Ch. 10 Review

- Perfusion requires an intact cardiovascular system and a functioning respiratory system.
- Remember, most types of shock (hypoperfusion) are caused by dysfunction in one or more parts of the perfusion triangle:
    - The pump (the heart)
    - The pipes, or container (blood vessels)
    - The content, or volume (blood)
- Shock (hypoperfusion) is the collapse and failure of the cardiovascular system, when blood circulation slows and eventually stops.
- Blood is the vehicle for carrying oxygen and nutrients through the vessels to the capillary beds to tissue cells, where these supplies are exchanged for waste products.
- Blood contains red blood cells, white blood cells, platelets, and a liquid called plasma.
- The *systolic* pressure is the peak arterial pressure, or pressure generated every time the heart contracts; the *diastolic* pressure is the pressure maintained within the arteries while the heart rests between heartbeats.
- The various types of shock are cardiogenic, obstructive, septic, neurogenic, anaphylactic, psychogenic, and hypovolemic.
- Signs of compensated shock include anxiety or agitation; tachycardia; pale, cool, moist skin; increased respiratory rate; nausea and vomiting; and increased thirst. If there is any question on your part, treat for shock. It is never wrong to treat for shock.
- Signs of decompensated shock include labored or irregular respirations, ashen gray or cyanotic skin color, weak or absent distal pulses, dilated pupils, and profound hypotension.
- Remember, by the time a drop in blood pressure is detected, shock is usually in an advanced stage.
- Anticipate shock in patients who may have the following conditions:
    - Severe infection
    - Significant blunt force trauma or penetrating trauma
    - Massive external bleeding or index of suspicion for major internal bleeding
    - Spinal injury
    - Chest or abdominal injury
    - Major heart attack
    - Anaphylaxis
- Treating a pediatric or geriatric patient in shock is no different than treating any other shock patient.
- Treat all patients suspected to be in shock from any cause as follows and in this order:
    - Open and maintain the airway.
    - Provide high-flow oxygen and as needed, provide bag-mask assisted ventilations.
    - Control all obvious external bleeding.
    - Place the patient in the shock position or, if on a backboard or stretcher, in the Trendelenburgôs position.
    - Maintain normal body temperature with blankets.
    - Provide prompt transport to the appropriate hospital.

Ch. 11 Review

- Basic life support (BLS) is noninvasive emergency lifesaving care that is used to treat medical conditions, including airway obstruction, respiratory arrest, and cardiac arrest.
- BLS care focuses on what is often termed the ABCs: airway (obstruction), breathing (respiratory arrest), and circulation (cardiac arrest or severe bleeding).
- Cardiopulmonary resuscitation (CPR) is used to establish artificial ventilation and circulation in a patient who is not breathing and has no pulse.
- The goal of CPR is to restore spontaneous breathing and circulation; however, advanced procedures such as medications and defibrillation are often necessary for this to occur.

- Advanced life support (ALS) involves advanced lifesaving procedures, such as cardiac monitoring, administration of intravenous fluids and medications, and use of advanced airway adjuncts.
- The four links in the chain of survival are early access, early CPR, early defibrillation, and early advanced care.
- The automated external defibrillator (AED) should be applied to any nontrauma cardiac arrest patient older than 1 year of age as soon as it is available.
- When using an AED on a child between 1 and 8 years of age, you should use pediatric-sized pads and a dose-attenuating system (energy reducer). If these are not available, an adult AED should be used.
- As an EMT, it is your responsibility to start CPR in virtually all patients who are in cardiac arrest. There are only two general exceptions to the rule: You should not start CPR if the patient has obvious signs of death and you should not start CPR if the patient and his or her physician have previously agreed on do not resuscitate (DNR) or no-CPR orders.
- You are not responsible for making the decision to stop CPR. Once you begin CPR in the field, you must continue until one of the following events occurs:
    - ï S, the patient Starts breathing and has a pulse.
    - ï T, the patient is Transferred to another person who is trained in BLS, to ALS-trained personnel, or to another emergency medical responder.
    - ï O, you are Out of strength or too tired to continue.
    - ï P, a Physician who is present or providing online medical direction assumes responsibility for the patient and gives direction to discontinue CPR.
- An airway obstruction may be caused by various things, including relaxation of the throat muscles in an unconscious patient, vomited or regurgitated stomach contents, blood, damaged tissue after an injury, dentures, or foreign bodies such as food or small objects.
- The manual maneuver recommended for removing severe airway obstructions in the conscious adult and child is the abdominal-thrust maneuver (the Heimlich maneuver).

