



Major Body Arteries

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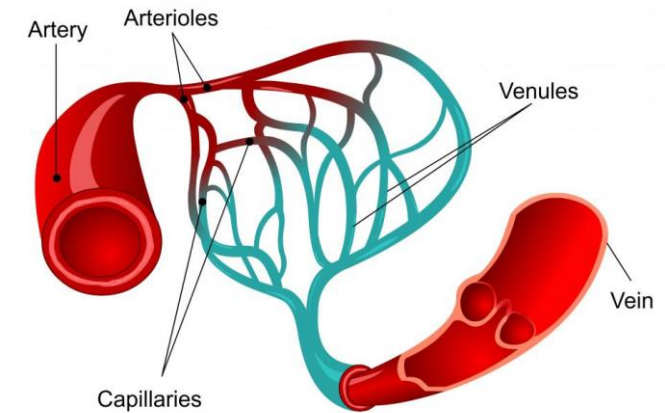
Objectives



- Define the artery and understand the general principle of the arterial system.
- Describe the aorta and its divisions and list the branches from each part.
- List major arteries and their distribution in the head & neck, thorax, abdomen and upper & lower limbs.
- List main sites of arterial pulsation.
- Define arterial anastomosis, describe its significance and list the main sites of anastomosis.
- Define end arteries and give examples.

Introduction

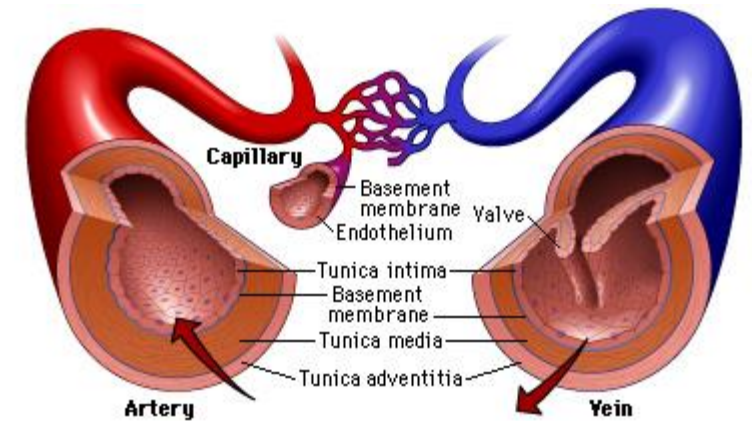
- Blood vessels are the part of the circulatory system that transports blood throughout the human body.
- There are three major types of blood vessels:
 - **Arteries**, which carry the blood away from the heart.
 - **Capillaries**, which enable the actual exchange of water and chemicals between the blood and the tissues.
 - **Veins**, which carry blood from the capillaries back toward the heart.
- The word vascular, meaning relating to the blood vessels, is derived from the Latin vas, meaning vessel.
 - Avascular refers to being without (blood) vessels.



wiseGEEK

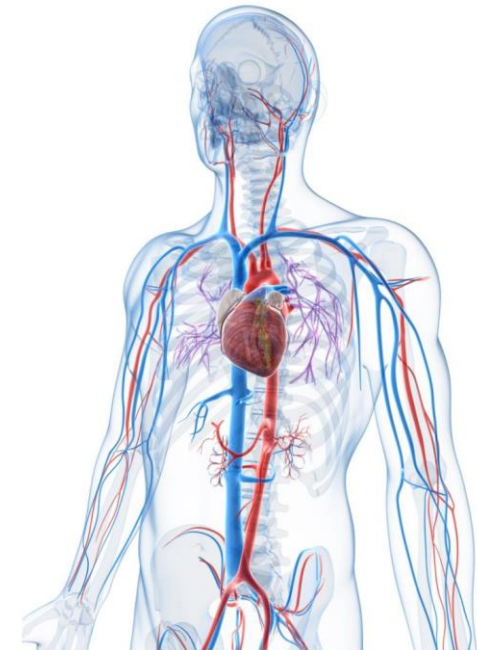
Microscopic Structure

- The arteries and veins have three layers, but the middle layer is thicker in the arteries than it is in the veins:
 - **Tunica Intima** (the thinnest layer): a single layer of simple squamous endothelial cells.
 - **Tunica Media** (the thickest layer in arteries): is made up of smooth muscle cells and elastic tissue.
 - **Tunica Adventitia** (the thickest layer in veins) entirely made of connective tissue.
- Capillaries consist of little more than a layer of endothelium and occasional connective tissue.



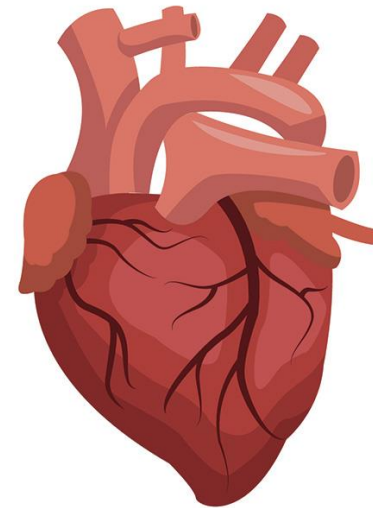
Arteries

- Arteries carry blood away from the heart.
- All arteries, carry oxygenated blood.
 - except the pulmonary and umbilical arteries, which carry deoxygenated blood to the lungs and to the placenta respectively
- The flow of blood depends on the pumping action of the heart.
- There are no valves in the arteries.
- The branches of arteries supplying adjacent areas normally.
 - anastomose with one another freely providing backup routes for blood to flow if one link is blocked.



