patient.
9. Monitor vital signs and symptoms, pulse oximetry and quantitative waveform capnography.
10. If patient improves, maintain CPAP for duration of transport and notify receiving hospital to prepare for a CPAP patient.
11. If patient begins to deteriorate, discontinue CPAP and assist respirations by BVM.
12. Document CPAP procedure, including time and provider. Document serial pulse oximetry and capnography readings to demonstrate effects.

## PARAMEDIC MEDICAL CONTROL ORDERS

# P



- Consider administering anxiolytic. **Contact Medical Control for authorization.**
  - Midazolam 2.5 mg IV/intranasal, may repeat once in 5 minutes; or 5 mg IM may repeat once in 10 minutes **OR**
  - Lorazepam 0.5 – 1 mg IV, may repeat once in 5 minutes; or 1 – 2 mg IM, may repeat once in 10 minutes **OR**
  - Diazepam 5 mg IV (then 2.5 mg every 5 minutes to total of 20 mg)



Administer benzodiazepines with caution in patients with signs of hypercarbia.

## 5.5 Foreign-Body Obstruction

### EMT/ADVANCED EMT STANDING ORDERS

#### INDICATIONS

- Sudden onset of respiratory distress often with coughing, wheezing, gagging or stridor due to a foreign-body obstruction of the upper airway.

#### PROCEDURE

- Routine Patient Care
  - Assess the degree of foreign body obstruction.
  - Do not interfere with a mild obstruction allowing the patient to clear their airway by coughing.
  - In severe foreign-body obstructions, the patient may not be able to make a sound. The victim may clutch his/her neck in the universal choking sign.
- **For an infant:** Deliver 5 back blows followed by 5 chest thrusts repeatedly until the object is expelled or the victim becomes unresponsive.
- **For a child:** Perform subdiaphragmatic abdominal thrusts (Heimlich Maneuver) until the object is expelled or the victim becomes unresponsive. 
- **For adults:** A combination of maneuvers may be required,
  - First, subdiaphragmatic abdominal thrusts (Heimlich Maneuver) should be used in rapid sequence until the obstruction is relieved.
  - If abdominal thrusts are ineffective, chest thrusts should be used. Chest thrusts should be used primarily in morbidly obese patients and in the patients who are in the late stages of pregnancy.
- If the victim becomes unresponsive, begin CPR immediately but look in the mouth before administering any ventilations. If a foreign-body is visible, remove.
- **Do not perform blind finger sweeps in the mouth and posterior pharynx. This may push the object farther into the airway.**

E/A

Airway Procedure 5.5

### PARAMEDIC STANDING ORDERS

- In unresponsive patients, visualize the posterior pharynx with a laryngoscope to potentially identify and remove the foreign-body using Magil forceps.
- If unable to remove object, or if obstruction is secondary to trauma or edema, or if uncontrollable bleeding into the airway causes life-threatening ventilation impairment, perform endotracheal intubation. See [Orotracheal Intubation Protocol 5.10](#).
- Consider forced right mainstem intubation (with pullback) to allow for ventilation of left lung in the extreme event of lower tracheal foreign body obstruction and inability to ventilate.
- If unable to intubate and the patient cannot be adequately ventilated by other means, perform percutaneous cricothyrotomy. See [Percutaneous Cricothyrotomy Protocol 5.11](#).

P

#### PEARLS

If air exchange is adequate with a partial airway obstruction, do not interfere; instead, encourage the patient to cough up the obstruction. Continue to monitor the patient for adequacy of air exchange. If air exchange becomes inadequate, continue with the protocol.

## Gum Elastic Bougie/Flexguide 5.6

### PARAMEDIC STANDING ORDERS – ADULT

#### INDICATIONS

- Unable to fully visualize vocal cords during an intubation attempt.

#### CONTRAINDICATIONS

- Use of a 6.0 or smaller ETT.

