

# Emergency

Care and Transportation of the Sick and Injured



Section 5: Trauma

## 22: Bleeding

# **Cognitive Objectives** (1 of 2)

- 5-1.1 List the structure and function of the circulatory system.
- 5-1.2 Differentiate between arterial, venous, and capillary bleeding.
- 5-1.3 State methods of emergency medical care of external bleeding.
- 5-1.4 Establish the relationship between body substance isolation and bleeding.
- 5-1.5 Establish the relationship between airway management and the trauma patient.

# **Cognitive Objectives** (2 of 2)

- 5-1.6 Establish the relationship between mechanism of injury and internal bleeding.
- 5-1.7 List the signs of internal bleeding.
- 5-1.8 List the steps in the emergency medical care of the patient with signs and symptoms of internal bleeding.

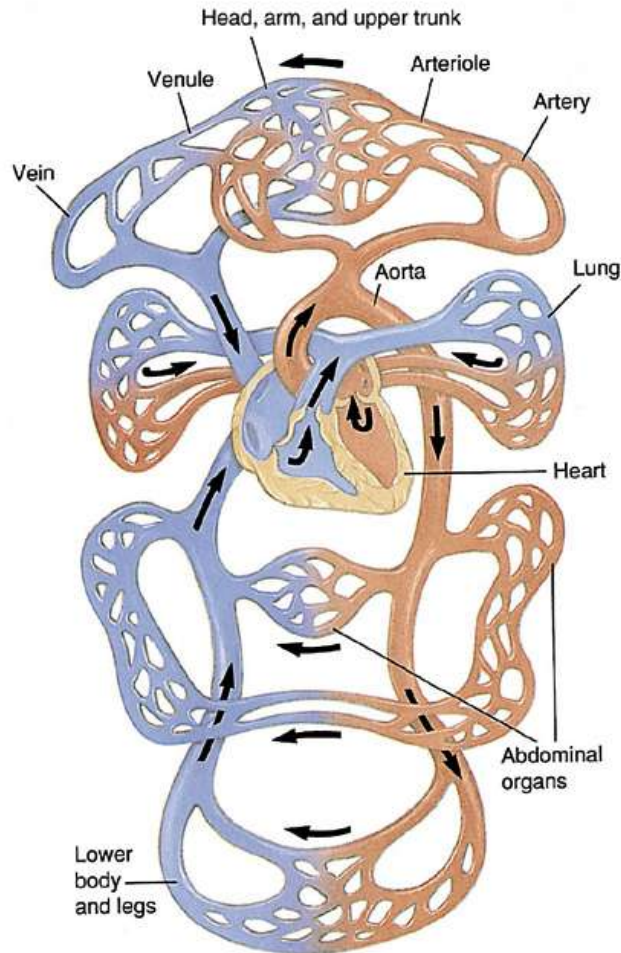
# Affective Objectives

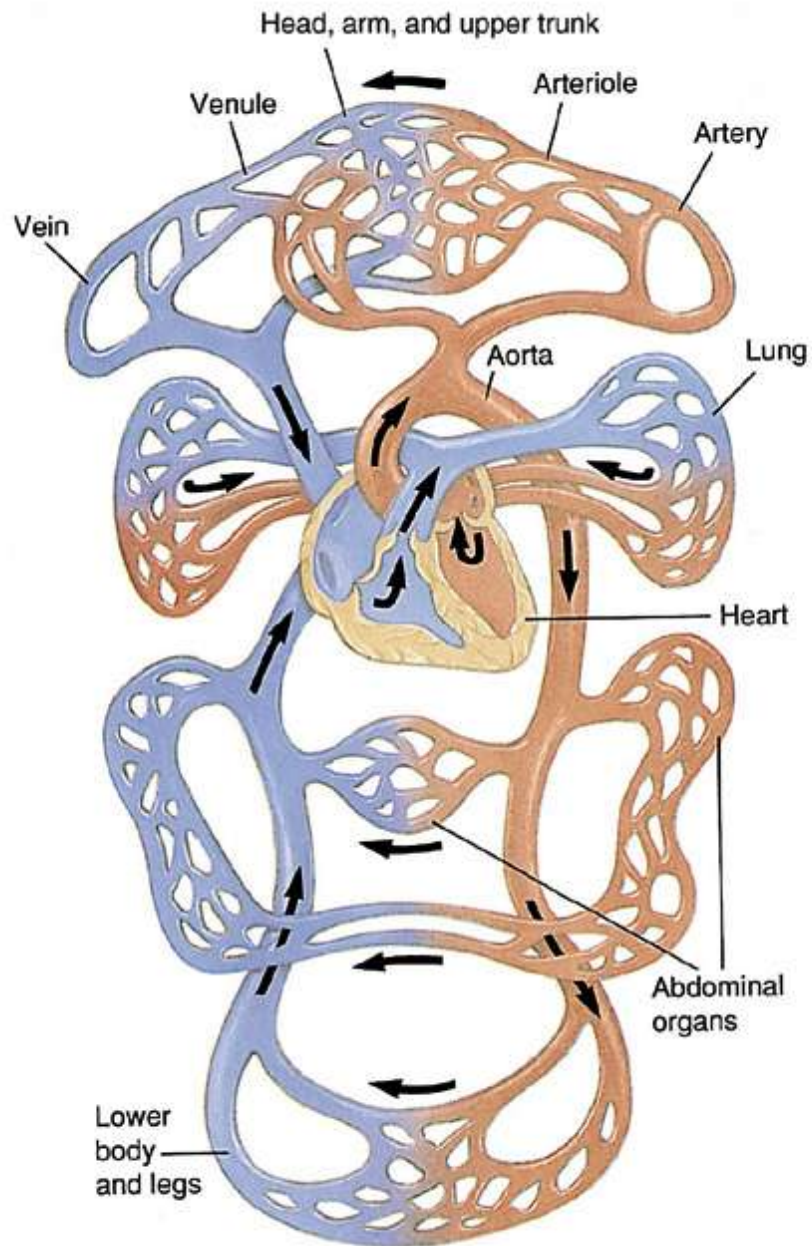
5-1.11 Explain the sense of urgency to transport patients who are bleeding and show signs of shock (hypoperfusion).

# Psychomotor Objectives

- 5-1.12 Demonstrate direct pressure as a method of emergency medical care of external bleeding.
- 5-1.13 Demonstrate the use of diffuse pressure as a method of emergency medical care of external bleeding.
- 5-1.14 Demonstrate the use of pressure points and tourniquets as a method of emergency medical care of external bleeding.
- 5-1.15 Demonstrate the care of the patient exhibiting signs and symptoms of internal bleeding.

