Chapter 8 - Airway Management

OBJECTIVES

8.1 Define key terms introduced in this chapter. Slides 12–15, 21, 24, 31–36, 39, 40, 54
8.2 Describe the anatomy and physiology of the upper and lower airways. Slides 12–16
8.3 Given a diagram or model, identify the structures of the upper and lower airways. Slides 13, 15

continued

8.4 Describe common pathophysiologic problems leading to airway obstruction. Slides 18–21
8.5 Demonstrate assessment of the airway in a variety of patient scenarios. Slides 22–26
8.6 Associate abnormal airway sounds with likely pathophysiologic causes. Slide 24

continued
### OBJECTIVES

8.7 Identify patients who have an open airway but who are at risk for airway compromise. Slide 23

8.8 Recognize patients who have an inadequate airway. Slide 25

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8.9 Demonstrate manually opening the airway in pediatric and adult medical and trauma patients: head-tilt, chin-lift maneuver, jaw-thrust maneuver. Slides 31–34

8.10 Describe the indications, contraindications, use, and potential complications of airway adjuncts, including oropharyngeal airway and nasopharyngeal airway. Slides 39–52

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8.11 Recognize the indications for suctioning of the mouth and oropharynx. Slide 54

8.12 Describe risks and limitations associated with suctioning the mouth and oropharynx. Slides 56–62, 66–67

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OBJECTIVES

8.13 Demonstrate the following airway management skills: inserting an oropharyngeal airway; inserting a nasopharyngeal airway; suctioning the mouth and oropharynx. Slides 45–47, 51–52, 65–67

8.14 Describe modifications in airway management for pediatric patients, patients with facial trauma, and patients with airway obstruction. Slides 74–80

MULTIMEDIA

- Slide 27 Responding to an Adult with an Obstructed Airway Video
- Slide 68 Suctioning—Oral Pharyngeal Video

CORE CONCEPTS

- Physiology of the airway
- Pathophysiology of the airway
- How to recognize an adequate or an inadequate airway
- How to open an airway
- How to use airway adjuncts
- Principles and techniques of suctioning
Chapter 8 - Airway Management

### Topics

- Airway Physiology
- Airway Pathophysiology
- Opening the Airway
- Airway Adjuncts
- Suctioning
- Keeping an Airway Open: Definitive Care
- Special Considerations

### Airway Physiology

### Upper Airway

- Begins at mouth and nose
  - Air is warmed and humidified in nasal turbinates
- Pharynx
  - Oropharynx, nasopharynx, and laryngopharynx
- Ends at glottic opening

continued
Lower Airway

- Begins at glottic opening
- Trachea
- Bronchial passages
- Alveoli

continued
Alveoli

- Tiny sacs in grapelike bunches at the end of the airway
- Surrounded by pulmonary capillaries
- Oxygen and carbon dioxide diffuse through pulmonary capillary membranes

Airway Pathophysiology

Airway Obstructions

- Variety of obstructions interfere with airflow
  - Foreign bodies: food, small toys
  - Liquids: blood, vomit
- Obstruction may result from poor muscle tone caused by altered mental status

continued
Airway Obstructions

• Obstructions can be acute or chronic
• Providers must initially evaluate airway and monitor patency over time

continued

Airway Obstructions

• Acute
  – Foreign bodies
  – Vomit
  – Blood
• Occurring over time
  – Edema from burns, trauma, or infection
  – Decreasing mental status

continued

Airway Obstructions

• Bronchoconstriction
  – Disorder of lower airway
  – Smooth muscle constricts internal diameter of airway
Airway Assessment

• Addressed in primary assessment
• Two questions must be answered
  – Is airway open?
  – Will airway stay open?

Will Airway Stay Open?