#### PROCEDURE

1. Lubricate Bougie with water-based lubricant.
2. Using a laryngoscope (Macintosh or Miller blade) and standard ETT intubation techniques, attempt to visualize the vocal cords.
3. If the vocal cords are partially visualized, pass the Bougie through the cords while attempting to feel the signs of tracheal placement (see below). The Bougie is advanced until the black line on the Bougie reaches the lip line.
4. If the vocal cords are not visualized, pass the Bougie behind the epiglottis, guiding the tip of the Bougie anteriorly towards the trachea, and assess for signs of tracheal placement (see below).
5. With the laryngoscope still in place, have an assistant load the ETT over the Bougie and slide it to the level of the lip line.
6. Advance the ETT over the Bougie, rotating the ETT about 1/4 turn counterclockwise so that the bevel is oriented vertically as the ETT passes through the vocal cords. This maneuver allows the bevel to gently spread the arytenoids with a minimum of force, thus avoiding injury. If resistance is felt, withdraw the ETT, rotating it in a slightly more counterclockwise direction, and advance the tube again. Advance the tube to a lip-line of 24 cm in an adult male, and 22 cm in an adult female.
7. Holding the ETT firmly in place, have an assistant remove the Bougie.
8. Remove the laryngoscope.
9. Inflate the cuff with 5 – 10 mL of air.
10. Follow the procedures outlined in [Orotracheal Intubation Protocol 5.10](#) to confirm placement, secure the ETT, monitor and document placement of the ETT.

#### SIGNS OF TRACHEAL PLACEMENT

- The Bougie is felt to stop or get “caught up” as the airway narrows and is unable to be advanced further. This is the most reliable sign of proper Bougie placement. If the Bougie enters the esophagus, it will continue to advance without resistance.
- It may be possible to feel the tactile sensation of “clicking” as the Bougie tip is advanced downward over the rigid cartilaginous tracheal rings.
- The Bougie can be felt to rotate as it enters a mainstem bronchus. Usually it is a clockwise rotation as the Bougie enters the right mainstem bronchus, but occasionally it will rotate counterclockwise if the Bougie enters the left mainstem bronchus.
- If the patient is not paralyzed, he/she may cough.

P

Airway Procedure 5.6

## 5.7

## King – LT

**ADVANCED EMT STANDING ORDERS – ADULT IN CARDIAC ARREST ONLY**  
**PARAMEDIC STANDING ORDERS – ADULT & PEDIATRIC**
**INDICATIONS**

- Inability to adequately ventilate a patient with a bag-valve-mask or longer EMS transports requiring a more definitive airway.
- Back-up device for failed endotracheal intubation attempt. Patient must be unconscious.

**CONTRAINDICATIONS**

- Intact gag reflex.
- Severe maxillofacial or oropharyngeal trauma.

**RELATIVE CONTRAINDICATIONS**

- Ingestion of a caustic substance.
- Burns involving the airway.
- Known esophageal disease (e.g. cancer).

**PROCEDURE**

1. Choose correct size:

Size	Color	Height	Cuff Volume (mL)
2	Green	35 - 45 inches	30
2.5	Orange	45 - 51 inches	35
3	Yellow	4 - 5 feet	50
4	Red	5 - 6 feet	70
5	Purple	6+ feet	80

2. Prepare King LT (refer to manufacturer's guidelines for use)  
Test cuffs for leaks (see volume above).  
Lubricate device with water soluble lubricant.
3. Pre-oxygenate and ventilate the patient, if time permits.
4. Grasp the patient's tongue and jaw with your gloved hand and pull forward.
5. With the King LT rotated laterally at 45 – 90 degrees such that the blue orientation line is touching the corner of the mouth, introduce tip into mouth and advance behind base of tongue.
6. As tube tip passes under tongue, rotate tube back to midline (blue orientation line faces chin.)
7. Advance tube until base of connector is aligned with teeth or gums.
8. Inflate cuffs to appropriate volume as listed above.
9. Connect the King LT to a bag-valve device
10. While ventilating the patient, gently withdraw the tube until ventilation becomes easy and free flowing.
11. Adjust cuff inflation if necessary to obtain a seal of the airway at the peak ventilatory pressure employed.
12. Confirm appropriate placement by symmetrical chest-wall rise, auscultation of equal breath sounds over the chest and a lack of epigastric sounds with bagging, and quantitative waveform capnography if available.
13. Secure the device.
14. Reassess tube placement frequently, especially after movement of the patient.
15. Document the time, provider, provider level and success for the procedure.  
Complete all applicable airway confirmation fields including chest rise, bilateral, equal breath sounds, absence of epigastric sounds and end-tidal CO<sub>2</sub> readings.

