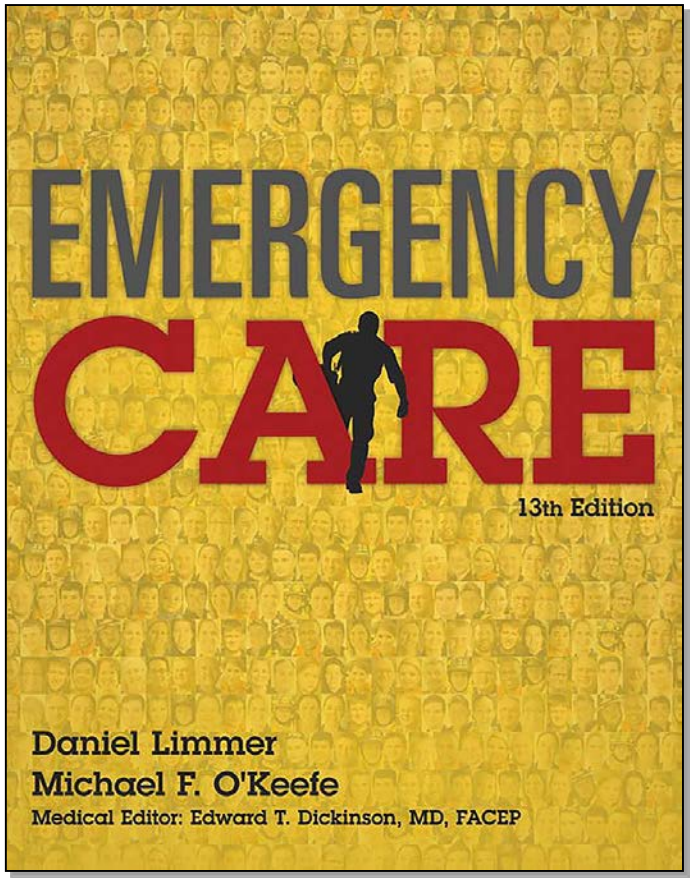
Emergency Care

THIRTEENTH EDITION



CHAPTER 25

Bleeding and Shock

Multimedia Directory

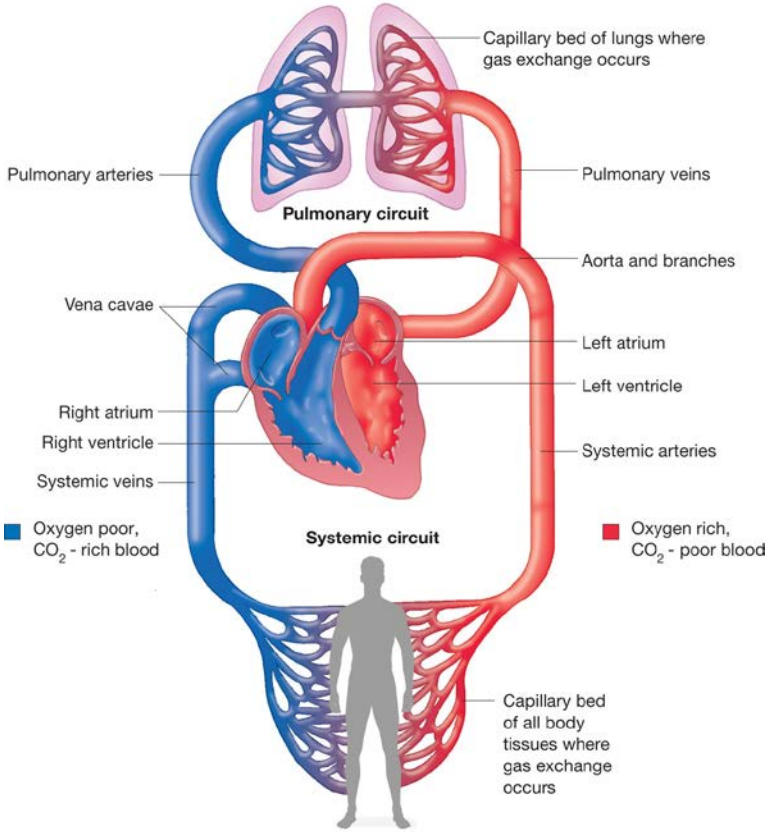
Slide 44 Hemorrhage Control Video
Slide 59 Shock Animation

Topics

- The Circulatory System
- Bleeding
- Shock (Hypoperfusion)

The Circulatory System

Circulatory System



The circulatory system.