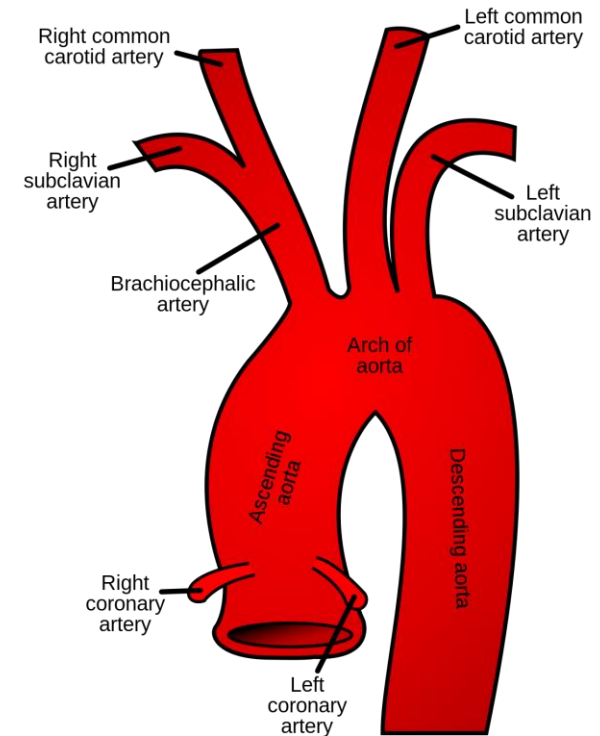
Aorta

- It is the largest artery in the body.
- Originates from the left ventricle.
- It is divided into 4 parts.
- It carries oxygenated blood to all parts of the body.



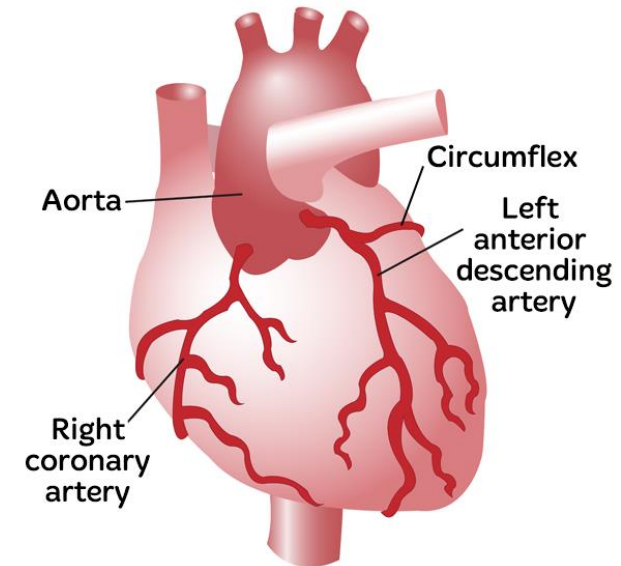
Divisions of Aorta

- Ascending Aorta
- Arch of Aorta
- Descending
 - Thoracic Aorta
 - Abdominal Aorta



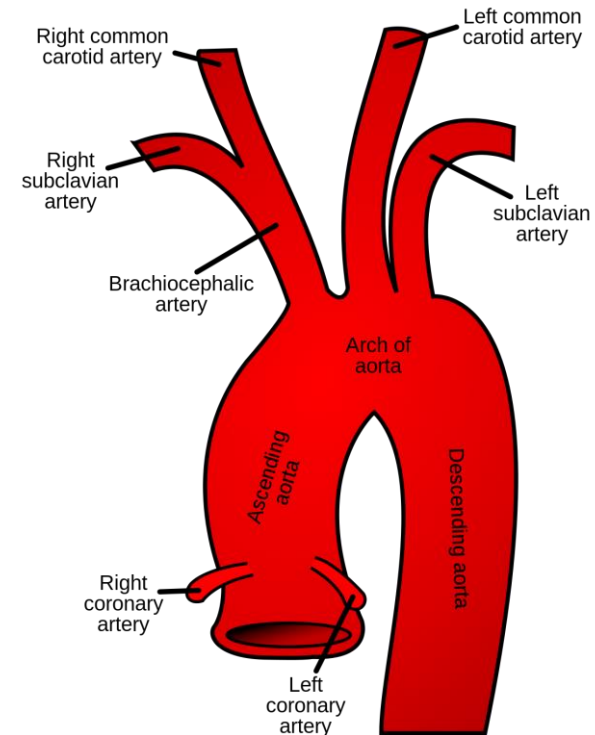
Ascending Aorta

- Originates from left ventricle.
- Continuous as aortic arch.
- Branches:
 - Coronary system
 - Right and left coronary arteries
 - Supply the heart