A/P

# Laryngeal Mask Airway (LMA) 5.8

## ADVANCED EMT STANDING ORDERS – ADULT IN CARDIAC ARREST ONLY

### PARAMEDIC STANDING ORDERS – ADULT & PEDIATRIC

#### INDICATIONS

- Inability to adequately ventilate a patient with a bag-valve-mask or longer EMS transports requiring a more definitive airway.
- Back-up device for failed endotracheal intubation attempt in a patient.
- Patient must be unconscious.

#### CONTRAINDICATIONS

- Intact gag reflex.
- Severe maxillofacial or oropharyngeal trauma.
- Pregnancy > 14 weeks.
- Pulmonary Fibrosis.
- Active vomiting.

#### RELATIVE CONTRAINDICATIONS

- Known esophageal disease (e.g. cancer).
- Ingestion of a caustic substance.
- Burns involving the airway.
- Morbid obesity.

#### PROCEDURE

1. Choose correct size: (Advanced EMT— Adult ONLY)

Mask	Patient Size	Cuff Volume
1	Neonate/Infants up to 5 kg	Up to 4 mL
1.5	Infants 5 – 10 kg	Up to 7 mL
2	Infants/Children 10 – 20 kg	Up to 10 mL
2.5	Children 20 – 30 kg	Up to 14 mL
3	Children 30 – 50 kg	Up to 20 mL
4	Adults 50 – 70 kg	Up to 30 mL
5	Adults 70 – 100 kg	Up to 40 mL
6	Large Adults over 100 kg	Up to 50 mL

2. Check cuff for proper inflation/deflation and leaks.
3. Lubricate the back of the mask with a water-soluble jelly.
4. Pre-oxygenate the patient.
5. Insert the LMA into the hypopharynx until resistance is met. Inflate the cuff until a seal is obtained.  
(Note: This airway does not prevent aspiration of stomach contents.)
6. Connect the LMA to a bag-valve device and ventilate the patient.
7. Confirm appropriate placement by symmetrical chest-wall rise, auscultation of equal breath sounds over the chest, and a lack of epigastric sounds with ventilation using bag-valve-mask, and quantitative waveform capnography, if available.
8. Secure the device.
9. Reassess tube placement frequently, especially after movement of the patient.
10. Document the time, provider, provider level and success for the procedure. Complete all applicable airway confirmation fields including chest rise, bilateral, equal breath sounds, absence of epigastric sounds and end-tidal CO<sub>2</sub> readings.

A/P

Airway Procedure 5.8

## 5.9 Nasotracheal Intubation

### PARAMEDIC STANDING ORDERS – ADULT

#### INDICATIONS

- Impending respiratory failure with intact gag reflex, or jaw is clenched and unable to be opened in spontaneously breathing patient.

#### CONTRAINDICATIONS

- Apnea.
- Nasal obstruction.
- Suspected basilar skull fracture.
- Severe facial trauma or suspected facial fractures.
- Patient fits on a pediatric length-based resuscitation tape.