Ch. 22 Review

- Determine the mechanism of injury (MOI) as quickly as possible; this will assist you in developing an index of suspicion for the seriousness of your patientôs unseen injuries.
- Three concepts of energy are typically associated with injury: potential energy, kinetic energy, and work.
- Traumatic injuries can be described as blunt trauma or penetrating trauma.
- Motor vehicle crashes are classified traditionally as frontal (head-on), lateral (T-bone), rear-end, rotational (spins), and rollovers.
- In every crash there are three collisions that occur:
    - ï The collision of the vehicle against some type of object
    - ï The collision of the passenger against the interior of the vehicle
    - ï The collision of the passengerôs internal organs against the solid structures of the body
- Maintain a high index of suspicion for serious injury in the patient who has been involved in a motor vehicle collision or a motor vehicle collision with significant damage to the vehicle, has fallen from a significant height, or has sustained penetrating trauma to the body.
- Communicate mechanism of injury (MOI) findings in the written patient care report and verbally to hospital staff; this will ensure that appropriate treatment for potential serious injuries continues for the patient at the hospital.
- People who are injured in explosions may have injuries that are classified as primary blast injuries, secondary blast injuries, tertiary blast injuries, and/or miscellaneous blast injuries.
- A patient who has sustained a significant mechanism of injury (MOI) and is considered to be in serious or critical condition should receive a rapid full-body scan or rapid head-to-toe examination. Any patient who has sustained a nonsignificant mechanism of injury (MOI) should receive an assessment focused on the chief complaint.
- Caring for victims of traumatic injuries requires the EMT to have a solid understanding of the trauma system in the United States. This includes transport time, transport destination, and selection of type of transport.

Ch. 23 Review

- Perfusion is the circulation of blood in adequate amounts to meet each cellôs current needs for oxygen, nutrients, and waste removal.
- The three arms of the perfusion triad must be functioning to meet this demand: a working pump (heart), a set of intact pipes (blood vessels), and fluid volume (enough oxygen-carrying blood).
- Hypoperfusion, or shock, occurs when one or more of these three arms is not working properly and the cardiovascular system fails to provide adequate perfusion.
- Both internal and external bleeding can cause shock. You must know how to recognize and control both.
- The methods to control bleeding, in order, are:
    - ï Direct local pressure
    - ï Elevation
    - ï Pressure dressing
    - ï Tourniquet
    - ï Splinting device
- Bleeding from the nose, ears, and/or mouth may result from a skull fracture. Other causes include high blood pressure and sinus infection. Evaluate the MOI and consider the more serious problem of skull fracture.
- Bleeding around the face always presents a risk for airway obstruction or aspiration. Maintain a clear airway by positioning the patient appropriately and using suction when indicated.
- If bleeding is present at the nose and a skull fracture is suspected, place a gauze pad loosely under the nose.
- If bleeding from the nose is present and a skull fracture is not suspected, pinch both nostrils together for 15 minutes. If the patient is awake and has a patent airway, place a gauze pad inside the upper lip against the gum.
- Any patient you suspect of having internal bleeding or significant external bleeding should be transported promptly.
- If the mechanism of injury is significant, be alert to signs of unseen bleeding in the chest or abdomenð signs such as serious bruising or symptoms such as complaints of difficulty breathing or abdominal pain.
- Signs of serious internal bleeding include the following:
    - ï Vomiting blood (hematemesis)
    - ï Black tarry stools (melena)
    - ï Coughing up blood (hemoptysis)
    - ï Distended abdomen
    - ï Broken ribs

