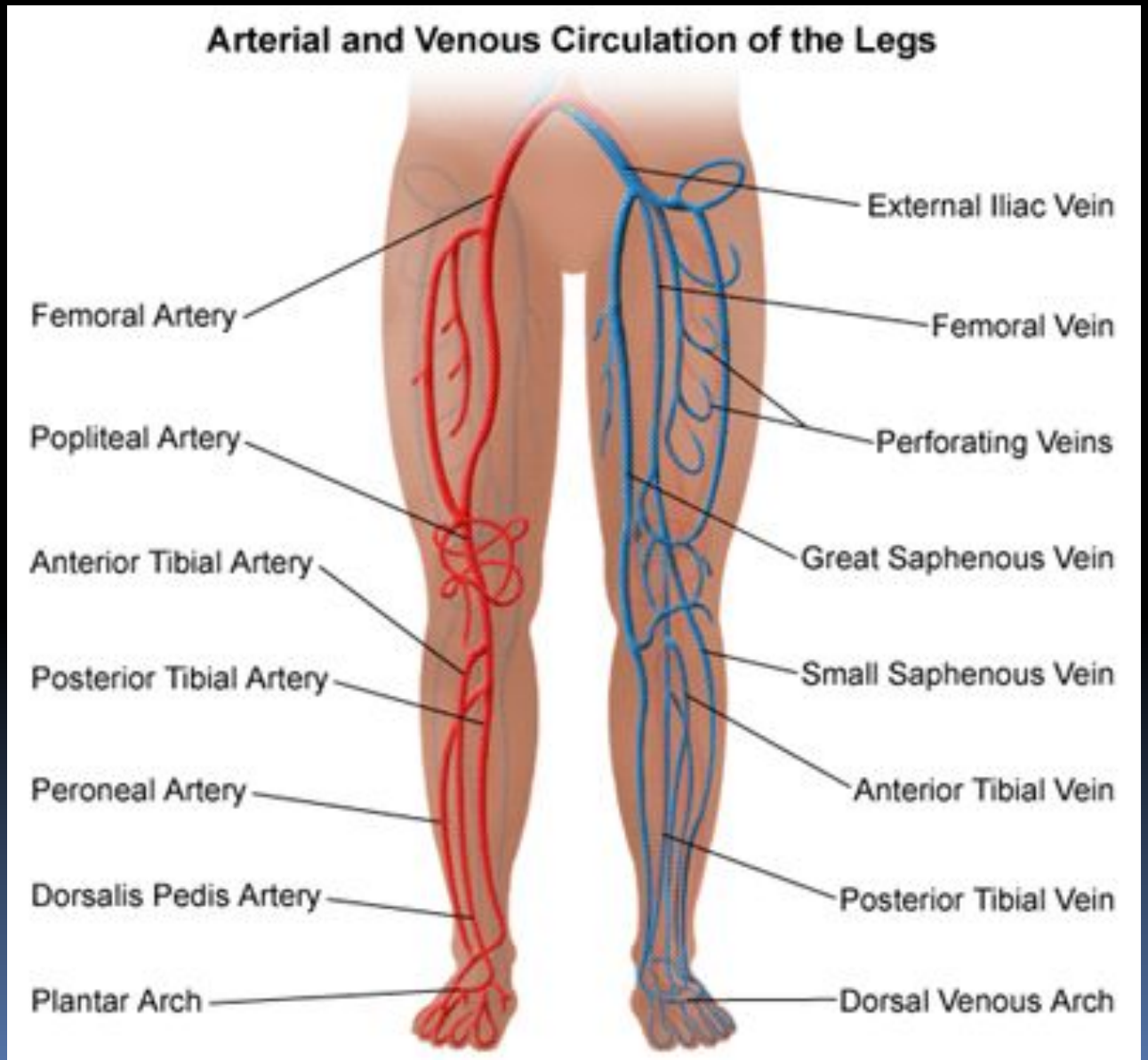
VENOUS INSUFFICIENCY

What is it?

Condition in which the veins fail to return blood efficiently to the heart from the legs

Review of Vessels of the Legs



Varicose veins

What are they?

- Abnormally large and bulging veins that are caused by impaired function of the venous valves
- Distended, twisted, or "ropey" superficial veins.
- Caused by damage to internal valves that are supposed to make sure blood moves towards the heart.
- Blood backs up along the system, causing vein to stretch, distort, and weaken.
- Can be found around the anus, but most common in the legs

Who gets them?

- Women are more susceptible than men, due to estrogen, which weakens venous walls
- History of pregnancy
  - Fetus can obstruct fluid return
- 1 in 10 people will have varicosities at some point
- Occurs mostly between 40-50 yrs of age in most people

What happens?