# Cardiovascular System



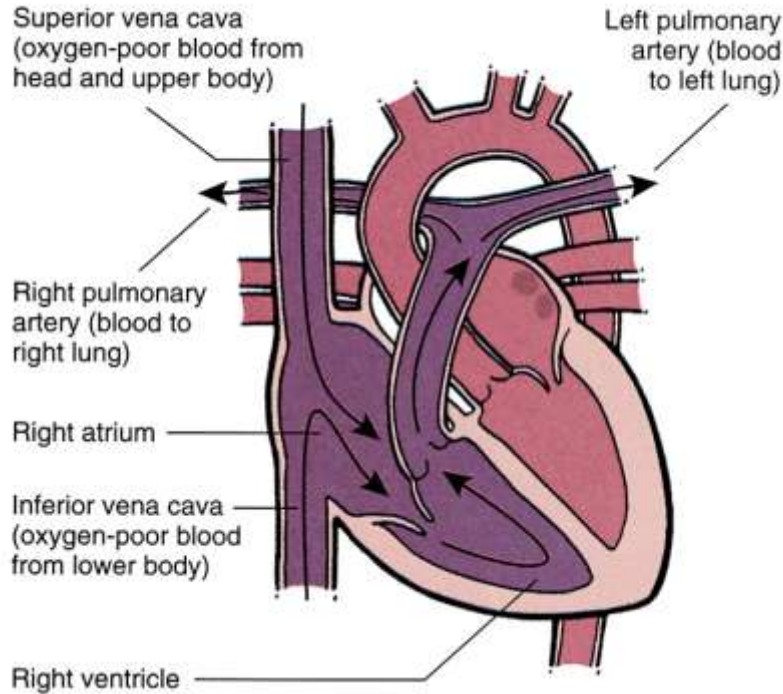


# Cardiovascular System

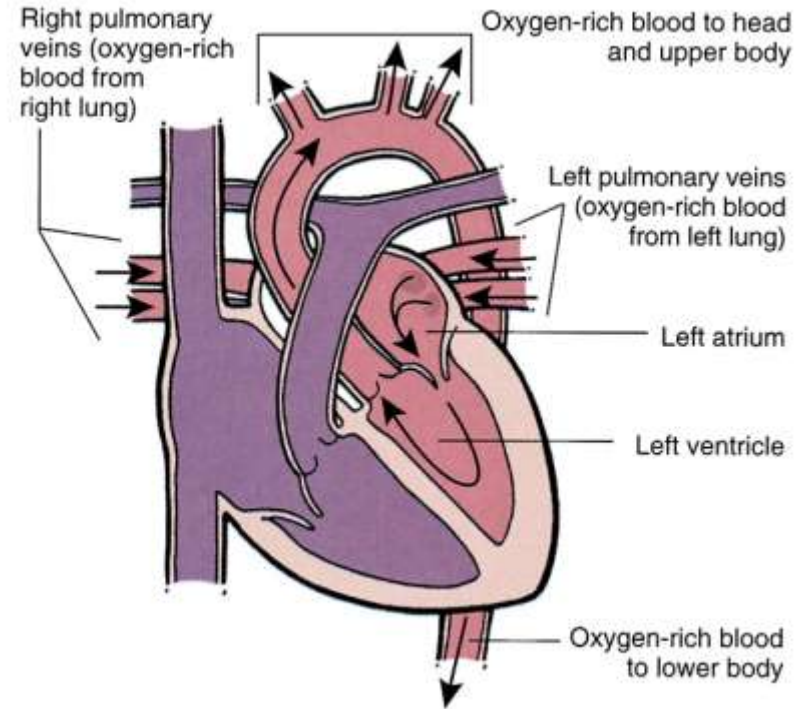
# Anatomy of the Cardiovascular System

- The cardiovascular system is responsible for supplying and maintaining adequate blood supply flow.
- Consists of three parts:
  - Heart (pump)
  - Blood vessels (container)
  - Blood and body fluids (fluids)