Arch of Aorta

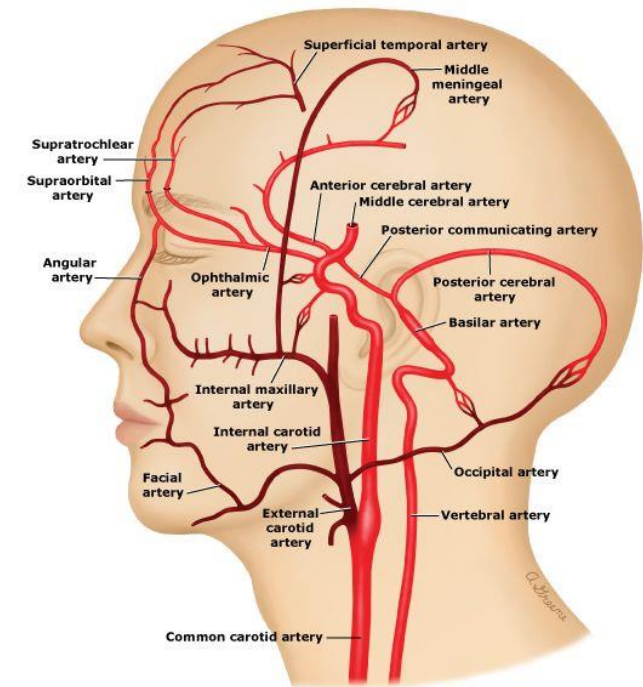
- Originates from left ventricle.
- Continuation of the ascending aorta.
- Leads to descending thoracic aorta.
- Located behind the lower part of manubrium sterni and on the left side of trachea.
- Branches:
 - Left Subclavian artery
 - Left Common Carotid artery
 - Brachiocephalic trunk
 - Right Subclavian artery
 - Right Common Carotid artery



ARTERIES OF HEAD & NECK

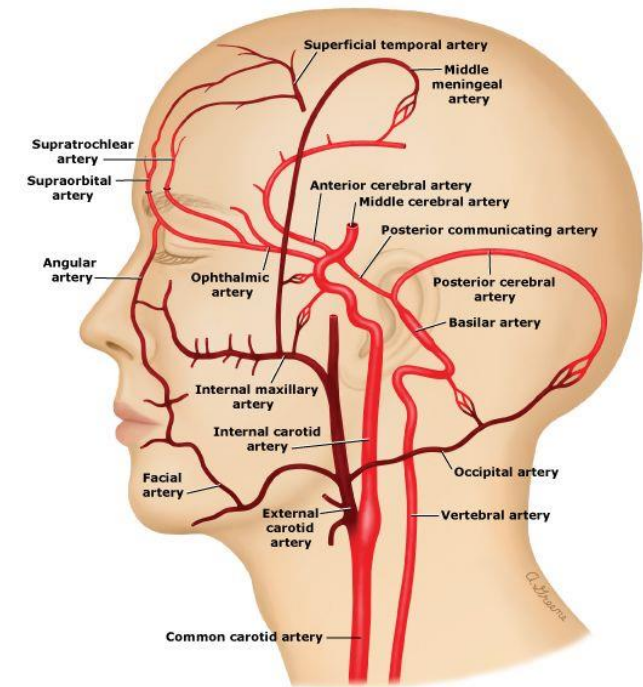
Common Carotid

- The left common carotid arises from aortic arch.
- The right common carotid arises from brachiocephalic trunk.
- Each common carotid gives two branches:
 - Internal carotid
 - External carotid



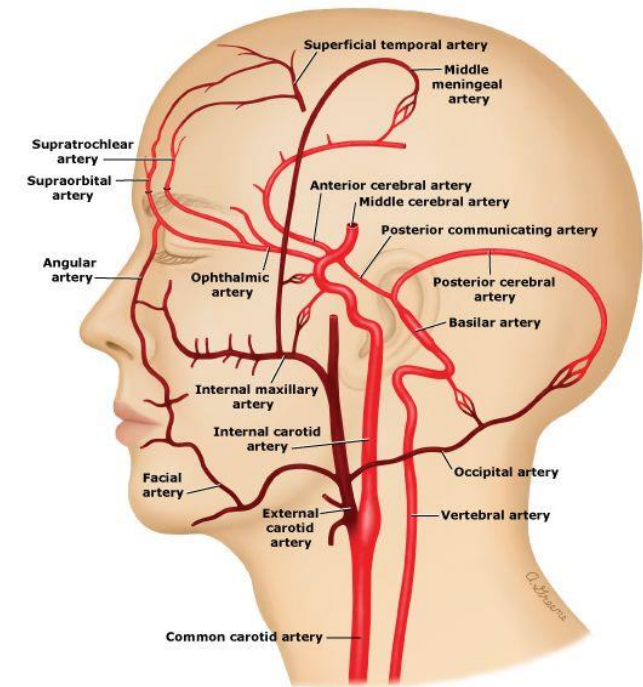
External Carotid

- It divides behind neck of the mandible into two terminal branches:
 - Superficial temporal
 - Maxillary artery
- It supplies:
 - Scalp: Superficial temporal artery
 - Face: Facial artery
 - Maxilla: Maxillary artery
 - Tongue: Lingual artery
 - Glands: Superior thyroid artery



Internal Carotid

- Has no branches in the neck and enters the cranial cavity.
- It Supplies:
 - Brain
 - Nose
 - Scalp
 - Eye