#### PROCEDURE

1. Pre-medicate nasal mucosa with 2% lidocaine jelly and vasoconstricting nasal decongestant spray such as neo-synephrine, if available.
2. Pre-oxygenate the patient.
3. Select the largest and least obstructed nostril and insert a lubricated nasal airway.
4. Lubricate the ETT with water-based lubricant.
5. Remove the nasal airway and gently insert the ETT with continuous quantitative waveform capnography monitoring, keeping the bevel toward the septum (a gentle rotation movement may be necessary at the turbinates).
6. Continue to advance the ETT while listening for maximum air movement and watching for capnography waveform. Consider use of BAAM device to aid in listening to airflow.
7. At the point of maximum air movement, indicating proximity to the level of the glottis, gently and evenly advance the tube through the glottic opening on inspiration.
  - If resistance is encountered, the tube may have become lodged into the pyriform sinus and you may note tenting of the skin on either side of the thyroid cartilage. If this happens, slightly withdraw the ETT and rotate it toward the midline and attempt to advance tube again with the next inspiration.
8. Upon entering the trachea, the tube may cause the patient to cough, buck, strain, or gag. This is normal. Do not remove the ETT. Be prepared to control the cervical spine and be alert for vomiting.
9. Placement depth should be from the nares to the tip of the tube: approximately 28 cm in males and 26 cm in females.
10. Inflate cuff with 5 – 10 mL of air.
11. Confirm appropriate placement by quantitative waveform capnography, symmetrical chest-wall rise, auscultation of equal breath sounds over the chest, a lack of epigastric sounds with bagging.
12. Secure the ETT, consider applying a cervical-collar and securing patient to a long backboard (even for the medical patient) to protect the placement of the ETT.

P

Airway Procedure 5.9

Procedure Continues 

# Nasotracheal Intubation

## 5.9

Procedure Continued

### PARAMEDIC STANDING ORDERS

P

13. Ongoing monitoring of ETT placement and ventilation status using waveform capnography is required for all patients.
14. Document each attempt as a separate procedure in SIREN. **An attempt is defined as placement of the tube into the patient's nostril.** For each attempt, document the time, provider, placement success, pre-oxygenation, ETT size, placement depth, placement landmark (e.g. cm at the nare), and confirmation of tube placement including chest rise, bilateral, equal breath sounds, absence of epigastric sounds and end-tidal CO<sub>2</sub> readings.

Sedation is not usually necessary following nasotracheal intubation.

### POST INTUBATION CARE

Sedation:

- Midazolam 2.5 – 5 mg IV, every 5 – 10 minutes as needed (maximum 20 mg),  
**OR**
- Lorazepam 1 – 2 mg IV every 15 minutes as needed for sedation (maximum 10 mg) **AND**
- Fentanyl 50 – 100 mcg slow IV push. May repeat every 15 minutes as needed for sedation (maximum 300 mcg).

Contact **Medical Control** for additional dosing.

Airway Procedure 5.9

## 5.10 Orotracheal Intubation

### PARAMEDIC STANDING ORDERS – ADULT & PEDIATRIC

#### INDICATIONS

- Apnea/respiratory failure. Impending respiratory failure. Impaired or absent gag reflex.

#### CONTRAINDICATION

- Epiglottitis.
- Facial or neck injuries that prohibit visualization of airway anatomy (relative).

#### CAUTIONS

- Pediatric patients should, at least initially, be managed with BVM.
- Patients with CHF should be managed with trial of CPAP if possible.
- Avoid intubating patients with severe TBI and asthmatics, if possible.

#### PROCEDURE

1. Prepare all equipment and have suction ready.
2. Pre-oxygenate the patient.
3. Assess for airway difficulty based on patient anatomy (e.g., short neck, obesity, decreased thyromental distance and Class III or IV oropharyngeal views on observation). Have fallback plan and equipment ready.
4. Open the patient's airway. While holding the laryngoscope in the left hand, insert the blade into the right side of the patient's mouth, sweeping the tongue to the left.
5. Use the blade to lift the tongue and the epiglottis, either directly with the straight (Miller) blade, or indirectly with the curved (Macintosh) blade.
6. Once the glottic opening is visualized, insert the tube through the vocal cords and continue to visualize while passing the cuff through the cords.
7. Remove the laryngoscope and then the stylet from the ETT.
8. Inflate the cuff with 5 – 10 mL of air.
9. Confirm appropriate proper placement with quantitative waveform capnography and also document symmetrical chest-wall rise, auscultation of equal breath sounds over the chest and a lack of epigastric sounds with ventilations using bag-valve-mask
10. Secure the ETT, consider applying a cervical-collar and securing patient to a long backboard (even for the medical patient) to protect the placement of the ETT
11. Reassess tube placement frequently, especially after movement of the patient.
12. Ongoing monitoring of ETT placement and ventilation status using waveform capnography is required for all patients.
13. Document each attempt as a separate procedure so it can be time stamped in the ePCR. **An attempt is defined as placement of the blade into the patient's mouth.** For each attempt, document the time, provider, placement success, pre-oxygenation, airway grade, ETT size, placement depth, placement landmark (e.g. cm at the patient's lip), and confirmation of tube placement including chest rise, bilateral, equal breath sounds, absence of epigastric sounds and end-tidal CO<sub>2</sub> readings.

