Chapter 19 – Blood Vessels

Assume someone has been injured in an automobile accident and is bleeding profusely. What pressure points could you compress to help stop the bleeding from the following areas?

________________________ Thigh
________________________ Forearm
________________________ Calf
________________________ Lower jaw
________________________ Thumb
________________________ Plantar surface of foot
________________________ Temple
________________________ Ankle

Please match the terms pertaining to blood vessels to the appropriate description. Some letters may be used more than once.

A. Arteries  C. Capillaries  E. Elastic  H. Venous sinuses  G. Muscular  I. Veins
B. Arterioles  D. Venules

____ Transport blood away from heart
____ Largest arteries, low resistance
____ Arteries with thickest muscle layer; active in vasoconstriction
____ Control blood flow into individual capillary beds
____ Lumen is the size of one red blood cell
____ Vessels formed when capillaries unite
____ Vessels with thin walls and large lumens that often appear collapsed in histologic preparations (slides)
____ Sometimes referred to as "conducting" arteries
____ Artery type that accounts for most of the named arteries studied in this class

Please match the descriptions with the correct term below.

____ Expansion and recoil of an artery during heart activity
____ Pressure exerted by the blood against the blood vessel walls
____ The product of these factors yields blood pressure
____ Event primarily responsible for peripheral resistance
____ Blood pressure during heart contraction
____ Blood pressure during heart relaxation
____ Site where blood pressure determinations are normally made
____ Points at the body surface where the pulse may be felt
____ Sounds heard over a blood vessel when the vessel is partially compressed


What effects do the following factors have on blood pressure? Use an “I” to indicate an increase in pressure and a “D” to indicate a decrease in pressure.

____ Increased diameter of the arterioles
____ Increased blood viscosity
____ Increased cardiac output
____ Increased pulse rate
____ Anxiety, fear
____ Increased urine output
____ Sudden change in position from reclining to standing
____ Physical exercise
____ Physical training
____ Alcohol
____ Hemorrhage
____ Nicotine
____ Arteriosclerosis
____ Stimulation of arterial baroreceptors
____ Stimulation of carotid body chemoreceptors
____ Release of epinephrine from adrenal medulla
____ Secretion of antidiuretic hormone
____ Secretion of NO
____ Renin/angiotensin mechanism
____ Secretion of aldosterone
Please choose the vessel type (arteries, capillaries, veins) with the indicated characteristic.

_____________________________ Highest total cross-sectional area  __________________________ Lowest velocity of blood flow
_____________________________ Highest velocity of blood flow  __________________________ Lowest blood pressure

Please match the arteries to their correct description below.

A. Anterior tibial  B. Aorta  C. Brachial  D. Brachiophepatic  E. Celiac trunk  F. Common carotid  G. Common iliac  
O. Intercostals  P. Internal carotid  Q. Internal iliac  R. Fibular  S. Phrenic  T. Posterior tibial  U. Radial  
V. Renal  W. Subclavian

____ _____ Two arteries formed by the division of the brachiophepatic artery  
____ _____ First branches off the ascending aorta; serve the heart  
____ _____ Two paired arteries serving the brain  
____ _____ Largest artery of the body  
____ _____ Arterial network on the dorsum of the foot  
____ _____ Serves the posterior thigh  
____ _____ Supplies the diaphragm  
____ _____ Splits to form the radial and ulnar arteries  
____ _____ Auscultated to determine blood pressure in the arm  
____ _____ Supplies the last half of the large intestine  
____ _____ Serves the pelvis  
____ _____ External iliac becomes this artery on entering the thigh  
____ _____ Major artery serving the arm  
____ _____ Supplies the small intestine and part of the large intestine  
____ _____ Terminal branches of the dorsal, or descending, aorta  
____ _____ Arterial trunk that has three major branches, which serve the liver, spleen, and stomach  
____ _____ Major artery serving the tissues external to the skull  
____ _____ _____ _____ Three arteries serving the leg  
____ _____ Artery generally used to feel the pulse at the wrist

Please match the veins to their correct description below.

A. Anterior tibial  B. Posterior tibial  C. Brachiophepatic  D. Cardiac  E. Cephalic  
F. Common iliac  G. Gastric  H. Gonadal  I. Hepatic  J. Hepatic portal  
K. Inferior mesenteric  L. Inferior vena cava  M. Internal jugular  N. Radial  
O. Renal  P. Subclavian  Q. Internal iliac  R. Superior mesenteric  S. Superior vena cava  
T. Ulnar