Main Components

- Heart
- Blood vessels
- Blood

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Main Components

- Arteries
  - Carry oxygen-rich blood away from the heart
  - Comprised of thick, muscular walls that enable dilation and constriction

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Main Components

- Capillaries
  - Microscopic blood vessels
  - Vital exchange site
    - Oxygen, nutrients passed through capillary walls in exchange for carbon dioxide from cells

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Main Components

- Veins
  - Carry oxygen-depleted blood rich in carbon dioxide back to the heart
  - Contain one-way valves to prevent back flow of blood

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Main Components

- Functions of blood
  - Transportation of gases
  - Nutrition
  - Excretion
  - Protection
  - Regulation

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Main Components

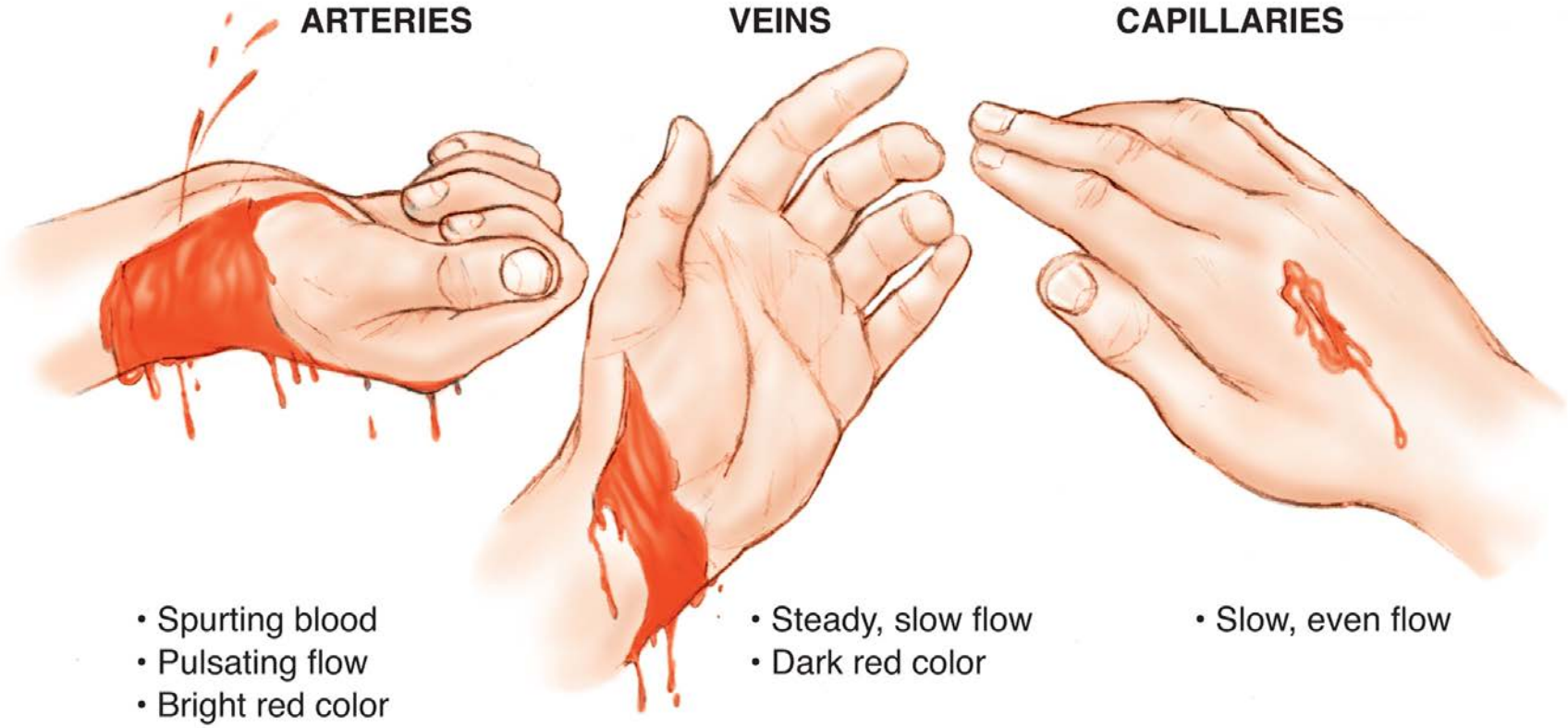
- Perfusion
  - Adequate circulation of blood throughout body
- Hypoperfusion
  - Inadequate perfusion of body's tissues and organs

Bleeding

Types of Bleeding

- Hemorrhage is severe bleeding.
  - Major cause of shock (hypoperfusion) in trauma
- External
- Internal

External Bleeding



Three types of external bleeding. Left to right, spurting to steady.