• Airway assessment is not just a moment in time
• Must give constant consideration

Findings Indicating Airway Problems

• Inability to speak
• Unusual raspy quality to voice
• Stridor
• Snoring
• Gurgling
Signs of Inadequate Airway

- Foreign bodies in airway
- No air felt or heard (air exchange below normal)
- Absent or minimal chest movements
- Abdominal breathing

Pediatric Airway Assessment

- Retractions
- Nasal flaring

Responding to an Adult with an Obstructed Airway Video

Click here to view a video on the subject of obstructed airway in an adult.
Opening the Airway

Patient Care: Airway Management

- When primary assessment indicates inadequate airway, a life-threatening condition exists
- Take prompt action to open and maintain airway

Open Airway

- If airway is not open, use position to open it
- Head-tilt, chin-lift maneuver and jaw-thrust maneuver move airway structures into position allowing air movement
Head-Tilt Chin-Lift Maneuver

1. Place one hand on forehead and fingertips of other hand under patient's lower jaw
2. Tilt head
3. Lift chin
4. Do not allow mouth to close

Jaw-Thrust Maneuver
Performing Jaw-Thrust Maneuver

1. Place one hand on each side of patient’s lower jaw at angles of jaw below ears
2. Using index fingers, push angles of patient’s lower jaw forward
3. Do not tilt or rotate patient’s head

Patient Care: Airway Management

• After airway has been opened, position must be maintained to keep airway open
• Airway must be cleared of secretions and other obstructions

Pediatric Note: Opening the Airway

• Infants and small children often have larger occipital regions of their heads
• Lying flat may cause hyperflexion of neck and airway occlusion
• Evaluate need to pad behind patient’s shoulders to achieve neutral airway position

continued
Pediatric Note: Opening the Airway

Airway Adjuncts

Patient Care: Airway Adjuncts

- Airway position and maneuvers are short-term solutions
- Airway adjunct provides longer term air channel
- Two most common airway adjuncts:
  - Oropharyngeal airway (OPA)
  - Nasopharyngeal airway (NPA)
Rules for Using Airway Adjuncts

- Use OPA only on patients not exhibiting gag reflex
- Open patient’s airway manually before using adjunct device
- When inserting airway, take care not to push patient’s tongue into pharynx

continued

Rules for Using Airway Adjuncts

- Have suction ready
- Do not continue inserting airway if patient gags
- Maintain head position after adjunct insertion

continued

Rules for Using Airway Adjuncts

- Patient may regain consciousness
- Be prepared to remove adjunct and have suction ready
- Use infection control practices while maintaining airway
Oropharyngeal Airway

- Device used to move tongue forward as it curves back to pharynx
- Sizes: infant to large adult

Sizing Oropharyngeal Airways

Inserting OPA

- Open mouth with crossed-finger technique
- Position airway with tip pointing toward roof of mouth

continued
Inserting OPA

1. Insert until you meet resistance
2. Gently rotate airway 180° so tip is pointing down into pharynx
3. Check that flange of airway is against lips
4. Monitor patient closely

Pediatric Note: Inserting OPA

- Use tongue depressor or rigid suction tip and insert OPA directly
- Do not rotate into place

Nasopharyngeal Airway

- Soft, flexible tube inserted through nostril and into hypopharynx
- Moves tongue and soft tissue forward to provide a channel for air

continued
Nasopharyngeal Airway

- Can be used in patients with intact gag reflex or clenched jaw
- Contraindicated if clear (cerebrospinal) fluid coming from nose or ears

Nasopharyngeal Airway

- Come in various sizes
- Must be measured
- Typical adult sizes: 34, 32, 30, and 28 French

Inserting NPA

1. Lubricate outside of tube with water-based lubricant before insertion

continued
Inserting NPA

2. Push tip of nose upward; keep head in neutral position
3. Insert into nostril; advance until flange rests firmly against nostril

Suctioning

Patient Care: Suctioning

• Obvious liquids (blood, secretions, vomit) must be removed from airway to prevent aspiration into lungs
• Use vacuum device to remove liquids from airway
Components of Suction Unit

- Suction source
- Collection container
- Tubing
- Suction tips or catheters

Suction Systems

- Fixed or portable

Suction Device Requirements

- Must furnish air intake of at least 30 Lpm at open end of collection tube
- Must generate vacuum of no less than 300 mmHg when collecting tube is clamped
Rigid Pharyngeal Suction Tip

- Also called “Yankauer Tip”
- Larger bore than flexible catheters

Rigid Pharyngeal Suction Tip

- Suction only as far as you can see
- Do not lose sight of distal end
- Careful insertion helps prevent gag reflex or vagal stimulation