# The Heart



Right Side



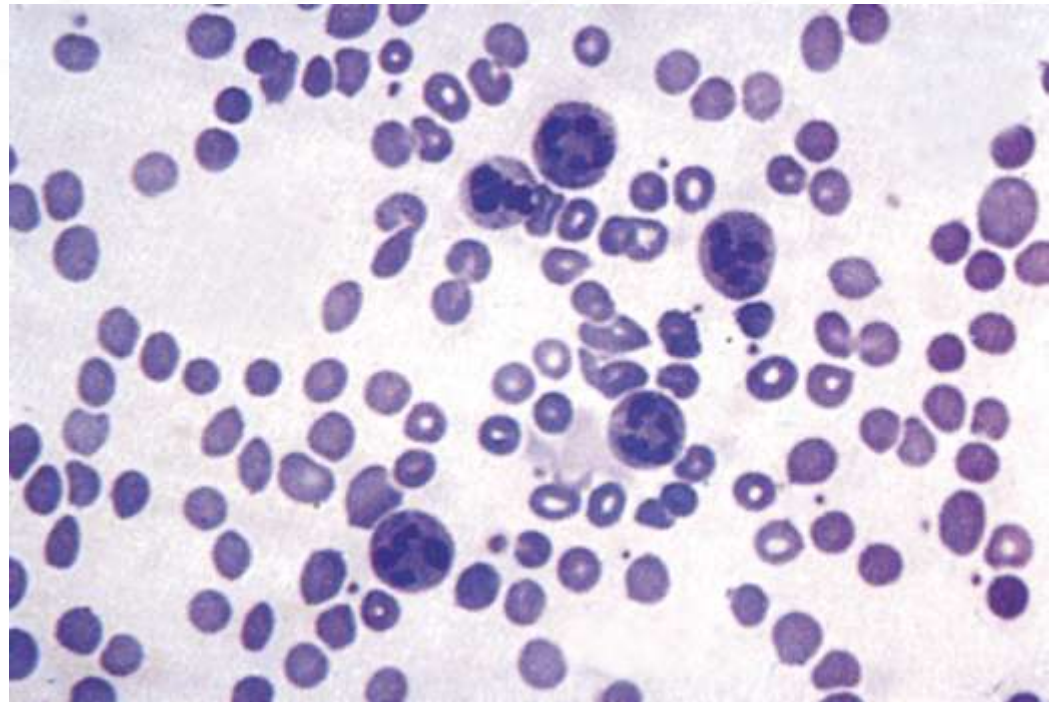
Left Side

# **Blood Vessels**

- Arteries
- Arterioles
- Capillaries
- Venules
- Veins

# Blood

- Contains:
  - Red blood cells
  - White blood cells
  - Platelets
  - Plasma



## Perfusion (1 of 2)

- Circulation within tissues in adequate amounts to meet the cells' needs for oxygen, nutrients, and waste removal
- Some tissues and organs need a constant supply of blood while others can survive on very little when at rest.

## **Perfusion** (2 of 2)

- The heart demands a constant supply of blood.
- The brain and spinal cord can survive for 4 to 6 minutes without perfusion.
- The kidneys may survive 45 minutes.
- The skeletal muscles may last 2 hours.

# External Bleeding

- Hemorrhage = bleeding
- Body cannot tolerate greater than 20% blood loss.
- Blood loss of 1 L can be dangerous in adults; in children, loss of 100-200 mL is serious.

# The Significance of Bleeding

- The body will not tolerate an acute blood loss of greater than 20% of the blood volume.
- In the typical adult, 20% is 1 liter or 2 pints.
- A 1-year-old infant typically has 800 mL. A loss of 200 mL is significant.

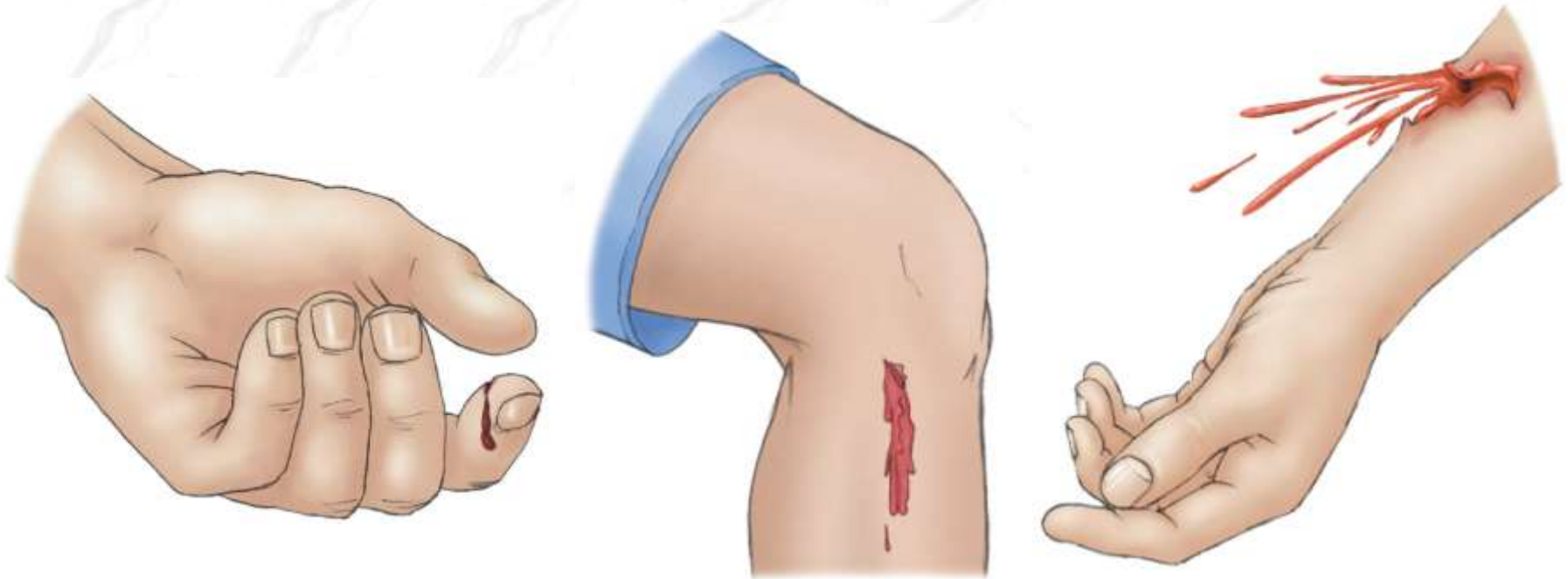
# Conditions With Possible Serious Bleeding