External Bleeding

- Occurs outside of body after force penetrates skin and lacerates or destroys underlying blood vessels
- Typically visible on surface of the skin
- How much a person bleeds determined by:
  - Size and severity of wound
  - Size and pressure of ruptured vessel
  - Individual's ability to clot

Massive Hemorrhage

- Arterial bleeding
  - Bright red color
  - Spurting with heartbeat
  - Oxygen rich
  - Most difficult to control

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Massive Hemorrhage

- Venous bleeding
  - Darker in color than arterial bleeding
  - Less pressure than arterial bleeding
  - Volume of blood carried by some veins can create immediately life-threatening hemorrhage

Other External Hemorrhage

- Capillary bleeding
  - Caused by superficial wounds to surface of skin
  - Slow and oozing
  - Stops spontaneously

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Other External Hemorrhage

- Bleeding can be accelerated by underlying conditions.
  - Prescription medications designed to limit body's natural ability to form blood clots
- Hypothermia affects body's ability to clot.

Think About It

- How severe is the bleeding? Is it exsanguinating hemorrhage? If so, how does that affect the priorities of treatment?

Assessment and Care of External Hemorrhage

- Must use Standard Precautions
- Ensure open airway.
- Ensure adequate breathing.

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Assessment and Care of External Hemorrhage

- Control bleeding only after assessing and treating prior elements.
  - Be aware of signs or symptoms of shock.
  - Use direct pressure, elevation, hemostatic agent, or a tourniquet to control bleeding.

Controlling External Bleeding

- Direct pressure
  - Apply firm pressure to wound with gloved hand and gauze bandage.
  - Hold pressure until bleeding is controlled.
  - If necessary, add dressings when lower ones are saturated.

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Controlling External Bleeding

- Direct pressure
  - Once bleeding is controlled, bandage a dressing firmly in place to form a pressure dressing.
  - Never remove bandages—even when bleeding is controlled.
  - When controlled, check for pulse distal to wound to make sure dressing has not been applied too tightly.

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Controlling External Bleeding

- Direct pressure
  - Pressure dressing
    - Place several gauze pads on wound.
    - Hold dressings in place with self-adhering roller bandage wrapped tightly over dressings and above and below wound site.
    - Create enough pressure to control bleeding.

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Controlling External Bleeding

- Elevation
  - Elevate injured extremity above level of the heart while applying direct pressure.
  - Do not elevate if musculoskeletal injury, impaled objects in extremity, or spine injury is suspected.

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Controlling External Bleeding

- Hemostatic agents
  - Designed to enhance direct pressure's ability to control bleeding
  - Work by applying a material design to absorb liquid portion of blood and leave larger formed elements to clot
  - Originated as powders, but does not include dressings and gauze bandages
  - Manual pressure is always necessary.

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Controlling External Bleeding

Hemostatic bandage. © *Edward T. Dickinson, MD*

Controlling External Bleeding

- Tourniquet
  - Use if bleeding is uncontrollable by direct pressure.
  - Use only on extremity injuries.
  - Always apply between the wound and the heart.

Tourniquet

The Mechanical Advantage Tourniquet (MAT).

Controlling External Bleeding

- Tourniquet
  - Follow manufacturer's instructions.
  - Once applied, do not remove or loosen.
  - Attach notation to patient alerting other providers tourniquet has been applied.

Think About It

- Is the current method of bleeding control working? Do you need to move on to a more aggressive step? How would you evaluate this?

Controlling External Bleeding

- A systematic approach to treat uncontrolled external hemorrhage
  - Recommendations from American College of Surgeons
  - Begin with direct pressure.
  - If not controlled, apply tourniquet.
  - If ineffective and wound on trunk or head, apply hemostatic dressing or bandage with direct pressure.

Other Methods of Bleeding Control

- Splinting
  - Stabilizing sharp ends of broken bones
  - Inflatable (air) splints
- Cold application
  - Minimizes swelling, constricts blood vessels, and reduces pain
  - Use in conjunction with other manual techniques.

Special Situations Involving Bleeding

- Head injury
  - From increased intracranial pressure, not direct trauma to ears or nose
  - Stopping bleeding only increases intracranial pressure.
  - Allow drainage to flow freely, using gauze pad to collect it.