Flexible Suction Catheter

- Designed to be used when a rigid tip cannot be used
- Can be passed through a tube such as the nasopharyngeal or endotracheal tube
- Can be used for suctioning the nasopharynx
Flexible Suction Catheter

- Come in various sizes identified by a number “French”
- Larger the number, larger the catheter

Flexible Suction Catheter

- Not typically large enough to suction vomitus or thick secretions
- May kink
- In event of copious, thick secretions consider removing tip or catheter and using large bore, rigid suction tubing

Flexible Suction Catheter

- Measured in similar way as OPA
- Length of catheter that should be inserted into patient’s mouth equals distance between corner of patient’s mouth and earlobe
Measuring Flexible Suction Catheter

Suctioning Techniques

- Use appropriate infection control practices while suctioning
- Protective eyewear, mask, disposable gloves
- Suction no longer than 10 seconds at a time
- Prolonged suctioning can cause hypoxia and bradycardia
- If patient vomits for longer than 10 seconds, continue suction
Suctioning Techniques

- Place tip or catheter where you want to begin suctioning
- Suction on the way out

Suctioning—Oral Pharyngeal Video

Click here to view a video on the subject of suctioning.

Keeping an Airway Open: Definitive Care
Keeping an Airway Open: Definitive Care

- Keeping the airway open may exceed capabilities of a basic EMT
- Medications and/or surgical procedures may be necessary to resolve airway obstruction

Continued

Keeping an Airway Open: Definitive Care

- Rapidly evaluate and treat airway problems
- Quickly recognize when more definitive care is necessary
  - May be advanced life support intercept
  - May be closest hospital

Think About It

- If you were not able to manage an airway at the basic level, what advanced resources might be available to you?
Special Considerations

Facial Injuries

- Frequently result in severe swelling or bleeding that may block or partially block airway
- Bleeding may require frequent suctioning or more definitive airway

Obstructions

- Many suction units are not adequate for removing solid objects
- Objects may have to be removed with manual techniques: abdominal thrusts, chest thrusts, finger sweeps
Dental Appliances

- Leave in place during airway procedures when possible
- Partial dentures may become dislodged during an emergency
- Be prepared to remove if airway endangered

Pediatric Patients

- Present a variety of anatomical differences to consider when managing the airway

Pediatric Anatomical Considerations

- Smaller mouth and nose
- Larger tongue
- Narrow, flexible trachea

continued
**Pediatric Anatomical Considerations**
- Child has smaller nose and mouth
- In child, more space is taken up by tongue
- Child’s trachea is narrow
- Cricoid cartilage is less rigid and less developed
- Airway structures are more easily obstructed

**Pediatric Management Considerations**
- Open airway gently
- Do not hyperextend neck
- Consider adjuncts when other measures fail
- Use rigid tip with adjunct, but do not touch back of airway

**Chapter Review**
Chapter Review

• The airway is the passageway by which air enters the body during respiration, or breathing.
• A patient cannot survive without an open airway.
• Maintaining an open airway is the first priority of emergency care.

Chapter Review

• Airway adjuncts can help keep the airway open.
• It may be necessary to suction the airway or to use manual techniques to remove fluids and solids from the airway before, during, or after artificial ventilation.

Remember

• Always use proper personal protective equipment when managing an airway.
• Airway assessment must be an ongoing process. Airway status can change over time.
• Airway management should start simply and become more complicated only if necessary.
Questions to Consider

• Name the main structures of the airway.
• Explain why care for the airway is the first priority of emergency care.
• Describe the signs of an inadequate airway.

Questions to Consider

• Explain when the head-tilt, chin-lift maneuver should be used and when the jaw-thrust maneuver should be used to open the airway—and why.
• Explain how airway adjuncts and suctioning help in airway management.

Critical Thinking

• On arrival at the emergency scene, you find an adult female patient with gurgling sounds in the throat and inadequate breathing slowing to almost nothing. How do you proceed to protect the airway?

continued
Critical Thinking

• When evaluating a small child you hear stridor. What does this sound tell you? What are your immediate concerns regarding this sound?

Critical Thinking

• When assessing an unconscious patient, you note snoring respirations. Should you be concerned with this and if so, what steps can you take to correct this situation?

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