- Significant mechanism of injury
- Poor general appearance of patient
- Assessment reveals signs of shock
- Significant amount of blood loss noted
- Blood loss is rapid.
- You cannot control external bleeding.

# Characteristics of Bleeding (1 of 2)

- Arterial
  - Blood is bright red and spurts.
- Venous
  - Blood is dark red and does not spurt.
- Capillary
  - Blood oozes out and is controlled easily.

# Characteristics of Bleeding (2 of 2)



# Blood Clotting

- Bleeding normally stops within 10 minutes.
- Some medications interfere with clotting.
- Some injuries will be unable to clot.
- Patients with hemophilia lack clotting factors.

**You are the Provider**

- You and your EMT-B partner are dispatched to a cabinet-making shop to a traumatic injury.
- You find a conscious, alert, oriented 27-year-old man bleeding heavily from his left arm.
- He states that he was working with a band saw when he slipped and ran into the blade.
- He is holding a red rag against the wound; it is bright red.

## You are the Provider

(continued)

- What precautions must you take in the scene size-up?
- What type of bleeding is this?
- Should you start oxygen therapy?
- During the initial assessment, when do you control bleeding?
- How would you control the bleeding?

**Scene Size-up**

- Follow BSI precautions; bleeding is present.
- Thorough hand washing between patients and after runs is important.
- Look for hazards.
- Request law enforcement for violent incidents.

**You are the Provider****(continued)**

- Patient has patent airway; no signs of respiratory distress.
- You start oxygen therapy via nonrebreathing mask at 10–15 L/min. Lung sounds are equal bilaterally.
- You quickly dress with wound with a bulky dressing.
- Radial pulse is rapid and weak. Skin is pale, cool, and moist.

## You are the Provider

(continued)

- What is your transport decision?
- What should you do with the dressing as it continues to saturate with blood?

**Initial Assessment**

- Do not be distracted by bleeding.
- In some cases, significant bleeding may need to be controlled even before applying oxygen.
- General impression
  - Use AVPU. Note any bleeding.

# **Airway and Breathing**

- Ensure clear airway with adequate breathing.
- Check breath sounds.
- Consider high-flow oxygen via nonrebreathing mask with assisted ventilations.
- Consider spinal stabilization.

# Circulation

- Quickly assess pulse rate and quality.
- Determine skin condition, color, and temperature.
- Control significant bleeding.
- Treat for shock.

# Transport Decision

- Transport rapidly if:
  - Patient has airway or breathing problems
  - Patient has significant bleeding
  - Patient has signs and symptoms of internal bleeding
- Watch for tachycardia, tachypnea, low blood pressure, and circulatory collapse.

**You are the Provider****(continued)**

- You apply additional dressings to the blood-soaked ones and continue to hold direct pressure.
- Provide rapid transport.
- In the ambulance:
  - Respirations of 24 breaths/min
  - Slightly dilated and sluggish pupils
  - Pale, cool, clammy skin
  - Patient states he is going to vomit.

**You are the Provider****(continued)**

- What do the patient's signs and symptoms suggest?
- Describe your continued care of the patient in the ambulance.

**Focused History and Physical Exam**

- Rapid physical exam versus focused physical exam
- Treat life-threatening injuries immediately.
- With significant trauma, look for fractures or other problems.
- Do not delay transport.
- Obtain baseline vital signs.
  - Pupillary changes may indicate bleeding inside the skull.
- Obtain SAMPLE history.