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Special Situations Involving Bleeding

- Nosebleed (epistaxis)
  - Have patient sit and lean forward.
  - Apply direct pressure to fleshy portion of nostrils.
  - Keep patient calm and quiet.
  - Do not let patient lean back.
  - If patient becomes unconscious, place patient in recovery position and be prepared to suction.

Internal Bleeding

- Damage to internal organs and large blood vessels can result in loss of a large quantity of blood in short time.
- Blood loss commonly cannot be seen.
- Severe blood loss can even result from injuries to extremities.

Patient Assessment

- Mechanisms of blunt trauma that may cause internal bleeding
  - Falls
  - Motor-vehicle or motorcycle crashes
  - Auto-pedestrian collisions
  - Blast injuries

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Patient Assessment

- Common injuries from penetrating trauma
  - Gunshot wounds
  - Stab wounds
  - Impaled objects

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Patient Assessment

- Signs of internal bleeding
  - Injuries to surface of body
  - Bruising, swelling, or pain over vital organs
  - Painful, swollen, or deformed extremities
  - Bleeding from mouth, rectum, or vagina

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Patient Assessment

- Signs of internal bleeding
  - Tender, rigid, or distended abdomen
  - Vomiting coffee-grounds like substance or bright red vomitus
  - Dark, tarry stools or bright red blood in stool
  - Signs and symptoms of shock

Patient Assessment

Bruising is one sign of internal bleeding. © *Edward T. Dickinson, MD*

Patient Care

- Maintain ABCs.
- Administer high-concentration oxygen by nonrebreather mask.
- Control any external bleeding.
- Take steps to preserve body temperature.
- Provide prompt transport to appropriate medical facility.

Hemorrhage Control Video

Click on the screenshot to view a video on the subject of controlling bleeding.

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Shock (Hypoperfusion)

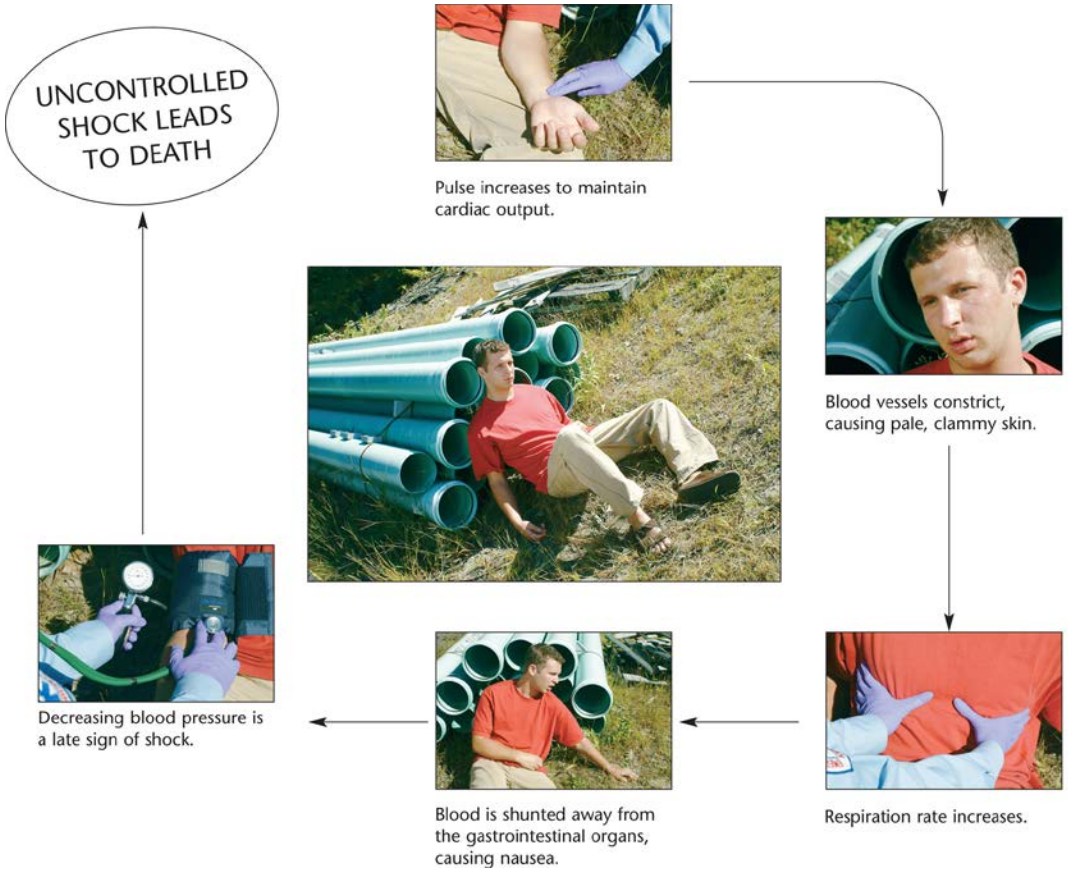
Shock (Hypoperfusion)

