

B01: Airway Management

Taylor Poirier & Mike Sugimoto

Updated: May 01, 2025

Reviewed: April 30, 2025

Introduction

Airway management is a core component of effective patient care in the pre-hospital setting. All patients, regardless of their emergency, require a structured airway assessment during their initial evaluation.

Essentials

1. **Oxygenation and ventilation are the ultimate goals of airway management.** Effective oxygenation depends on the fraction of inspired oxygen (FiO₂), the capacity for gas to diffuse across the alveolar membrane, the ability (and availability) of hemoglobin to transport oxygen through the body, and the propensity of oxygen to diffuse into tissues. Effective ventilation depends on sufficient tidal volume and respiratory rate.
2. **The effectiveness of airway management is measured by a variety of clinical endpoints.** Oxygenation is most readily measured by SPO₂. Ventilation is quantitatively measured by EtCO₂. Chest rise, breath sounds, and consciousness are all important clinical assessments of effective ventilation.
3. **A thorough assessment and reassessment of the respiratory system should be undertaken with all patients.** Airway patency and respiratory mechanics should be continuously reconsidered and documented. Ominous airway sounds include stridor, snoring, stertorous, or wet characteristics.
4. **Airway interventions progress from minimally to maximally invasive.** The simplest and safest form of respiration is spontaneous ventilation by the patient themselves. With each necessary tier of airway intervention, there are progressively more harmful effects of intervention (such as the effects of positive pressure ventilation on the cardiopulmonary system and medications used for induction).
5. **Field intubations are high risk invasive procedures.** Although they may be clinically necessary, the goals of airway management should be attained by less invasive means whenever possible.

General Information

- **Functional airway obstruction** is the displacement of the airway anatomy into the passageway due to loss of airway tone, secondary to impaired consciousness from various means.
- **Jaw thrust** is the most effective manual maneuver to open an airway when airway muscle tone is lost. The jaw thrust moves the tongue and epiglottis away from the posterior oropharynx, maximizing space for air passage.
- **Jaw thrust** and **head-tilt chin-lift** are not mutually exclusive maneuvers. In the absence of cervical spinal injury, the two maneuvers should occur in tandem to maximize airway patency.
- The **oropharyngeal airway (OPA)** and **nasopharyngeal airway (NPA)** are equally effective at creating an air passage and should be used in conjunction with manual maneuvers where appropriate. Ease and speed of OPA insertion is advantageous, whereas the ability of the NPA to bypass the gag reflex may be more appropriate depending on circumstances.
- **Bag-valve mask (BVM) ventilation** is a difficult skill that requires positive feedback (chest rise) to determine efficacy with the chest appropriately exposed. Optimal BVM ventilation is performed by two providers. Only a slight (but definite) amount of chest rise is necessary to achieve safe ventilation.
- Application of a **nasal cannula** at 10-15L/min from a second oxygen source may be appropriate underneath a BVM to increase available FiO₂ in critically ill hypoxic patients (referred to as high-flow nasal cannula, or NO DESAT)
- **Positive end-expiratory pressure (PEEP)** valves enhance alveolar recruitment and are an effective means of improving oxygenation. The application of PEEP is generally safe at low levels (starting at 5cmH₂O) but can be harmful at any level, particularly in patients experiencing shock physiology and those experiencing dynamic hyperinflation.
- Paramedics should have a low threshold to apply a PEEP valve in the management hypoxic patients.
- **Continuous positive airway pressure (CPAP)** is not a means of airway management. In dyspnea, CPAP is an effective means of recruiting alveoli and improving oxygenation. BCEHS utilizes fixed flow-dependent CPAP

devices that pair oxygen flow rates to CPAP. This means that we may see a transient drop in SPO2 on the initiation of CPAP before alveoli are recruited, as we often deliver a lower FiO2 than we may have previously been providing via non-rebreather (NRB). Supplemental oxygen can be applied where appropriate.

- CPAP is not capable of providing forced ventilation and should not be used for patients who have questionable airway integrity or lack the ability to spontaneously trigger ventilation.
- **Indications for Intubation include:**
 - **Oxygenation and ventilation** when unable to achieve with maximal supraglottic airway management.
 - **Protection** of airway patency when not adequately managed with suction and severely soiled by fluid
 - Rapid **progression** of airway compromise from inflammation due to burns or angioedema with prolonged transport time.

Interventions

First Responder

- Optimize position (head extension and sitting upright where appropriate)
- Functional airway obstruction present:
 - Jaw thrust
 - Head-tilt chin-lift
 - Oropharyngeal airway
- Bag-valve mask ventilation
- Supplemental oxygen
 - [A07: Oxygen Administration](#)

Emergency Medical Responder – All FR interventions, plus:

- Functional airway obstruction present:
 - [PR07: Nasopharyngeal Airway](#)
- Supplemental oxygen to maintain SPO2 > 93% where appropriate.