# **Interventions**

- With significant bleeding, provide high-flow oxygen.
- Control bleeding.
- Using multiple methods to control bleeding usually works best.
- Treat aggressively for shock.
- Provide rapid transport.

**Detailed Physical Exam**

- Consider once obvious life threats are corrected and focused history and physical exam has identified hidden injuries.
- Important in patients with significant trauma
- May be impractical

**Ongoing Assessment**

- Reassess interventions and treatment.
- With severe bleeding, take vital signs every 5 minutes.
- Communication and documentation
  - Recognize, estimate, and report amount of blood loss and how rapidly and during what time it occurred.
  - Paperwork must reflect all injuries and care you provided.

# **Controlling External Bleeding**

- Follow BSI precautions.
- Ensure patient has an open airway and adequate breathing.
- Provide oxygen if necessary.
- There are several methods to control bleeding.

# Direct Pressure and Elevation

- Direct pressure is the most common and effective way to control bleeding.
- Apply pressure with gloved finger or hand.
- Elevating a bleeding extremity often stops venous bleeding.
- Use both direct pressure and elevation whenever possible.
- Apply a pressure dressing.



# Direct Pressure and Elevation

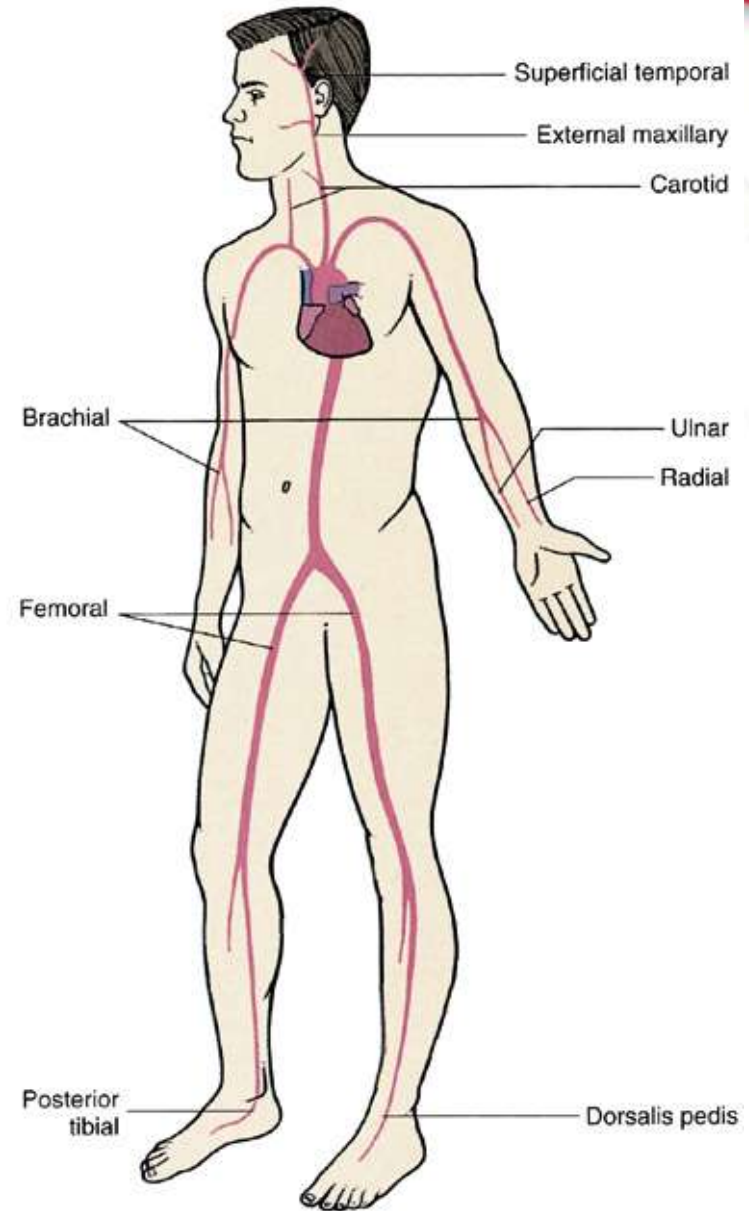


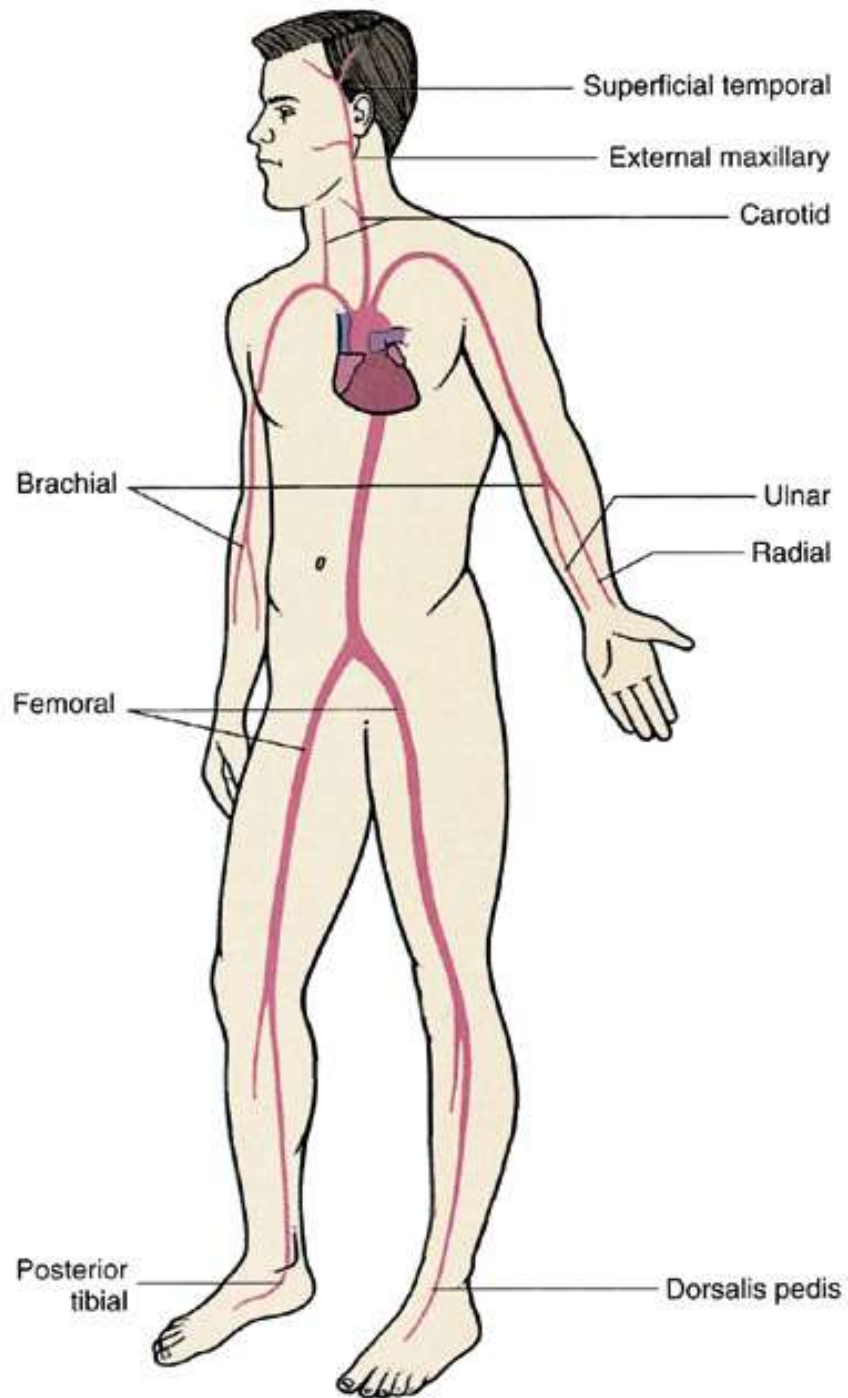
# Pressure Points

- If bleeding continues, apply pressure on pressure point.
- Pressure points are located where a blood vessel lies near a bone.
- Be familiar with the location of pressure points.