- Inadequate tissue perfusion
- It also causes inadequate removal of waste products from cells.

Causes of Shock

- Failure of any component of circulatory system
  - Heart
    - Loses ability to pump
  - Blood vessels
    - Dilate, making too large a "container" to fill
  - Blood
    - Loses volume from bleeding

Causes of Shock



Signs of shock will be detectable during the patient assessment.

Severity of Shock

- Compensated shock
  - Body senses the decrease in perfusion and attempts to compensate for it.
  - Early signs of shock
- Decompensated shock
  - Begins when the body can no longer compensate for low blood volume or lack of perfusion
  - Late signs of shock

Types of Shock

- Hypovolemic shock
  - Results from a decreased volume of circulating blood and plasma
  - Called hemorrhagic shock if caused by uncontrolled bleeding (internal or external)
  - Can be caused by burns or crush injuries or severe dehydration

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Types of Shock

- Cardiogenic shock
  - Seen in patients suffering myocardial infarction
  - Results from inadequate pumping of blood by heart, decreasing strength of contractions
  - Heart's electrical system may malfunction, causing heartbeat that is too slow, too fast, or irregular.

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Types of Shock

- Neurogenic shock
  - Results from uncontrolled dilation of blood vessels because of nerve paralysis
  - No blood loss, but vessels dilated so much that blood volume cannot fill them
  - Rarely seen in the field

Pediatric Note

- Infants and children
  - Efficient compensating mechanisms maintain blood pressure until half of volume is depleted
- Potential for shock must be recognized and treated before tell-tale signs appear

Patient Assessment

- Progression of the signs and symptoms of shock
  - Altered mental status
  - Pale, cool, clammy skin
  - Nausea and vomiting
  - Vital sign changes
  - Late signs of shock include thirst, dilated pupils, and sometimes cyanosis around lips and nail beds.

Emergency Care for Shock

- Transportation is an intervention.
  - Every minute between the time of injury and the patient's getting to an operating suite is, in fact, like gold to the patient—and to his chances of survival.
- Goal is *platinum 10 minutes* at the scene.
- Prevent heat loss, coagulopathy, and further blood loss.

Patient Care

- Maintain open airway and assess respiratory rate
  - Address inadequate breathing immediately and aggressively.
  - If patient is breathing adequately, apply high-concentration oxygen by nonrebreather mask.

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Patient Care

- Control any external bleeding.
- If pelvic fracture is suspected, use pelvic binding device.