Ch. 24 Review

- The skin protects the body by keeping pathogens out, water in, and assisting in body temperature regulation.
- There are three types of soft-tissue injuries:
    - ï Closed injuries (Soft-tissue damage occurs beneath the skin or mucous membrane but the surface remains intact.)
    - ï Open injuries (There is a break in the surface of the skin or the mucous membrane, exposing deeper tissue to potential contamination.)
    - ï Burns (The soft tissue receives more energy than it can absorb without injury; the source of this energy can be thermal, toxic chemicals, electricity, or radiation.)
- Closed soft-tissue injuries are characterized by a history of blunt trauma, pain at the site of injury, swelling beneath the skin, and discoloration. Contusions, hematomas, and crushing injuries are classified as closed injuries. Treat a closed soft-tissue injury by applying the mnemonic RICES: *Rest, Ice, Compression, Elevation*, and *Splinting*.
- Open injuries differ from closed injuries in that the protective layer of skin is damaged. Abrasions, lacerations, avulsions, and penetrating wounds are classified as open injuries. Treat an open soft-tissue injury by applying direct pressure with a sterile bandage using a roller bandage, and splint the extremity.
- The assessment of an open injury is generally easier than the assessment of a closed injury because you can see the injury.
- Burns are serious and painful soft-tissue injuries caused by heat (thermal), chemicals, electricity, and radiation.
- Burns are classified primarily by the depth and extent of the burn injury and the body area involved.
- Burns are considered to be superficial, partial-thickness, or full-thickness based on the depth involved.
- When providing emergency care for burns, do the following:

- ï Use standard precautions to protect yourself from potentially contaminated body fluid and to protect the patient from potential infection.
- ï Ensure you have cooled the burned area to prevent further cellular damage.
- ï Remove jewelry and constrictive clothing; never attempt to remove any synthetic material that may have melted into the burned skin.
- ï Ensure an open and clear airway, provide high-flow oxygen, and be alert to signs and symptoms of inhalation injury such as difficulty breathing, stridor, or wheezing.
- ï Place sterile dressings over the burned area(s); prevent hypothermia by covering the patient with a clean blanket. Provide prompt transport.

- Small animal and human bites can lead to serious infection and must be evaluated by a physician. Small animals can carry rabies.
- Dressings and bandages are designed to control bleeding, protect to the wound from further damage, prevent further contamination, and prevent infection.

Ch. 25 Review

- Soft-tissue injuries and fractures of the bones of the face and neck are common and vary in severity.
- In face and neck injuries, your priorities are to prevent further injury to the cervical spine, manage the airway and ventilation of the patient, and control bleeding.
- Airway compromise may be caused by heavy bleeding into the airway, swelling in and around the structures of the airway located in the face and neck, and injuries to the central nervous system that interfere with normal respiration.
- To control heavy bleeding from soft-tissue injuries to the face, use direct pressure with a dry, sterile dressing. If brain tissue is exposed, use a moist, sterile dressing.
- Always check for bleeding inside the mouth because this may produce airway obstruction.
- Open the airway using the modified jaw-thrust maneuver (when indicated), and clear the airway in all patients with facial injuries.
- Save avulsed pieces of skin and tissue, and transport them with the patient for possible reattachment at the hospital.
- Maintain a high index of suspicion for patients with unequal pupilsð this sign may indicate an illness or an injury to the brain. Remember, some people are born with one pupil larger than the other. During your assessment, ask your patient whether he or she normally has unequal pupils.
- Foreign bodies on the surface of the eye should be irrigated gently with normal saline solution. Always flush from the region of the eye closest to the nose toward the outside, away from the midline.
- If a foreign body is on the underside of the eyelid, remove it gently with a cotton-tipped applicator. Never remove foreign bodies stuck to the cornea.
- Chemicals, heat, and light rays can all cause burn injury to the eyes, resulting in permanent damage.
- Be alert to clear fluid draining from the ears or nose. This may indicate a basilar skull fracture.
- Blunt and penetrating trauma to the neck can produce life-threatening injuries. Palpate the neck for signs of subcutaneous emphysema. In patients with this sign, complete airway obstruction may develop in minutes.
- If bleeding is present from a penetrating injury, direct pressure over the site will usually control most forms of bleeding.
- Be alert to the possibility of an air embolism from an open neck injury. Place an occlusive dressing over the site, and provide direct pressure.