# P


 Procedure Continues

# Orotracheal Intubation

## 5.10



### PARAMEDIC STANDING ORDERS – ADULT & PEDIATRIC

If intubation attempt is unsuccessful, ETT placement cannot be verified or ETT becomes dislodged:

- Monitor oxygen saturation and end-tidal CO<sub>2</sub> **AND**
- Ventilate the patient with 100% oxygen via a BVM until ready to attempt intubation again.

If continued intubation attempts are unsuccessful (maximum of 3 attempts for cardiac arrest) or BVM ventilation is not adequate, consider placing a supraglottic airway.

### POST INTUBATION CARE

Sedation:

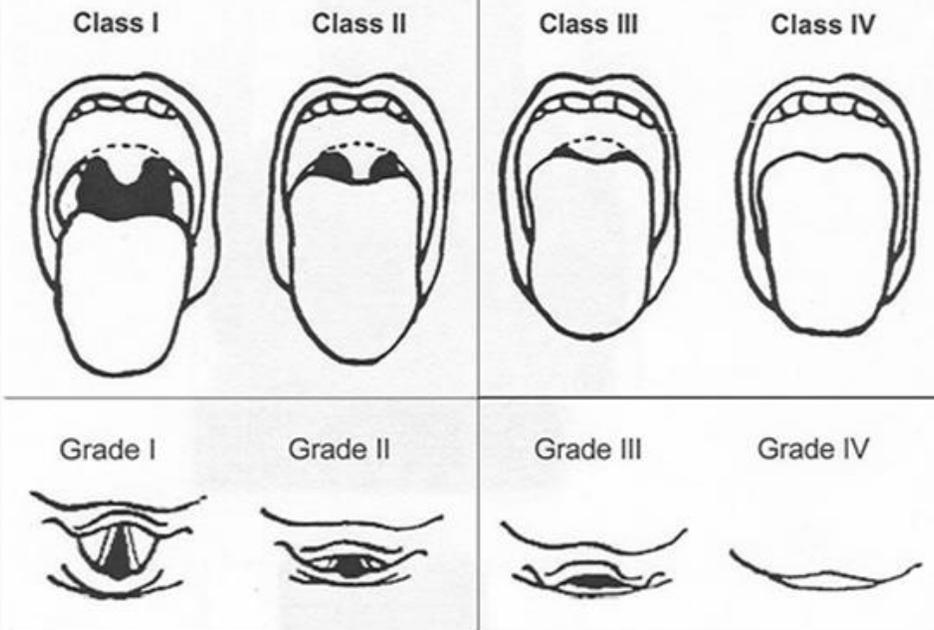
- Midazolam 2.5 – 5 mg IV, every 5 – 10 minutes as needed (maximum 20 mg), **OR**
- Lorazepam 1 – 2 mg IV, may repeat every 15 minutes as needed for sedation (maximum 10 mg) **AND**
- Fentanyl 50 – 100 mcg, slow IV push. May repeat every 15 minutes as needed for sedation (maximum 300 mcg).

Contact **Medical Control** for additional dosing.

**Video-Laryngoscope:** May be used instead of manual laryngoscope with appropriate training and credentialing. Video-laryngoscopy has been shown to have better success rates than manual laryngoscopy.

### Classifications of Oropharyngeal and Laryngoscopy

Views



## 5.11 Percutaneous Cricothyrotomy

### PARAMEDIC STANDING ORDERS

#### INDICATIONS

- Failed airway: Viable patient whose airway cannot be successfully managed by any other means.
  - All other methods have been exhausted including BVM, blind airway device, and intubation attempts;
  - Massive mid-face trauma precluding use of BVM, obstruction, trismus (clenching);
  - Inability to control the airway using less invasive measures;
  - Age > 10;
  - Last Resort: All other airway management techniques have failed. Unable to ventilate or oxygenate patient.

