Peripheral Vascular System and Lymphatic System

- Peripheral arterial disease
    - Peripheral artery disease (PAD) affects noncoronary vessels and refers to arteries affecting the limbs
        - PAD is a circulatory issue in which blood flow is reduced to limbs due to narrowed arteries. Extremities (usually occurring in the legs) do not receive enough blood flow to meet the demand.
    - Symptoms include:
        - Painful cramping in one or both hips, thighs, or calf muscles after walking/climbing stairs or other activities; leg numbness or weakness, coldness in lower leg/foot, sores on toes and feet, legs that do not heal well, change in color of legs, hair loss or slowed hair growth on feet and legs, slower growing.
    - Culture and Genetics
        - Peripheral artery diseases (PAD) is a risk factor for Coronary artery disease (CAD)
        - PAD is genes and environment related
        - Smoking is the strongest risk factor associated with PAD
        - PAD disproportionally affects Blacks, and the ethnic group with the highest PAD risk factors are non-Hispanic Blacks.

- Arteries
    - Transport oxygenated blood away from the heart (exception: pulmonary artery)
    - Artery walls are strong, tough, and tense to withstand pressure demands
    - Contain elastic fibers, which allow their walls to stretch with systole and recoil with diastole
    - Contain smooth muscle to control amount of blood delivered to tissues by contracting or dilating (changes the diameter of arteries)
    - Arteries to Know:
        - Arm- Brachial Artery
        - Leg- Femoral Artery & Popliteal artery
- Veins
    - Returns deoxygenated blood and tissue waste products back toward the heart (exception: pulmonary vein)
    - Low-pressure system. No pump!
    - Veins have a larger diameter and more distensible. Able to hold more blood to compensate stress on heart.
    - Run parallels to arteries and are closer to skin surface
    - Veins to Know:
        - Legs-
            - Deep veins
                - conduct most of venous return from the legs
                - Femoral and popliteal veins
            - Superficial veins

        - great and small saphenous vein
    - Perforators
        - connecting veins that join two sets
- Venous flow
    - Venous flow is pulled from the superficial system (skin and fat under the skin) to the deep system (veins lying in the muscles) through a series of one-way valves (Intraluminal valves and Semilunar valves).
    - Gradient pressure by breathing
    - Venous Stasis
        - Pooling of blood in the veins
        - Risk factors for venous stasis
            - Standing, sitting or lying down for a long period of time
            - Varicose veins
            - Lack of muscular activity

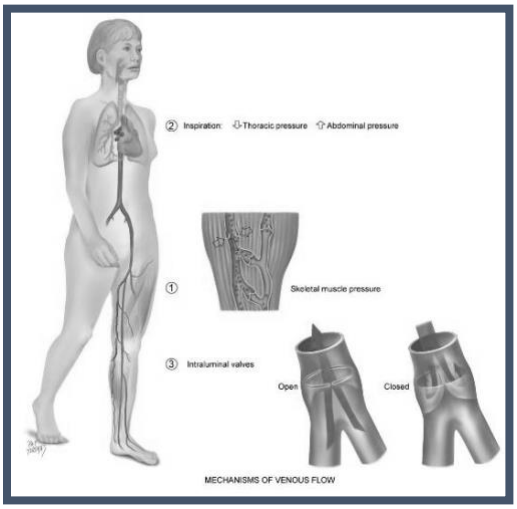
Venous (Stasis) Ulcer

After acute DVT or chronic incompetent val
deep veins. Venous ulcers account for 80% (
leg ulcers.

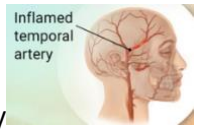
S: Aching pain in calf or lower leg, worse at en
worse with prolonged standing or sitting; pai
lessens with leg elevation. Itching with stasis
dermatitis.

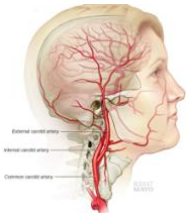
O: Lower leg edema that does not resolve with
therapy. Firm, brawny edema; coarse, thicken
pulses normal; brown pigment discoloration;
petechiae; dermatitis. Venous stasis causes in
venous pressure, which then causes red blooc
(RBCs) to leak out of veins and into skin. RBC
down to hemosiderin (iron deposits), which a
brown pigment deposits. Borders are irregula
Venous ulcers are shallow and may contain
granulation tissue. A weepy, pruritic stasis de
may be present.

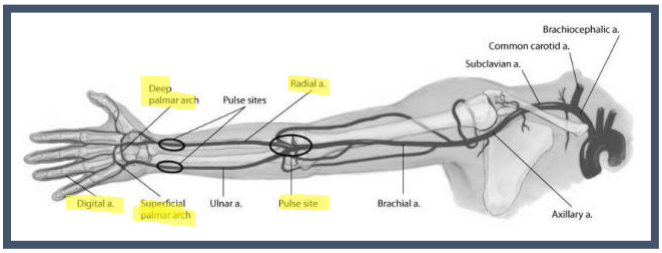
Ulcers occur at medial malleolus and tibia;
characterized by bleeding, uneven edges.



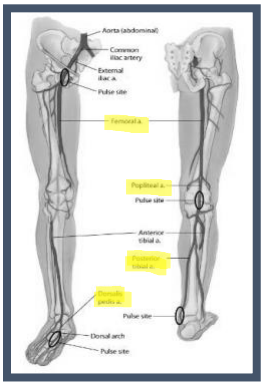
- Arterial flow
    - Arterial blood is the oxygenated blood in the circulatory system found in the pulmonary vein, the left chambers of the heart, and in the arteries.