Ch. 26 Review

- The nervous system of the human can be divided into two parts: the central nervous system and the peripheral nervous system.

- The central nervous system consists of the brain and the spinal cord; the peripheral nervous system consists of a network of nerve fibers, like cables, that transmit information to and from the bodyôs organs to and from the brain.
- The central nervous system is well protected by bony structures; the brain is protected by the skull and the spinal cord is protected by the bones of the spinal column.
- The central nervous system is also covered and protected by three layers of tissue called the meninges. The layers are called the dura mater, the arachnoid, and the pia mater.
- A head injury is a traumatic injury to the head that may result in injury to soft tissue, bony structures, or the brain.
- A traumatic brain injury is a severe head injury that can be a life threat or leave the patient with life-altering injuries.
- The cervical, thoracic, and lumbar portions of the spinal column can be injured through compression such as in a fall, unnatural motions such as overextension from trauma, distraction such as from a hanging, or a combination of mechanisms. Each of these can also cause injury to the spinal cord encased in these regions of bone, causing permanent neurologic injury or death.
- Motor vehicle crashes, direct blows, falls from heights, assault, and sports injuries are common causes of spinal injury. A patient who has experienced any of these events may have also sustained a head injury.
- Treat the patient with a head injury according to three general principles that are designed to protect and maintain the critical functions of the central nervous system: establish an adequate airway, control bleeding, and reassess the patientôs baseline level of consciousness.
- Treat the patient with a spinal injury by maintaining the airway while keeping the spine in proper alignment, assess respirations, and give supplemental oxygen.
- In those situations in which your patient has problems with the ABCs or has other conditions for which you decide a rapid transport to the hospital is needed, rapid stabilization of the spine and quick loading into the ambulance may be indicated. Reduction of on-scene time and recognition of a critical patient increases the patientôs chances for survival or a reduction in the amount of irreversible damage.

Ch. 27 Review

- A penetrating chest injury has the potential to penetrate the lung and diaphragm and injure the liver or stomach.
- Chest injuries are classified as closed or open. Closed injuries are often the result of blunt force trauma, and open injuries are the result of some object penetrating the skin and/or chest wall.
- Blunt trauma may result in fractures to the ribs and the sternum.
- During the primary assessment, if an injury is encountered that interferes with the ability of the patient to ventilate or oxygenate, the injury must be addressed quickly.
- Any penetrating injury to the chest may result in air entering the pleural space and may cause pneumothorax. An occlusive dressing should be placed on this injury as soon as it is identified.
- When a penetrating injury creates a hole in the chest wall, you may hear a sucking sound as the patient inhales. This is called an open pneumothorax.
- A simple pneumothorax is a result of blunt trauma, such as fractured ribs.
- A spontaneous pneumothorax may be the result of rupture of a weak spot on the lung, allowing air to enter the pleural space and accumulate. This often results from nontraumatic injuries and may occur during times of physical activity such as exercise.
- A pneumothorax may progress to a tension pneumothorax and cause cardiac arrest.
- Hemothorax is the result of blood accumulating in the pleural space after a traumatic injury when the vessels of the lung are lacerated and leak blood.
- A flail chest segment is two or more ribs broken in two or more places.
- A flail chest segment should be secured with a large bulky dressing that is secured with a roller bandage, cravat, or tape.
- All patients with chest injuries should receive high-flow oxygen or ventilation with a bag-mask device.
- Pulmonary contusion, which is bruising of or injury to lung tissue after traumatic injury, may interfere with oxygen exchange in the lung tissue.
- Traumatic asphyxia is sudden, severe compression of the chest.
- Myocardial contusion is bruising of the heart muscle after traumatic injury. This condition may have the same signs and symptoms as a heart attack, including an irregular pulse. Remember that this is an injury to the heart muscle from trauma, not from a heart attack.