#### PROCEDURE

1. Can use Rusch QuickTrach or other approved device.
2. Pre-oxygenate patient when possible.
3. Assemble all available additional personnel
4. Locate cricothyroid membrane at the inferior portion of the thyroid cartilage (with head in neutral position, membrane is approximately 3 finger widths above the sternal notch). May be difficult to locate in obese patients.
5. Hold skin taut over membrane and locate the midline.
6. Prep area, preferably with betadine.
7. Hold the needle bevel up at a 90-degree angle, aimed inferiorly as you approach the skin.
8. Puncture the skin with the needle and continue with firm, steady pressure while aspirating for air with the syringe.
9. As soon as air is aspirated freely, stop advancing the needle/airway assembly.
10. Modify the angle to 60 degrees from the head and advance to level of the stopper.
11. Remove the stopper while holding the needle/airway assembly firmly in place.
12. Do not advance the needle further. (NOTE: if the patient is obese and no air can be aspirated with the stopper in place, you may remove the stopper and continue advancing until air is aspirated. Be aware that without the stopper, risk of perforating the posterior aspect of the trachea is greatly increased.)
13. Hold the needle and syringe firmly and slide only the plastic cannula along the needle into the trachea until the flange rests on the neck. Carefully remove the needle and syringe.
14. Secure the cannula with the neck strap.
15. Apply the EtCO<sub>2</sub> detector, then the connecting tube to the EtCO<sub>2</sub> detector and connect the other end to the BVM.
16. Confirm placement with the use of breath sounds, pulse ox, EtCO<sub>2</sub> and waveform capnography.
17. Ensure 100% FiO<sub>2</sub> to BVM via supplemental O<sub>2</sub>.

# P

## Suctioning of Inserted Airway 5.12

### ADVANCED EMT/PARAMEDIC STANDING ORDERS

#### INDICATIONS

- Obstruction of the airway (secondary to secretions, blood, and/or any other substance) in a patient currently being assisted by an inserted airway such as an endotracheal tube, King LTD, or tracheostomy tube.

#### CONTRAINDICATIONS

- None.

#### PROCEDURE

1. Ensure the suction device is operable.
2. Pre-oxygenate the patient.
3. While maintaining aseptic technique, attach the suction catheter to the suction unit.
4. If applicable, remove ventilation device from the airway.
5. Insert the sterile end of the suction catheter into the tube without suction. Insert to proper depth so that suction catheter does not extend past the tube/device.
6. Once the desired depth is met, apply suction by occluding the port of the suction catheter and slowly remove the catheter from the tube using a twisting motion.
7. Suctioning duration should not exceed 10 seconds, using lowest pressure that effectively removes secretions.
8. Saline flush may be used to help loosen secretions and facilitate suctioning.
9. Re-attach the ventilation device to the patient.

A/  
P

Airway Procedure 5.12

## 5.13

## Tracheostomy Care – Adult & Pediatric

### EMT/ADVANCED EMT STANDING ORDERS

#### INDICATIONS

- An adult or pediatric patient with an established tracheostomy in respiratory distress or failure.

#### PROCEDURE

1. Consult with the patient's caregivers for assistance.
2. Assess tracheostomy tube. Look for possible causes of distress (DOPES) which may be easily correctable, such as a detached oxygen source.
3. If the patient's breathing is adequate but exhibits continued signs of respiratory distress, administer high-flow oxygen via non-rebreather mask or blow-by, as tolerated, over the tracheostomy.
4. If patient's breathing is inadequate, assist ventilations using bag-valve-mask device with high-flow oxygen.
5. If on a ventilator, remove the patient from the ventilator prior to using bag valve mask device as there may be a problem with the ventilator or oxygen source.
6. Suction if unable to ventilate via tracheostomy or if respiratory distress continues.
7. Use no more than 100 mmHg suction pressure.
8. If the tracheostomy tube has a cannula, remove it prior to suctioning.
9. Determine proper suction catheter length by measuring the obturator.
10. If the obturator is unavailable, insert the suction catheter approximately 2 – 3 inches into the tracheostomy tube. **Do not use force!**
11. 2 – 3 mL saline flush may be used to help loosen secretions.
12. If the patient remains in severe distress, continue ventilation attempts using bag valve mask with high-flow oxygen via the tracheostomy. Consider underlying reasons for respiratory distress and refer to the appropriate protocol for intervention.