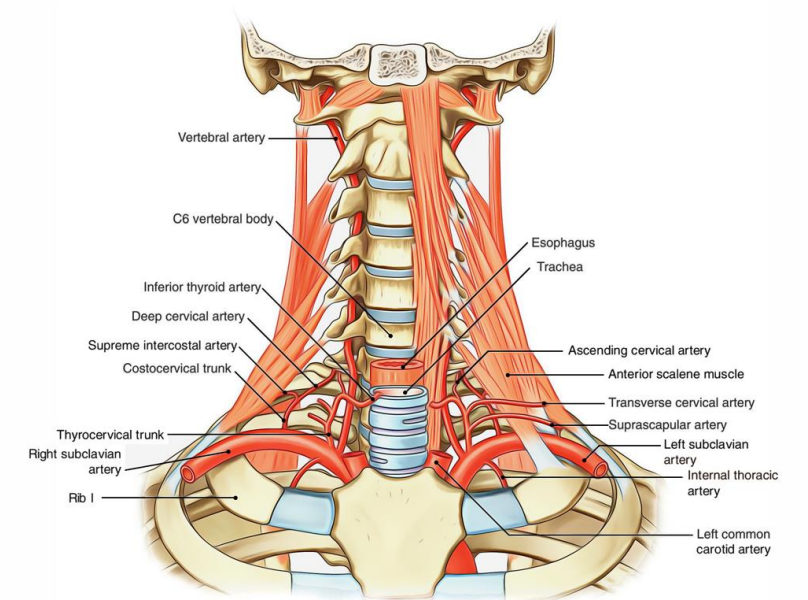


ARTERIES OF UPPER LIMBS



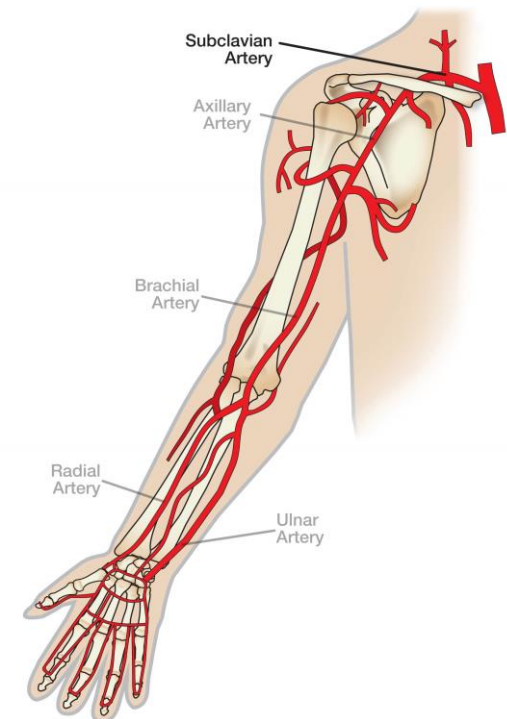
Subclavian Arteries

- Left subclavian arises from aortic arch.
- Right subclavian arises from brachiocephalic trunk
- Main branches:
 - Vertebral artery to supply CNS.
 - Internal thoracic artery to supply mammary gland and the thoracic wall.



Axillary Artery

- At lateral border of the first rib, it is continuous in the axilla as the **Axillary artery**
 - It is the source of the arterial supply of the upper limb.
- Beyond the lower margin of teres major muscle, the axillary artery become **brachial artery**.
- It descends close to the medial side of the humerus to the cubital fossa to divide into:
 - **Radial artery**: The smaller terminal branch
 - **Ulnar artery**: The larger terminal branch
- The superficial and deep **palmar arches** are formed by both ulnar & radial arteries.

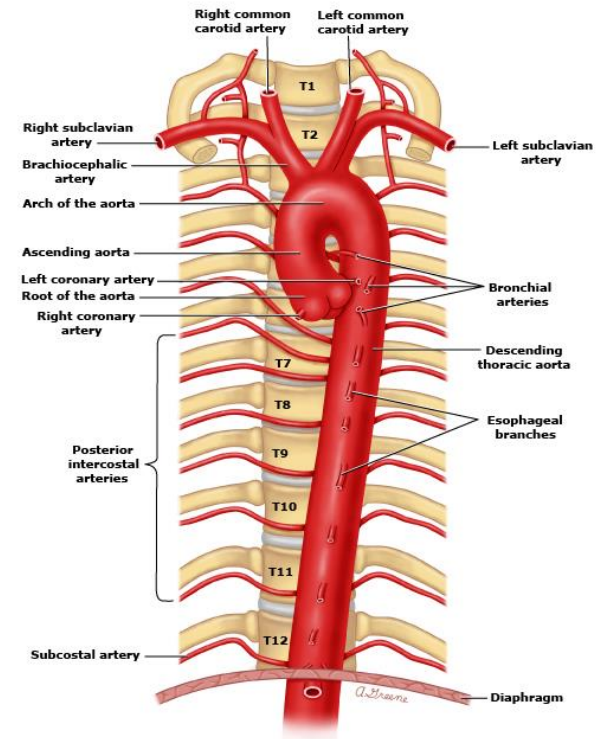


ARTERIES OF THORACIC



Descending Thoracic Aorta

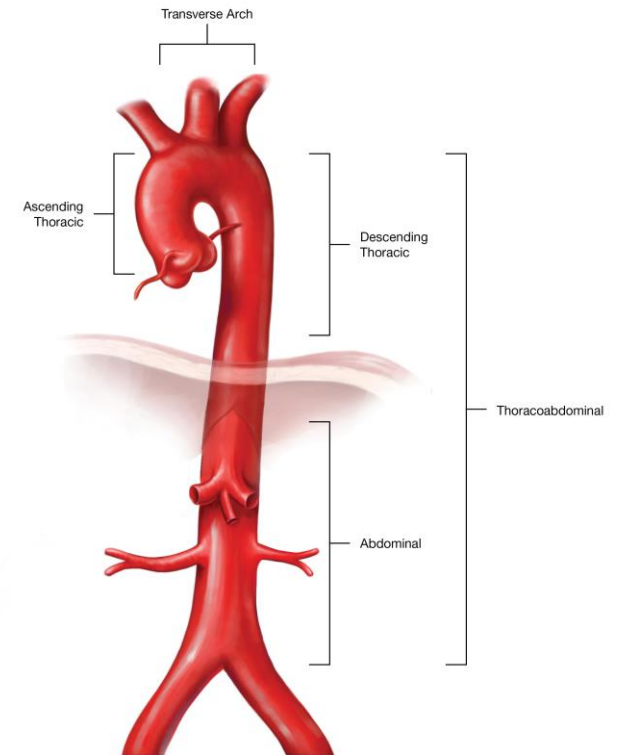
- It is the continuation of aortic arch.
- At the level of the 12th thoracic vertebra, it is continuous as the abdominal aorta which passes through the Diaphragm
- Branches:
 - Pericardial
 - Esophageal
 - Bronchial
 - Posterior intercostal