- Commotio cordis occurs from a direct blow to the chest during a critical portion of the patientôs heartbeat. It may result in immediate cardiac arrest.
- Cardiac tamponade is when blood collects in the space between the pericardial sac and the heart. This condition results in pressure building up inside the pericardial sac until the heart cannot pump effectively; cardiac arrest may occur quickly.
- The great vessels of the body are located in the mediastinum. These large vessels may be lacerated or tear after traumatic injury and cause heavy, unseen bleeding inside the patientôs chest cavity.
- Any patient who has signs of shock with a chest injury, even with unseen bleeding, should make you suspicious of unseen, life-threatening bleeding inside the chest cavity.

Ch. 28 Review

- Abdominal injuries are categorized as either open (penetrating trauma) or closed (blunt force trauma).
- Either classification of injury can result in injury to the hollow or solid organs of the abdomen and cause significant life-threatening bleeding.
- Blunt force trauma that causes closed injuries results from an object striking the body without breaking the skin, such as being hit with a baseball bat or when the patientôs body strikes the steering wheel during a motor vehicle crash.
- Penetrating trauma is often a result of a gunshot wound or stab wound. Other mechanisms of injury such as a fall on an object can also cause penetrating trauma to the abdomen.
- Injury to the solid internal organs often causes significant unseen bleeding that can be life threatening.
- Injury to the hollow organs of the abdomen may cause irritation and inflammation to the peritoneum as caustic digestive juices leak into the peritoneum. A serious infection may also occur over several hours.
- Always maintain a high index of suspicion for serious intra-abdominal injury in the trauma patient, particularly in the patient who exhibits signs of shock.
- Assess the abdomen for signs of bruising, rigidity, penetrating injuries, and complaints of pain.
- Never remove an impaled object from the abdominal region. Secure it in place with a large bulky dressing and provide prompt transport.
- Be prepared to treat the patient for shock. Place the patient in the modified shock position, keep the patient warm, and provide high-flow oxygen.
- Never replace an organ that protrudes from an open injury to the abdomen (evisceration). Instead, keep the organ moist and warm. Cover the injury site with a large sterile, moist, bulky dressing.
- Injuries to the kidneys may be difficult to detect because of the well-protected region of the body where they are located. Be alert to bruising or a hematoma in the flank region.
- Injury to the external genitalia of male and female patients is very painful but not usually life threatening.
- In the case of sexual assault or rape, treat for shock if necessary, and record all the facts in detail. Follow any crime scene policy established by your system to protect the scene and any potential evidence. Advise the patient not to wash, douche, or void until after a physician has examined him or her.

Ch. 29 Review

- Skeletal or voluntary muscle attaches to bone and forms the major muscle mass of the body. This muscle contains veins, arteries, and nerves.
- There are 206 bones in the human body. When this living tissue is fractured, it can produce bleeding and significant pain.
- A joint is a junction where two bones come into contact. Joints are stabilized in key areas by ligaments.
- A fracture is a broken bone, a dislocation is a disruption of a joint, a sprain is a stretching injury to the ligaments around a joint, and strain is a stretching of the muscle.
- Depending on the amount of kinetic energy absorbed by tissues, the zone of injury may extend beyond the point of contact. Always maintain a high index of suspicion for associated injuries.
- Fractures of the bones are classified as open or closed. Both are splinted in a similar manner, but remember to control bleeding and apply a sterile dressing to the open extremity injury before splinting.
- Fractures and dislocations are often difficult to diagnose without an x-ray examination. You will treat these injuries similarly. Stabilize the injury with a splint, and transport the patient.

- Signs of fractures and dislocations include pain, deformity, point tenderness, false movement, crepitus, swelling, and bruising.
- Signs of sprain include bruising, swelling, and an unstable joint.
- Compare the unaffected extremity with the injured extremity for differences whenever possible.
- There are three main types of splints used by EMTs: rigid splints, traction splints, and formable splints.
- Remember to splint the injured extremity from the joint above to the joint below the injury site for complete stabilization.
- A sling and swathe is used commonly to treat shoulder dislocations and to secure injured upper extremities to the body. Lower extremities can be secured to the unaffected limb or to a long backboard.
- The most common life-threatening musculoskeletal injuries are multiple fractures, open fractures with arterial bleeding, pelvic fractures, bilateral femur fractures, and limb amputations.

Assessment in Action

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