E/A

Airway Procedure 5.13

### PARAMEDIC STANDING ORDERS

#### INDICATIONS

- An adult or pediatric patient with an established tracheostomy, in respiratory distress or failure where EMT and Advanced EMT tracheostomy interventions have been unsuccessful.
- Dislodged tracheostomy tube.

#### CONTRAINDICATIONS

- None.

#### PROCEDURE

1. If the patient continues in severe respiratory distress, remove tracheostomy tube and attempt bag valve mask ventilation.
2. If another tube is available from caregivers, insert into stoma and resume ventilation (a standard endotracheal tube may be used or the used tracheostomy tube, after being cleaned).
3. If unable to replace tube with another tracheostomy tube or endotracheal tube, assist ventilations with bag valve mask and high-flow oxygen.

P

# Rapid Sequence Intubation (RSI) 7.1

## PARAMEDIC - PREREQUISITES REQUIRED

This procedure is only to be used by paramedics who are trained and credentialed to perform RSI with oversight by local Medical Control and agency participation in an RSI educational and CQI program approved by Vermont EMS. Either 2 RSI paramedics or 1 RSI paramedic and 1 RSI assistant must be present.

### INDICATION

- Immediate, severe airway compromise in the adult patient where respiratory arrest is imminent and other methods of airway management are ineffective.

### PROCEDURE: THE SEVEN P'S

**PREPARATION "SOAPME":** T minus 5 minutes.

- Suction set up.
- Oxygen: 100% non-rebreather mask, with bag-valve mask ready.
- Assessment: Evaluate airway difficulty based on patient anatomy (e.g., short neck, obesity, decreased thyromental distance and Class III or IV oropharyngeal views on observation). Have fallback plan and equipment ready.
- Pharmacology: IV/Medications drawn.
- Monitor: Cardiac / O<sub>2</sub> saturation/ ETCO<sub>2</sub>.
- Equipment : ETT (check cuff) / Stylet / BVM / Laryngoscope / Blades / Suction / Bougie / Back-up devices.

**PREOXYGENATION:** T minus 5 minutes .

- When possible, use a non-rebreather mask for at least 3 minutes to effect nitrogen washout and establish an adequate oxygen reserve. In emergent cases, administer 8 vital capacity bag-valve-mask breaths with 100% oxygen.
- Apply nasal cannula with oxygen regulator turned up to its fullest capacity, (nasal cannula should remain in place until endotracheal tube is secured).

**PREMEDICATION:** T minus 3-5 minutes.

- Consider lidocaine (1.5 mg/kg) for patients with suspected increased intracranial pressure (ICP) (e.g., traumatic brain injury, seizures, suspected intracranial hemorrhage) .
- Consider atropine 0.5 mg IV for pediatric patients with bradycardia.

**{SEDATE THEN} PARALYZE:** T minus 45 seconds.

- Etomidate 0.3 mg/kg IV; maximum 40 mg.
- If Etomidate is not available:
  - Ketamine 2 mg/kg IV, **OR**
  - Midazolam 0.2 mg/kg IV (0.1 mg/kg IV for patients in shock).
- Succinylcholine 1.5 mg/kg IV immediately after sedation.
- For patients with contraindications to succinylcholine:
  - Rocuronium 1 mg/kg IV, **OR**
  - Vecuronium 0.1 mg/kg IV.

**PASS THE TUBE:** T minus 0 seconds.

- Observe for fasciculations approximately 90 seconds after succinylcholine to indicate imminent paralysis.
- After paralysis is achieved, follow the procedure outlined in [Orotracheal Intubation Procedure 5.10](#) to place the ETT.