ARTERIES OF ABDOMEN

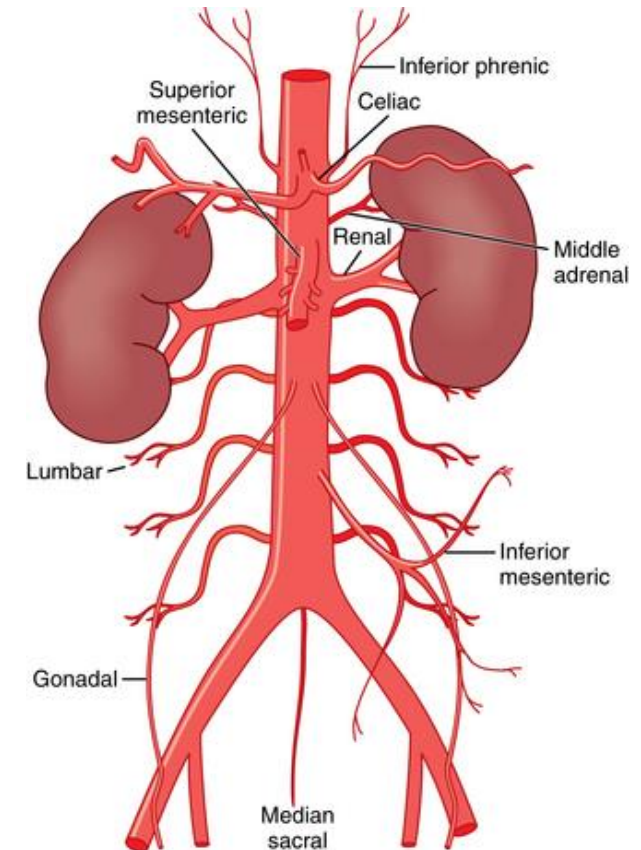
Descending Abdominal Aorta

- It enters the abdomen through the aortic opening of diaphragm.
- At the level of L4, it divides into two common Iliac arteries.
- There are single and paired are branches of descending abdominal aorta.



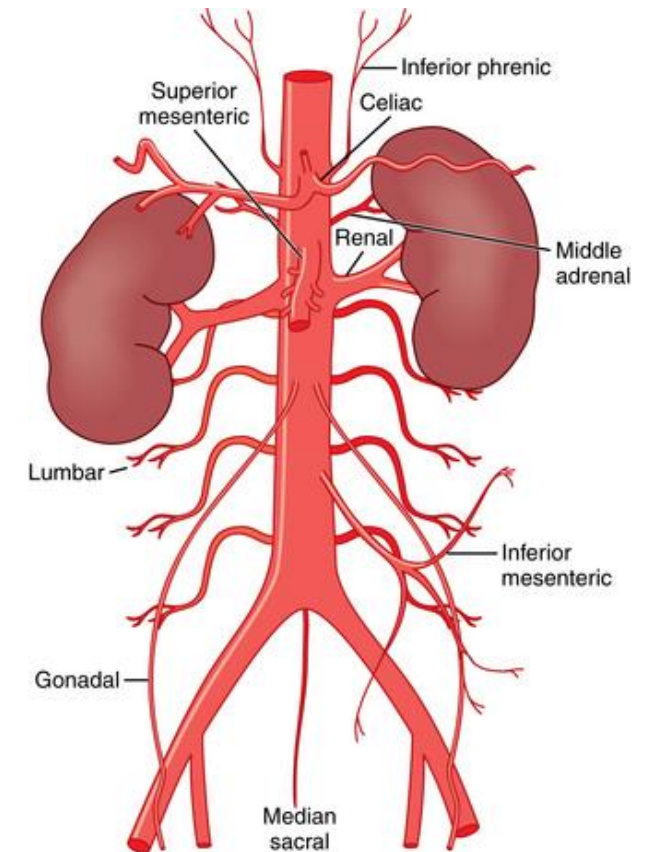
Single Abdominal Branches

- Celiac Trunk
 - Left gastric artery to stomach
 - Hepatic artery to liver and pancreas
 - Splenic artery to spleen
- Superior Mesenteric Artery
 - Pancreas
 - Small and large intestine
 - Right 2/3 of Transverse Colon
- Inferior Mesenteric Artery
 - Large intestine
 - Left 1/3 of transverse colon & descending colon
 - Rectum and anal canal



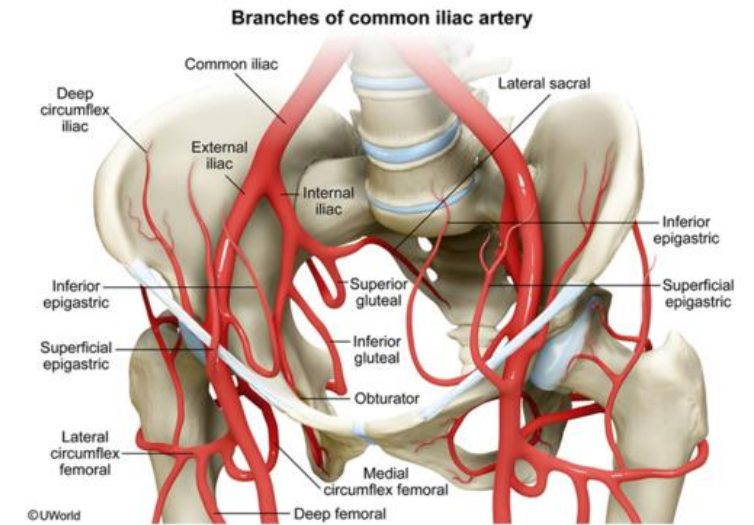
Paired Abdominal Branches

- Gonadal arteries (Testicular and Ovarian)
- Renal arteries
- Suprarenal arteries
- Common Iliac arteries