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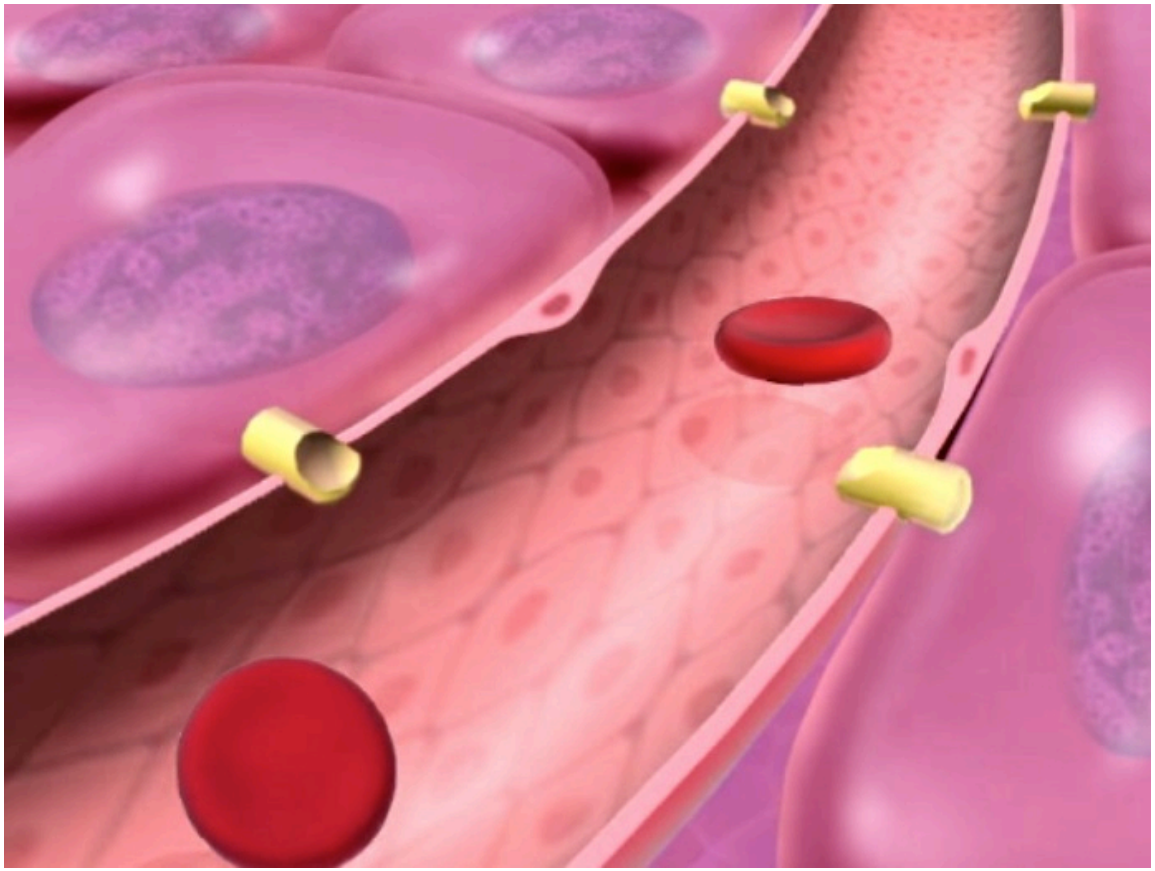
Patient Care

- Splint any suspected bone or joint injuries.
- Prevent loss of body heat.
- Transport patient immediately.
- Speak calmly and reassure throughout assessment and care.

Shock Animation



Click on the screenshot to view an animation on the subject of shock.

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Chapter Review

Chapter Review

- Almost all external bleeding can be controlled by direct pressure and elevation. When these do not work, apply a tourniquet if bleeding is on an extremity or a hemostatic dressing if the bleeding is from the head or torso.
- Emergency care for internal bleeding is based on prevention and treatment of shock.

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Chapter Review

- Early signs of shock are often restlessness, anxiety, pale skin, rapid pulse, and respirations.
- If shock is uncontrolled, the patient's blood pressure falls, late sign of shock.
- Signs and symptoms may not be evident early in the call, so treatment based on MOI may be lifesaving.

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Chapter Review

- Treat shock by maintaining the airway, administering high-concentration oxygen, controlling bleeding, and keeping the patient warm. One of most important treatments is early recognition of shock and immediate transport to a hospital.

Remember

- The circulatory system is designed to ensure adequate perfusion of body tissues.
- The classification of hemorrhage is directly related to the type of vessel ruptured and the pressure within that vessel.

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Remember

- Treatment of external hemorrhage includes progression through the following steps: direct pressure, elevation, tourniquet application, use of hemostatic agents.
- Internal bleeding is impossible to evaluate. The most appropriate treatment must be rapid transport to an appropriate facility.

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Remember

- Shock develops if the heart fails, blood volume is lost, or blood vessels dilate, resulting in inadequate perfusion.
- Signs of shock reflect the body's attempts at compensating for inadequate perfusion.

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Remember

- The most significant treatment for the shock patient is early recognition and prompt transport to a hospital where the patient will receive definitive care.

Questions to Consider

- What can I use for a tourniquet that will control bleeding but not damage tissue?
- When treating a patient with shock, what should I do at the scene and what should I do en route to the hospital?

Questions to Consider

- Is a patient with pale, cool skin, tachycardia, and rapid, shallow respirations in shock or just under stress? How will continuing assessment help in making that decision?

Critical Thinking

- A patient has been involved in a motor-vehicle collision. There is considerable damage to the vehicle. The steering column and wheel are badly deformed. The patient complains of a "sore chest." You note no external bleeding.

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Critical Thinking

- The patient's vital signs are pulse 116, respirations 20, blood pressure 106/70. How would you proceed to assess and care for this patient?