Prerequisite Protocol 7.1

P

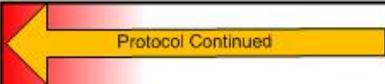


#### SUCCINYLCHOLINE CONTRAINDICATIONS:

- Extensive recent burns or crush injuries > 24 hours old.
- Known or suspected hyperkalemia.
- History of malignant hyperthermia.

Protocol Continues

# Rapid Sequence Intubation (RSI) 7.1



## PARAMEDIC - PREREQUISITES REQUIRED - Continued

**P**



### PROOF OF PLACEMENT

- Assess for proper placement by following the procedure outlined in [Orotracheal Intubation Procedure 5.10](#).

### POST INTUBATION CARE

Sedation:

- Midazolam 2 – 5 mg IV, every 5 – 10 minutes as needed (maximum 20 mg), **OR**
- Lorazepam 1 – 2 mg IV every 15 minutes as needed for sedation (maximum 10 mg), **AND**
- Fentanyl 50 – 100 mcg IV. May repeat every 15 minutes as needed for anesthesia (maximum dose 300 mcg).
- Be sure to maintain adequate sedation if patient is paralyzed.

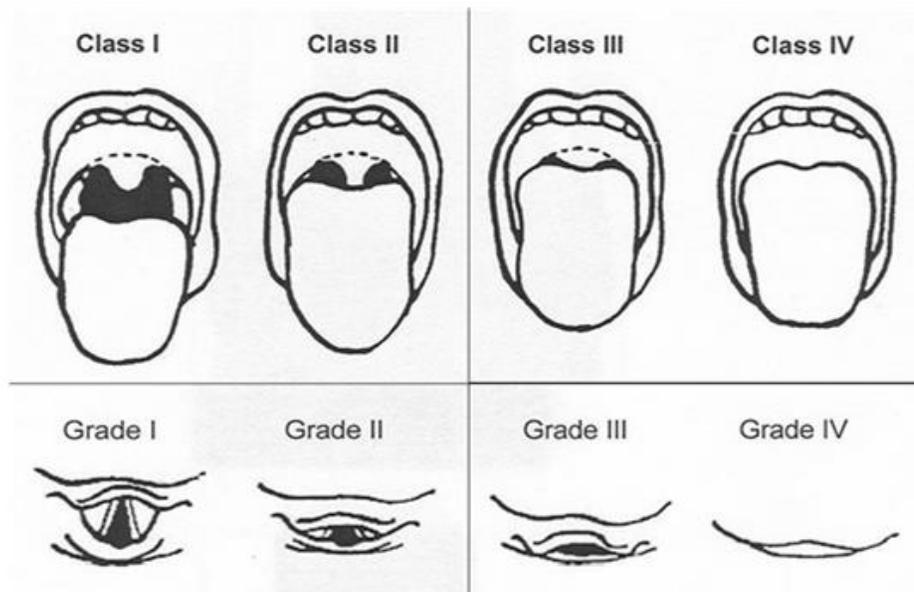
Paralysis (via on-line **Medical Control** only):

- Vecuronium 0.1 mg/kg IV, **OR**
- Rocuronium 1 mg/kg IV.

Contact **Medical Control** for additional dosing.

### DOCUMENTATION

- Rapid Sequence Intubation is the process by which the Seven P's are carried out. "Pass The Tube" (Step 5) may require more than one attempt before successful placement. When documenting the procedure in SIREN, choose "Airway, RSI" from the Active Protocol Menu. Within the RSI protocol, document each procedure and medication, including the time performed and the provider. Document each successful or unsuccessful attempt at Step 5 (Pass The Tube) as Endotracheal Intubation. Finish by documenting the remaining steps as part of the entire RSI sequence in SIREN.
- Follow all other required documentation outlined in [Orotracheal Intubation Procedure 5.10](#).



Classifications of Oropharyngeal and Laryngoscopy Views

**References & Acknowledgments:**

Engel, Applegate II, Chung & Sanchez. Management of the Difficult Airway, Cook Incorporated, 2001.

Scanlan, Wilkins & Stroller. Egan's Fundamentals of Respiratory Care, Mosby, St. Louis 1999.

Walls, Luten, Murphy, Schneider. Manual of Emergency Airway Management, Lippincott Williams and Wilkins, 2000.

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