Common Iliac

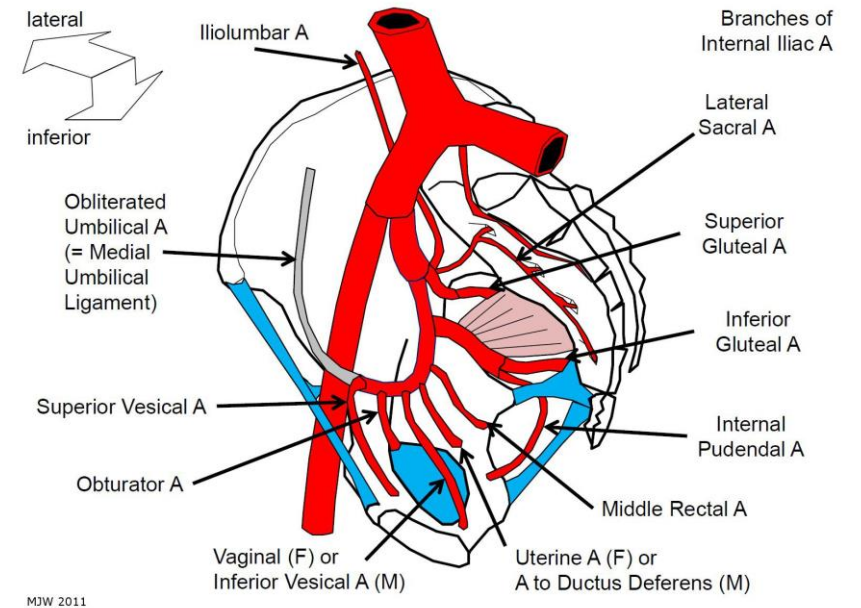
- The Abdominal Aorta terminates, at the level of the 4th lumbar vertebra into:
 - Right common iliac artery
 - Left common iliac artery
- Each divides into external & internal iliac arteries
 - Internal supplies the pelvic region
 - External supplies the lower limbs



ARTERIES OF PELVIC REGION

Internal Iliac Artery

- It supplies the following organs in pelvic region:
 - Uterus
 - Vagina
 - Pelvic Walls
 - Perineum
 - Rectum & Anal Canal
 - Urinary Bladder