____ _____ Deep veins; drain the forearm  
____ _____ Receives blood from the arm via the axillary vein  
____ _____ Drains venous blood from the myocardium of the heart into the coronary sinus  
____ _____ Drains the dural sinuses of the brain  
____ _____ Join to become the superior vena cava (2)  
____ _____ Carries nutrient-rich blood from the digestive organs to the liver for processing  
____ _____ Superficial vein that drains the lateral aspect of the arm  
____ _____ _____ _____ Three veins that form/empty into the hepatic portal vein  
____ _____ Formed by the union of the external and internal iliac veins  
____ _____ Drains the kidney  
____ _____ Drains the ovaries or testes  
____ _____ Drains the liver  
____ _____ Largest vein inferior to thorax  
____ _____ _____ _____ Drain the leg and foot
The figure below illustrates the major systemic arteries of the body. Color the arteries red, and label the arteries indicated by the leader lines.
The figure below illustrates the major systemic veins of the body. Color the veins blue, and label the veins indicated by the leader lines.
Blood flows from high to low pressure. Hence, it flows from the high-pressure arteries through the capillaries and then through the low-pressure veins. Because blood pressure contributes less to blood propulsion in veins, special measures are required to ensure that venous return equals cardiac output. What role do the venous valves play?

Briefly explain why veins are called blood reservoirs and state where in the body venous blood reservoirs are most abundant.

Briefly explain why blood flow in large, thick-walled arteries, such as the aorta and its branches, is fairly continuous and does not stop when the heart relaxes.

The figure below shows the major arteries of the head and neck. Note that the clavicle is omitted and that dashed lines represent deeper vessels. Please color code and color the following vessels.

- Brachiocephalic
- Costocervical trunk
- External carotid
- Facial
- Occipital
- Internal carotid
- Vertebral
- Internal thoracic
- Lingual
- Maxillary
- Superior thyroid
- Ophthalmic
- Right common carotid
- Right subclavian
- Superficial temporal
- Thyrocervical trunk

![Diagram of major arteries of the head and neck](image-url)
The figure below shows the venous drainage of the head. Color code and color each of the drainage veins individually. Label each of the dural venous sinuses that has a leader line, but color all the dural sinuses yellow. Note that the clavicle has been omitted.

Dural venous sinuses
- Cavernous sinus
- Inferior sagittal sinus
- Straight sinus
- Superior sagittal sinus
- Transverse sinus

Drainage veins
- Brachiocephalic
- External jugular
- Facial
- Internal jugular
- Middle thyroid
- Ophthalmic
- Superficial temporal
- Superior thyroid
- Vertebral
- Subclavian
Clinical Applications – Chapter 19 (Blood Vessels)

1) Why shouldn't a pregnant woman sleep on her back late in pregnancy?

2) When an entire capillary bed is closed off due to arteriolar vasoconstriction, are the precapillary sphincters open or closed? What is the pattern of blood flow into the capillaries when the arteriole dilates? From this, explain why the face flushes when coming inside on a cold day.

3) Standing up quickly after being in a horizontal position can cause dizziness. Why is this more likely in a warm room than in a cool room?

4) Your friend, who knows very little about science, is reading a magazine article about a patient who had an "aneurysm at the base of his brain that suddenly grew much larger." The surgeons' first goal was to "keep it from rupturing" and the second goal was to "relieve the pressure on the brain stem and cranial nerves." The surgeons were able to "replace the aneurysm with a section of plastic tubing," so the patient recovered. Your friend asks you what all this means, and why the condition is life-threatening. What would you tell him?

5) Mr. Brown was distracted while trying to fell a large tree. His power saw whipped around and severed his right arm at the shoulder. Without a limb stump, applying a tourniquet is impossible. Where would you apply pressure to save Mr. Brown from fatal hemorrhage?
6) A routine scan on an elderly man reveals partial occlusion of the internal carotid artery, yet blood supply to his cerebrum is unimpaired. What are two possible causes of the occlusion? What compensatory mechanism is maintaining blood supply to the brain?

7) A patient with a bone marrow cancer is polycythemic. Will his blood pressure be high or low? Why?

8) Mr. Grimaldi was previously diagnosed as having a posterior pituitary tumor that causes hypersecretion of ADH. He comes to the clinic regularly to have his blood pressure checked. Would you expect his BP to be chronically elevated or depressed? Why?

9) Examination of Mr. Cummings, a man in his 60s, reveals a blood pressure of 140/120. What is his pulse pressure? Is it normal, high, or low? What does this indicate about the state of his elastic arteries?

10) A man in his 40s was diagnosed as hypertensive. Dietary changes and exercise have helped, but his blood pressure is still too high. Explain to him why his doctor recommended beta Mocker and diuretic drugs to treat his condition.

11) Sidney received a small but deep cut from broken glass in the exact midline of the anterior side of his distal forearm. He worried that he would bleed to death because he had heard stories about people committing suicide by slashing their wrist. Judge if Sid's fear of death is justified and explain your reasoning.