- Veins help getting blood back towards the heart from the toes
- Small veins pick up blood from internal mm capillaries
- Veins tend to run on the superficial aspect of mm
- Feed into larger veins that perforate the mm bellies
- Then into really big deep veins that run under the mm, close to bones
- Leg mm contract, veins are squeezed, sending contents to deep veins
- Leg mm relax, veins draw in new blood
- Contraction/relaxation of mm is crucial for blood return
- Valves in perforating veins and deep veins ensure blood will not collect in smaller/weaker superficial veins

Causes

- Wear and tear
  - Being on feet for hours
  - Not allowing mm to contract/relax weakening the veins
- Mechanical obstruction to returning blood
  - Knee socks too tight, knee brace, fetus pressing on femoral vein, chronic constipation

Causes

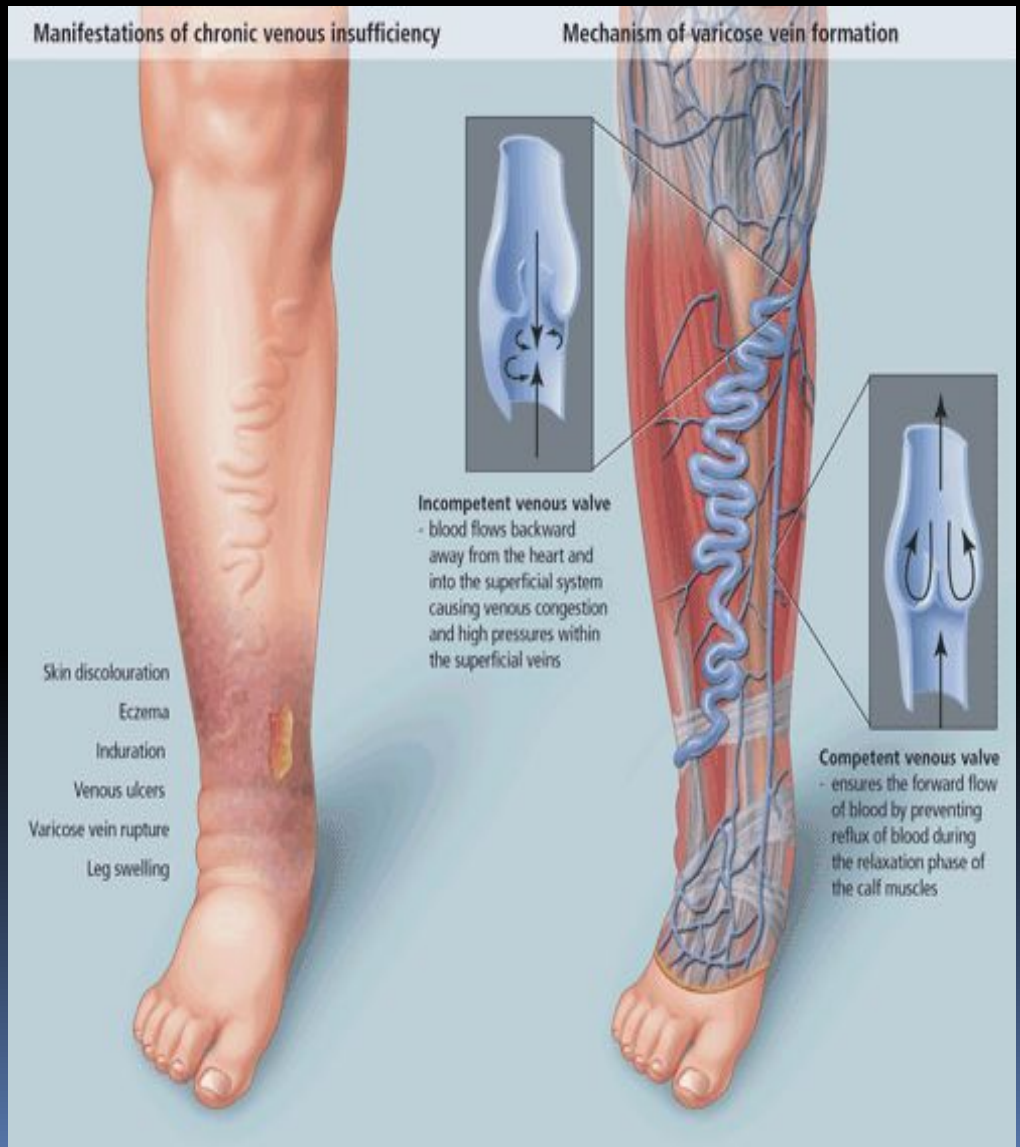
- Congenitally weak veins
- Systemic congestion
  - Kidney problems
  - Liver back up
  - Tumors
  - Heart failure
  - DVT
  - Vitamin C deficiency

VARICOSE VEINS

Once a valve has been damaged, blood puts pressure on next valve down

Vascular incompetence will cause weakest superficial veins to become distorted, dilated, and twisted off their regular pathway

Seldom affects biggest, deepest veins because their walls are thicker and leg mm act as built-in support hose