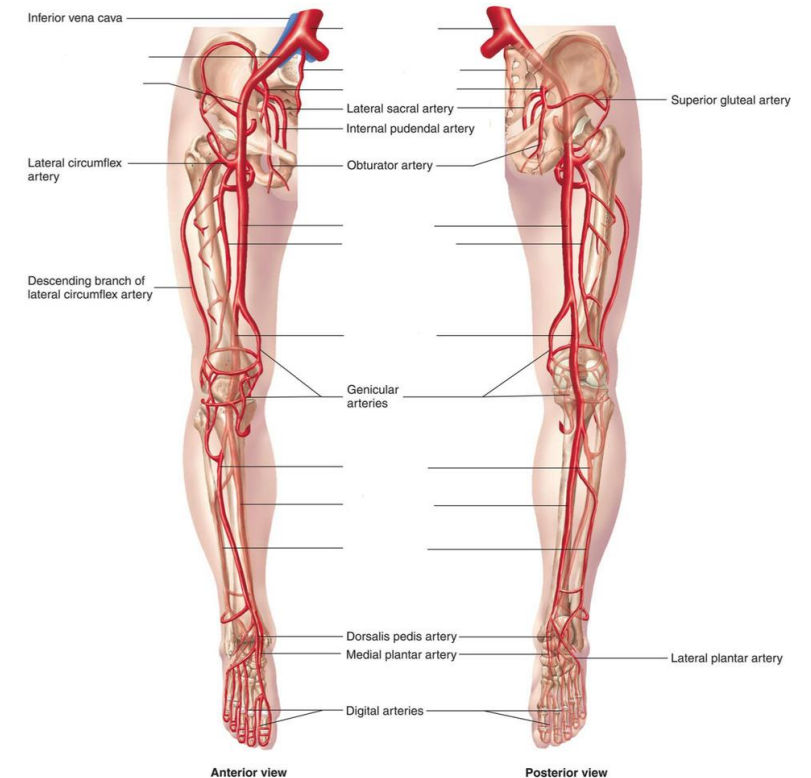


ARTERIES OF LOWER LIMBS



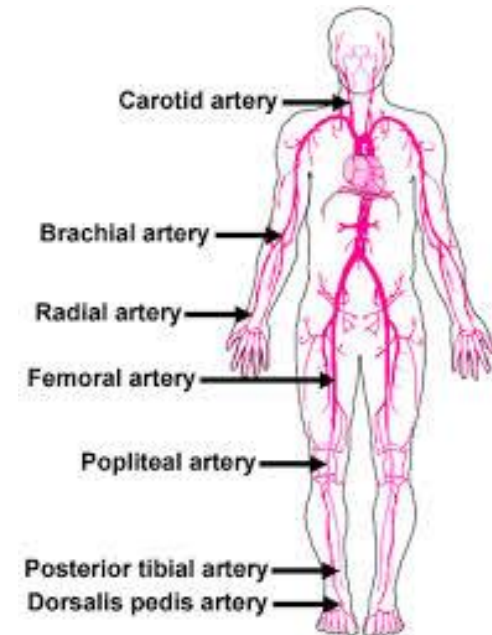
External Iliac Artery

- The Source of arterial supply to the lower limb.
- Deep to the inguinal ligament, it become the femoral artery.
- Femoral artery is the main arterial supply to lower limb, and it lies in a sheath with the femoral vein in the anterior components.
- At the popliteal fossa, femoral artery becomes popliteal artery.
- Popliteal artery divides into:
 - Anterior tibial
 - the smaller terminal branch.
 - It continues to the dorsum of foot as the dorsalis pedis artery.
 - Posterior tibial
 - It terminates by dividing into medial & lateral planter arteries to supply the sole of the foot.



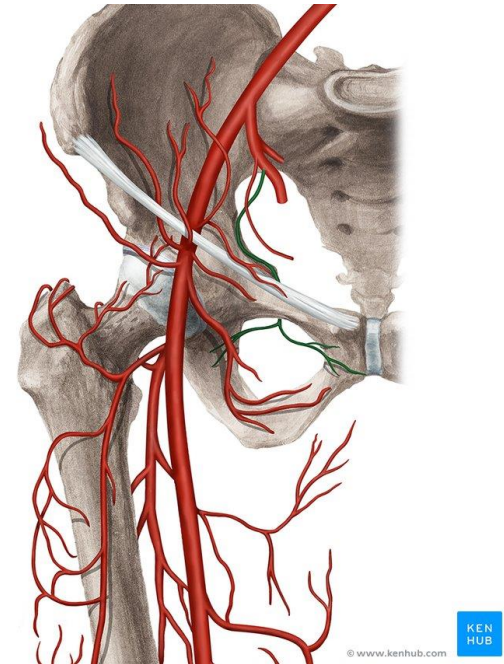
Arterial Pulsation

- **Superficial Temporal Pulse** in front of the ear.
- **Facial Pulse** at the lower border of the mandible.
- **Carotid Pulse** at the upper border of thyroid cartilage
- **Subclavian Pulse** as it crosses the 1st rib
- **Radial Pulse** in front of the distal end of the radius
- **Femoral artery** midway between anterior superior iliac spine & symphysis pubis
- **Popliteal artery** in the depths of popliteal fossa
- **Dorsalis Pedis artery** in front of ankle (between the two malleoli)



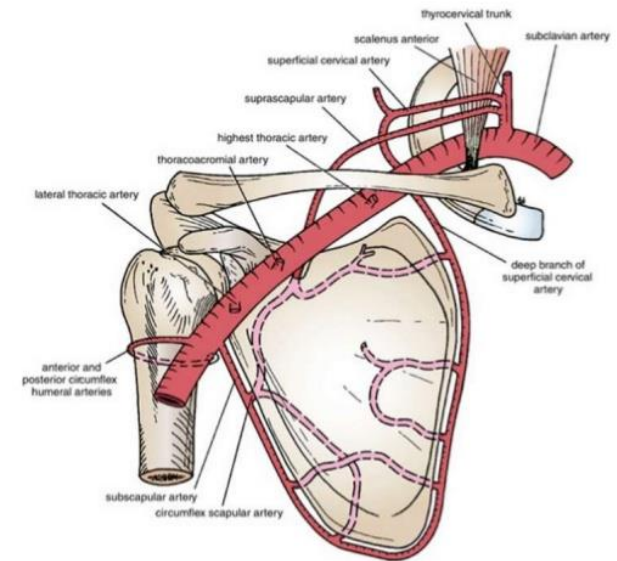
Arterial Anastomosis

- Anastomosis is the connection of two structures.
- Arterial anastomosis is the joining of branches of arteries supplying adjacent areas.
- What is the main reason for having an arterial anastomosis?
 - To have multiple supply to a region (so in case one artery is blocked, the distal region is still perfused)
- Anatomic end arteries
 - Their terminal branches do not anastomose with branches of adjacent arteries



Sites of Anastomosis

- In the upper limb
 - Scapular anastomosis between branches of Subclavian and Axillary
- Around the elbow
 - Brachial, Radial and Ulnar
- In the lower limb
 - Trochanteric & Cruciate to provide anastomosis between internal iliac and femoral



Summary

Head & Neck

Common carotid
Internal + External

Upper Limbs

Subclavian artery
Axillar + Brachial
Ulnar + Radial
Palmar Arches

Abdomen & Thoracic

Descending Thoracic Aorta
Descending Abdominal Aorta
Single & Paired branches

Pelvis & Lower Limbs

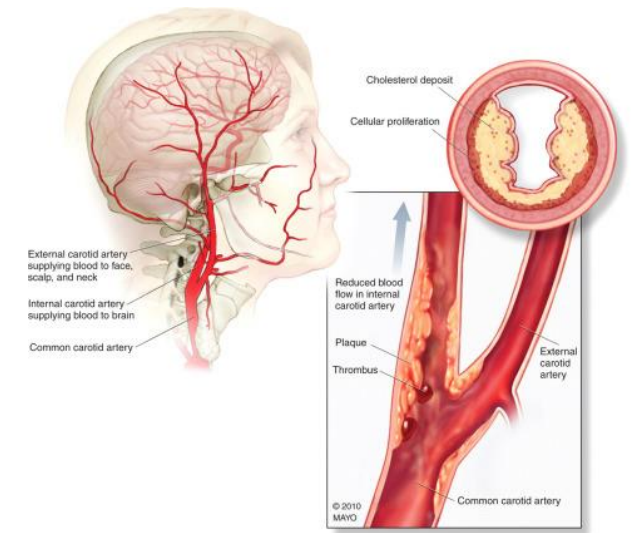
Internal iliac
External iliac
Femoral + Popliteal
Anterior & Posterior Tibial
Dorsalis pedis + Planter arteries