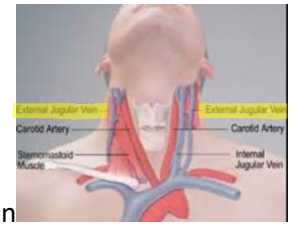
- Temporal Artery 


- Carotid Artery
- Arteries in the Arm
  - Brachial
  - Radial
  - Ulnar
  - Palmar



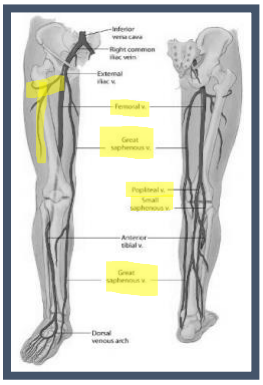
- Arteries in the Leg
  - Femoral
  - Popliteal
  - Dorsalis pedis
  - Posterior tibial



- Jugular vein 

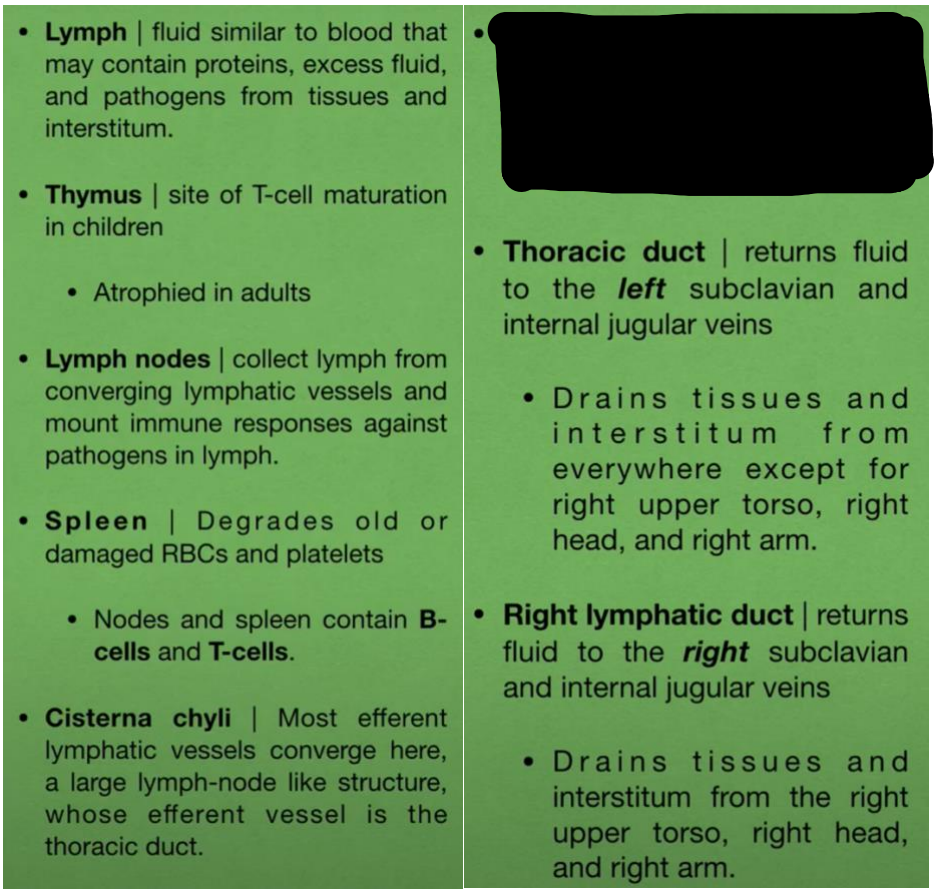
- Veins in the arm (parallel to arm arteries)

- Veins in the leg
    - Deep veins
        - Femoral
        - Popliteal
    - Superficial veins
        - Great and small saphenous veins



Lymphatic system

- A separate vessel system from arterial and venous
    - Retrieves excess fluid and plasma protein from the tissue spaces and returns it to the bloodstream
- Function is to
    - Conserve fluid and plasma proteins that leak out of capillaries
        - Slow flow
        - Valves
    - Defends body against disease
        - Detects and eliminates foreign pathogens
        - Digests and produce antibodies
        - Enlarge and tender lymph nodes may indicate infection
    - Absorb lipids from intestinal tract
- Vessels drain into two main trunks
    - Right lymphatic duct
        - Empties to right subclavian veins
    - Thoracic duct
        - Empties to left subclavian veins



How fluid travels around the lymphatic system

- Lymph nodes
  - Cervical
- Found in the neck
- Cervical lymph nodes are subject to a number of different pathological conditions including tumors, infection and inflammation.
  - Axillary
    - Found in the armpit
    - A group of lymph nodes in the axilla and receive lymph from vessels that drain the arm, the walls of the thorax, the breast and the upper walls of the abdomen.
  - Epitrochlear
    - Found in the elbow
    - Part of the superficial lymphatic system of the upper limb
    - Drains the lymph from the last two or three fingers and from the medial aspect of the hand itself.
    - An enlarged epitrochlear node occurs with infection of the hand or forearm.