CHAPTER 10

Airway Management

National EMS Education Standard Competencies

**Airway Management, Respiration, and Artificial Ventilation**
Applies knowledge of general anatomy and physiology to patient assessment and management in order to assure a patent airway, adequate mechanical ventilation, and respiration for patients of all ages.

**Airway Management**
- Airway anatomy (pp 388–392)
- Airway assessment (pp 400–405)
- Techniques of assuring a patent airway (pp 405–408)

**Respiration**
- Anatomy of the respiratory system (pp 388–392)
- Physiology and pathophysiology of respiration
  - Pulmonary ventilation (pp 393–395)
  - Oxygenation (pp 395–396)
  - Respiration (pp 396–397)
    - External (pp 396–397)
    - Internal (pp 396–397)
    - Cellular (pp 396–397)
- Assessment and management of adequate and inadequate ventilation (pp 402–405)
- Supplemental oxygen therapy (pp 416–425)

**Artificial Ventilation**
- Assessment and management of adequate and inadequate ventilation (pp 425–435)
- Artificial ventilation (pp 426–435)
- Minute ventilation (pp 393–394)
- Alveolar ventilation (pp 393–394)
- Effect of artificial ventilation on cardiac output (pp 427)

**Pathophysiology**
Applies fundamental knowledge of the pathophysiology of respiration and perfusion to patient assessment and management.

**Knowledge Objectives**
1. Describe the major structures of the respiratory system. (pp 387–392)
2. Discuss the physiology of breathing. (pp 392–397)
3. Give the signs of adequate breathing. (p 400)
4. Give the signs of inadequate breathing. (p 401)
5. Describe the assessment and care of a patient with apnea. (p 402)
6. Explain how to assess for adequate and inadequate respiration, including the use of pulse oximetry. (pp 402–405)
7. Explain how to assess for a patent airway. (p 405)
8. Describe how to perform the head tilt–chin lift maneuver. (pp 405–406)
9. Describe how to perform the jaw-thrust maneuver. (pp 406–407)
10. Explain the importance of and techniques for suctioning. (pp 408–411)
11. Explain how to measure and insert an oropharyngeal (oral) airway. (pp 411–413)
12. Describe how to measure and insert a nasopharyngeal (nasal) airway. (pp 413–416)
13. Explain the use of the recovery position to maintain a clear airway. (p 416)
14. Describe the importance of giving supplemental oxygen to patients who are hypoxic. (p 416)
15. Discuss the basics of how oxygen is stored and the various hazards associated with its use. (pp 416–422)
16. Explain the use of a nonrebreathing mask and the oxygen flow requirements for its use. (p 423)
17. Describe the indications for using a nasal cannula rather than a nonbreathing face mask. (p 423)
18. Describe the indications for using a humidifier cannula rather than a nonrebreathing face mask. (pp 423–425)
19. Describe how to perform mouth-to-mouth or mouth-to-mask ventilation. (pp 427–428)
20. Describe the use of a one- or two-person bag-valve mask (BVM) and a manually triggered ventilation (MTV) device. (pp 428–435)
21. Describe the signs associated with adequate and inadequate artificial ventilation. (p 434)
22. Describe the use of continuous positive airway pressure (CPAP). (pp 435–439)
23. Explain how to recognize and care for a foreign body airway obstruction. (pp 440–442)

**Skills Objectives**
1. Demonstrate use of pulse oximetry. (pp 403–404, Skill Drill 10-1)
2. Demonstrate how to position the unconscious patient. (pp 405–406, Skill Drill 10-2)
1. Demonstrate how to perform the head tilt–chin lift maneuver. (pp 405–406)
2. Demonstrate how to perform the jaw-thrust maneuver. (pp 406–407)
3. Demonstrate how to operate a suction unit. (p 410)
4. Demonstrate how to suction a patient’s airway. (pp 410–411, Skill Drill 10-3)
5. Demonstrate the insertion of an oral airway. (pp 411–413, Skill Drill 10-4)
6. Demonstrate the insertion of an oral airway with a 90-degree rotation. (pp 412–414, Skill Drill 10-5)
7. Demonstrate the insertion of a nasal airway. (pp 413–416, Skill Drill 10-6)
8. Demonstrate how to place a patient in the recovery position. (p 416)
9. Demonstrate how to place an oxygen cylinder into service. (pp 421–422, Skill Drill 10-7)
10. Demonstrate the use of a partial rebreathing mask in providing supplemental oxygen therapy to patients. (p 424)
11. Demonstrate the use of a Venturi mask in providing supplemental oxygen therapy to patients. (p 424)
12. Demonstrate the use of a humidifier in providing supplemental oxygen therapy to patients. (p 425)
14. Demonstrate how to assist a patient with ventilations using the BVM. (pp 431–433, Skill Drill 10-9)
15. Demonstrate how to use a manually triggered ventilation device to assist in delivering artificial ventilation to the patient. (pp 434–435)
16. Demonstrate how to use an automatic transport ventilator to assist in delivering artificial ventilation to the patient. (p 435)
17. Demonstrate the use of CPAP. (pp 435–439, Skill Drill 10-10)

Introduction

The single most important step in caring for patients is to make sure that life threats are addressed. A primary component of that is to ensure that patients can breathe adequately. When the ability to breathe is disrupted, oxygen delivery to the body tissues and cells is compromised. Cells require a constant supply of oxygen to survive. Within seconds of being deprived of oxygen, vital organs such as the heart and brain may not function normally. Therefore, it is imperative that you recognize airway and breathing inadequacies and correct them immediately. Brain tissue will begin to die within 4 to 6 minutes without oxygen.

Oxygen reaches body tissues and cells through two separate but related processes: breathing and circulation. During inhalation, oxygen moves from the atmosphere into the lungs, then crosses the alveolar membrane onto hemoglobin by a process called diffusion. Diffusion is a process in which molecules move from an area of higher concentration to an area of lower concentration. Next, red blood cells carry the hemoglobin, and therefore oxygen, through the body, ultimately delivering it to the capillaries to oxygenate the body’s cells. At the same time, carbon dioxide, produced by cells in the tissues of the body, moves from the blood into the air sacs by diffusion. The blood, enriched with oxygen, travels through the body by the pumping action of the heart. The carbon dioxide then leaves the body during exhalation.

As an EMT, you must be able to locate the parts of the respiratory system, understand how the system works, and be able to recognize which patients are breathing adequately and which patients are breathing inadequately. This will enable you to determine how best to treat your patients.

This chapter reviews the anatomy, physiology, and pathophysiology of the respiratory system. It describes how to assess patients quickly and

YOU are the Provider

PART 1

You and your partner are dispatched to a residence at 145 Landa Street for a man with trouble breathing. The patient’s wife, who called 9-1-1, told the dispatcher that her husband is “breathing funny” and is not responding to her appropriately. The time is 1510 hours, the temperature outside is 39°F (4°C), and a fine mist is falling.

1. What is the function of the respiratory system?
2. What is the difference between ventilation and respiration?
3. How often should you assess a patient’s airway and breathing status?