# Location of Pressure Points





# Splints

- Splints can help control bleeding associated with a fracture.
- Air splints can be used to control bleeding of soft-tissue injuries.



# **Pneumatic Antishock Garment (PASG)**

- Stabilizes fractures of the pelvis and proximal femurs
- Controls significant internal bleeding
- Controls massive soft-tissue bleeding of the lower extremities
- Refer to local protocol.

# **PASG Contraindications**

- Pregnancy
- Pulmonary edema
- Acute heart failure
- Penetrating chest injuries
- Groin injuries
- Major head injuries
- Less than 30 minute transport time

# Application of PASG

- Apply the garment so the top is below the lowest rib.
- Enclose both legs and the abdomen.
- Open the stopcocks.
- Inflate with the foot pump.
- Check patient's vital signs.



# Applying a Tourniquet

- Fold a triangular bandage into 4" cravat.
- Wrap the bandage.
- Use a stick as a handle to twist and secure the stick.
- Write "TK" and time. Place on patient.



# Tourniquet Precautions

- Place as close to injury as possible, but not over joint.
- Never use narrow material.
- Use wide padding under the tourniquet.
- Never cover a tourniquet with a bandage.
- Do not loosen the tourniquet once applied.

# Bleeding from the Nose, Ears, and Mouth

- Causes:
  - Skull fractures
  - Facial injuries
  - Sinusitis
  - High blood pressure
  - Coagulation disorders
  - Digital trauma

# Controlling a Nosebleed

- Follow BSI precautions.
- Help the patient sit and lean forward.
- Apply direct pressure by pinching the patient's nostrils.
  - Or place a piece of gauze bandage under the patient's upper lip and gum.
- Apply ice over the nose.
- Provide transport.



# Bleeding from Skull Fractures

- Do not attempt to stop the blood flow.
- Loosely cover bleeding site with sterile gauze.
- If cerebrospinal fluid is present, a target (or halo) sign will be apparent.



# Bleeding from Skull Fractures



# Internal Bleeding

- Internal bleeding may not be readily apparent.
- Assess patient's:
  - Mechanism of injury
  - Nature of illness

# **Signs and Symptoms of Internal Bleeding** (1 of 2)

- Ecchymosis: Bruising
- Hematoma: Bleeding beneath the skin
- Hematemesis: Blood in vomit
- Melena: Black, tarry stool

# **Signs and Symptoms of Internal Bleeding (2 of 2)**

- Hemoptysis: Coughing up blood
- Pain, tenderness, bruising, guarding, or swelling
- Broken ribs, bruises over the lower chest, or rigid, distended abdomen

# Signs of Hypoperfusion

- Change in mental status
- Tachycardia
- Weakness
- Thirst
- Nausea or vomiting
- Cold, moist skin
- Shallow, rapid breathing
- Dull eyes
- Dilated pupils
- Weak, rapid pulse
- Decreased blood pressure
- Altered level of consciousness

**Scene Size-up**

- Be alert for hazards.
- Look for indications of nature of illness or mechanism of injury.
- Consider spinal stabilization.
- Consider ALS backup.

**Initial Assessment**

- Form general impression.
- Address life threats.
- Determine level of consciousness.
- Provide high-flow oxygen or assist ventilations with a BVM device.
- Assess pulse and skin.
- Treat for shock.
- Control bleeding.
- Assessment of ABCs and life threats will determine transport priority.

**Focused History and Physical Exam**

- Internal bleeding is found in both medical and trauma patients.
- Perform a rapid physical exam or focused physical exam depending on type of patient.
- Obtain vital signs, history.

**Detailed Physical Exam**

- Perform if:
  - Patient is unstable.
  - Problems persist.
  - Time permits.

**Ongoing Assessment**

- Reassess vital signs and interventions.
- Signs and symptoms of internal bleeding are often slow to present.
- Children will compensate well for blood loss, then crash quickly.

# **Emergency Medical Care**

- Follow BSI precautions.
- Maintain airway and administer oxygen.
- Control external bleeding and care for any internal bleeding.
- Monitor and record vital signs.
- Elevate legs and keep patient warm.
- Transport immediately.