CLINICAL NOTES



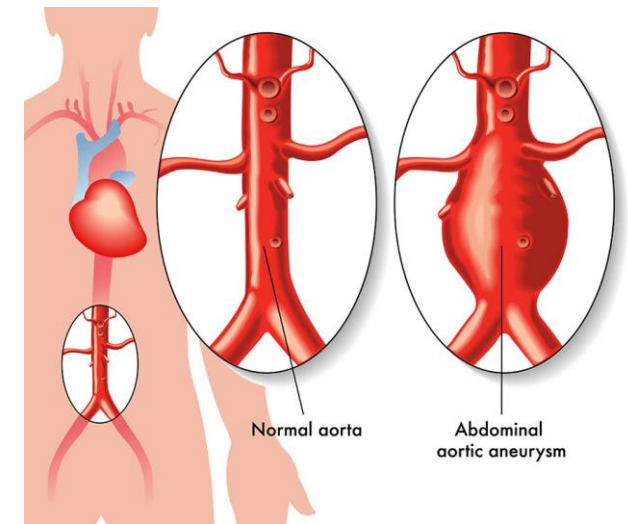
Atherosclerosis of the Carotid Arteries

- Atherosclerotic thickening of the tunica intima of these arteries will reduce blood flow to the brain, resulting in the variety of neurological symptoms include headache, dizziness, muscular weakness.
- If blood flow is completely occluded, a cerebral ischaemia (stroke) will results.
- If atherosclerosis of the carotid arteries is suspected,, Doppler study can be used to assess the severity of any thickening.
- In severe cases, the artery can be opened, and the atheromatous tunica intima removed.
- This procedure is called a **carotid endarterectomy**.



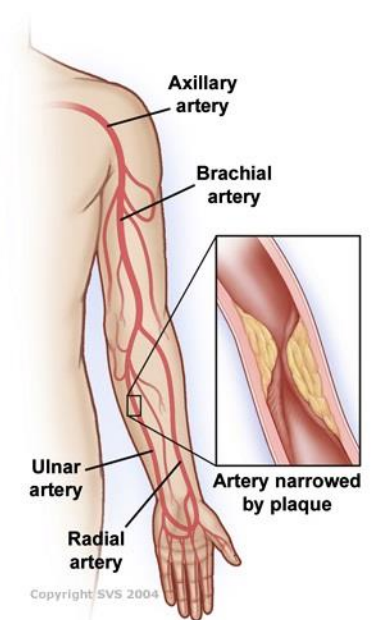
Aortic Aneurysm

- The aneurysm describes a dilation of the artery.
- The abdominal component of the aorta is the most common site for aneurysmal changes.
- Patients suffering with an abdominal aortic aneurysm may experience abdominal pulsations, abdominal pain and back pain.
- The aneurysm may also compress nerve roots causing pain and numbness in the lower limbs.
- A patient with an aortic arch aneurysm may have a hoarse voice due to the dilation stretching the left recurrent laryngeal nerve. Patients may also not have any symptoms at all.
- Diagnosis is made from an ultrasound and the weakened vessel wall can be surgically replaced with a piece of synthetic tubing.
- If left untreated, a large aneurysm can rupture. This is a medical emergency and often fatal.



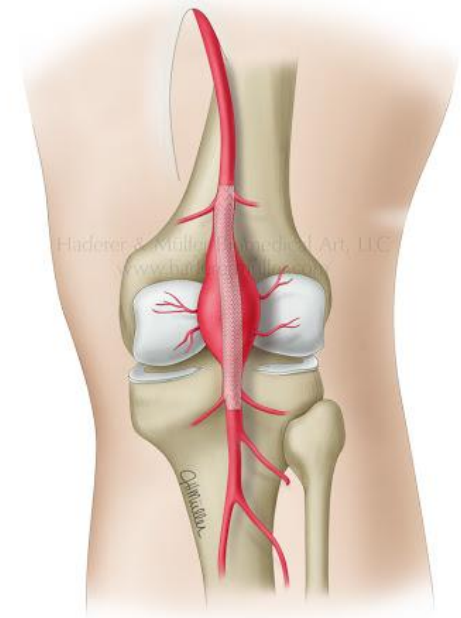
Occlusion of Brachial Artery

- The arm has relatively good anastomotic supply.
- This means that it is well protected from ischaemia in cases of temporary or partial occlusion of the brachial artery.
- However, if the artery is completely occluded (or severed), the resulting ischaemia can cause necrosis of forearm muscles.
- Muscle fibres are replaced by scar tissue and shorten considerably.
- This can cause a characteristic flexion deformity, called Volkmann's ischaemic contracture.



Popliteal Aneurysm

- The popliteal fascia (the roof of the popliteal fossa) is tough and non-extensible, and so an aneurysm of the popliteal artery has consequences for the other contents of the popliteal fossa.
- The tibial nerve is particularly susceptible to compression from the popliteal artery.
- The major features of tibial nerve compression include weakened or absent of plantarflexion and paraesthesia of the foot and posterolateral leg.
- An aneurysm of the popliteal artery can be detected by an obvious palpable pulsation in the popliteal fossa.





QUESTIONS?

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