Primary Care Paramedic – All FR and EMR interventions, plus:

- Supraglottic airway devices may be used to maintain airway patency as necessary:
 - [PR08: Supraglottic Airway](#)
- Utilize PEEP to maintain SPO2 > 93%
 - [PR10: Positive End Expiratory Pressure](#)

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Intubation modality and urgency are determined by the severity of airway deterioration. *Elective* should not occur out-of-hospital. *Urgent* intubations should likely be deferred. *Emergent* and *life-threatening* intubations may be necessary prehospital.
- ☒ **Mandatory EPOS consultation required prior to sedation facilitated intubation decision.**
 - **Emergent intubation may occur under extraordinary clinical or logistical situations without EPOS consultation. If all EPOS resources are unavailable, SFI decision-making will be supported by PS utilizing Pre-Intubation checklist for consistency.**
- [Pre-Intubation Checklist](#)
- [Post-Intubation Checklist](#)
- [PR15: Tracheal Tube Introducer](#)
- [PR18: Sedation Facilitated Intubation](#)
- [PR22: Surgical Airways](#)
- [PR23: Awake Intubation](#)

Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:

- Rapid sequence intubation

- **3** ☐ **Mandatory EPOS consultation required** prior to the administration of neuromuscular blocking agents (NMBAs). EPOS consultation may be deferred if not possible due to clinical or technical factors.
- **PR47: Critical Care Anesthesia Planning**

Evidence Based Practice

Intubation

Supportive

- [Bougie](#)
- [Laryngeal Manipulation](#)
- [Oxymetry Monitoring](#)
- [Securing tube](#)

Neutral

- [Direct Laryngoscopy \(No airway reflexes\)](#)
- [Direct Laryngoscopy \(with airway reflexes\)](#)
- [ETI via a SGA device](#)
- [Lighted Stylet](#)
- [NO DESAT/Nasal apneic oxygenation](#)
- [Optical \(non-video\) Visualization \(e.g. Airtraq\)](#)
- [Video Visualization \(e.g. Glidescope\)](#)
- [Digital Intubation](#)
- [Nasotracheal intubation](#)

Against

- [Cricoid Pressure](#)

Alternative Rescue Airway Management

Supportive

- [BVM](#)
- [Laryngeal Tube \(without AW reflexes\)](#)
- [I-Gel](#)
- [Laryngeal Tube \(with AW reflexes\)](#)
- [Surgical Cricothyrotomy](#)
- [Bougie-assisted Cricothyrotomy](#)
- [Pressure manometer](#)

Neutral

- [NPA](#)
- [OPA](#)
- [Pharyngeal Tracheal Lumen \(PTL\)](#)
- [LMA \(with AW reflexes\)](#)

Against

- [Combitube \(without AW reflexes\)](#)

- [LMA \(without AW reflexes\)](#)
- [Percutaneous Cricothyrotomy](#)
- [Combitube \(with AW reflexes\)](#)

Medication for Airway Management

Supportive

- [RSI \(CCT\)](#)
- [Sedation](#)
- [DSI \(CCT\)](#)

Neutral

- [Topical anaesthetic](#)
- [RSA](#)
- [Sedation \(CCT\)](#)

Against

- [Rapid Sequence Induction](#)

Airway Confirmation

Supportive

- [Quantitative Capnography \(with circulation\)](#)
- [EDD](#)
- [Qualitative Capnography \(with circulation\)](#)

Neutral

- [POCUS](#)
- [Oxymetry Monitoring](#)
- [Qualitative Capnography \(no circulation\)](#)
- [Quantitative Capnography \(no circulation\)](#)

Against

References

1. Measures of Oxygenation and Mechanisms of Hypoxemia. [\[LINK\]](#)
2. Kovacs, et al. Airway Management in Emergencies: The Infinity Edition. 2020. [\[LINK\]](#)
3. EMSPEP Database. [\[LINK\]](#)
4. Jarvis, J. L., Lyng, J. W., Miller, B. L., Perlmutter, M. C., Abraham, H., & Sahni, R. (2022). Prehospital Drug Assisted Airway Management: An NAEMSP Position Statement and Resource Document. *Prehospital Emergency Care*, 26(sup1), 42-53
5. Merelman AH, Perlmutter MC, Strayer RJ. Alternatives to Rapid Sequence Intubation: Contemporary Airway Management with Ketamine. *West J Emerg Med*. 2019 May;20(3):466-471. doi: 10.5811/westjem.2019.4.42753. Epub 2019 Apr 26. PMID: 31123547; PMCID: PMC6526883.
6. Hoffmann M., Czorlich P., Lehmann W., Spiro AS., Rueger JM., Lefering R., et al. The Impact of Prehospital Intubation With and Without Sedation on Outcome in Trauma Patients With a GCS of 8 or Less. *J Neurosurg Anesthesiol* 2017; 29(2):161-167

7. Bernard SA., Nguyen V., Cameron P., Masci K., Fitzgerald M., Cooper DJ., et al. *Prehospital rapid sequence intubation improves functional outcome for patients with severe traumatic brain injury: a randomized controlled trial.* *Ann Surg* 2010; 252(6):959-65
8. AlGhamdi FA, AlJoaib NA, Saati AM, Abu Melha MA, Alkhofi MA. *Paramedics' Success and Complications in Prehospital Pediatric Intubation: A Meta-Analysis.* *Prehospital and Disaster Medicine.* 2024;39(2):184-194. doi:10.1017/S1049023X24000244
9. Ferguson I, Buttfield A, Burns B, Reid C, Shepherd S, Milligan J, Harris IA, Aneman A; Australasian College for Emergency Medicine Clinical Trials Network. *Fentanyl versus placebo with ketamine and rocuronium for patients undergoing rapid sequence intubation in the emergency department: The FAKT study-A randomized clinical trial.* *Acad Emerg Med.* 2022 Jun;29(6):719-728. doi: 10.1111/acem.14446. Epub 2022 Mar 15. PMID: 35064992; PMCID: PMC9314707.

Practice Updates

- 2025-05-01 Clarity around EPOS consultation.
- 2023-12-18: Removed COVID-related restrictions.