Signs and Symptoms

- Lumpy, bluish wandering lines on surface of skin
- Visible on back of calf, more often affect greater saphenous vein, showing up from ankle to groin on MED side
- May be visible only when patient standing
- May itch
- Throbbing pain, at end of day
- Contribute to edema sound ankles as fluid backs up in lower leg

Complications

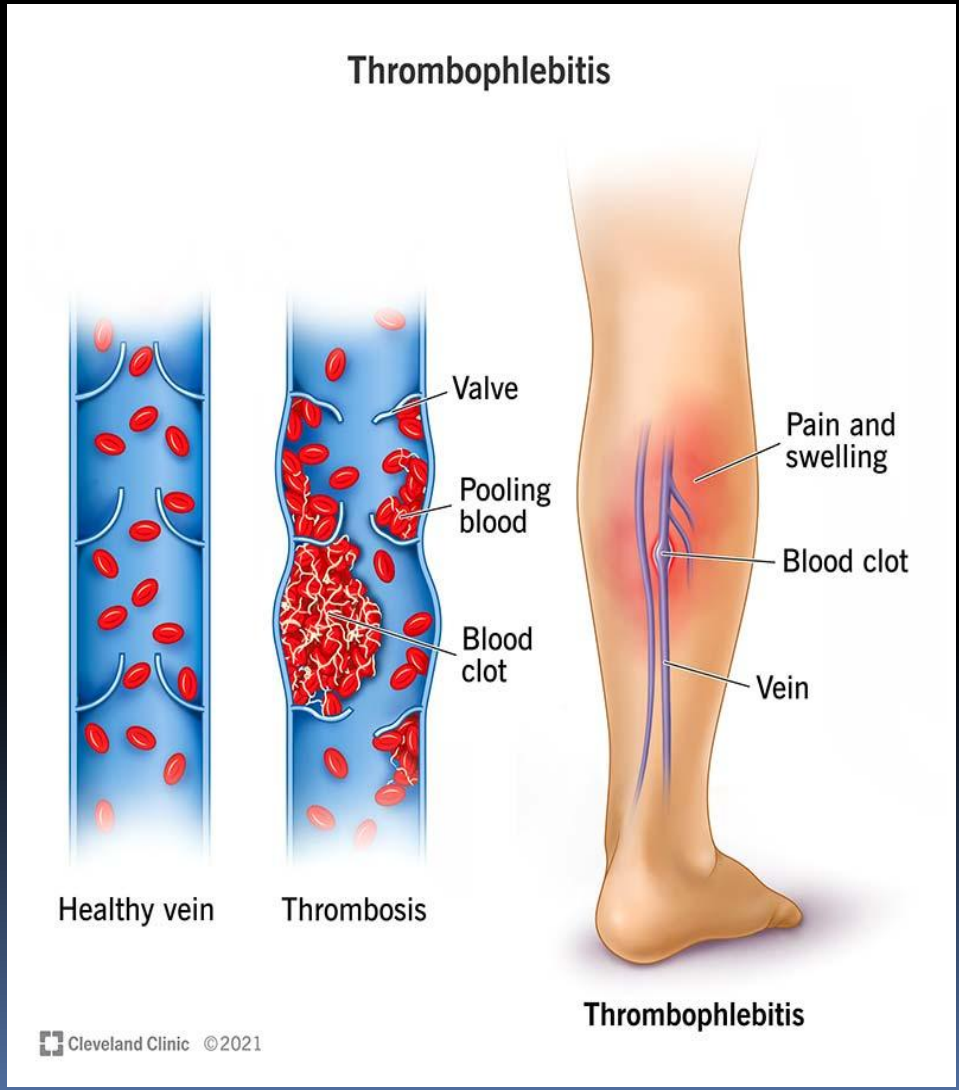
- Chronically impaired circulation resulting in varicose ulcers
  - Do not heal until circulation restored
- Skin irritation from poor circulation leading to eczema
- Night cramps
- Clotting from stagnant blood
- Risk of DVT

Treatment

- Support hose/elastic bandages
- Reclining with feet slightly elevated
- Relieve mechanical stress with hydrotherapy
- Surgery to remove affected vein (*stripping*)
- Ambulatory phlebectomy (*mini stripping*)
- Sclerosing
  - Injecting chemicals into vein causing it to close down
  - salt/sugar solutions
- Treatments that heat and collapse vein walls, generating new vessels

Thrombophlebitis

Superficial or deep vein that leads to the formation of a thrombus



A partial or complete occlusion of a vein by a thrombus, with a secondary inflammatory reaction in the wall of the vein. Occurs most often in the lower extremities. There are two forms of venous thrombosis:

Superficial: most commonly of the saphenous vein in the lower extremity, usually the result of varicose veins and is self-limiting (not a serious condition). In the upper extremity this condition does not generally cause pulmonary embolism as the blood flow to deeper veins is via small perforating venous channels. This can be secondary to prolonged IV catheter use.

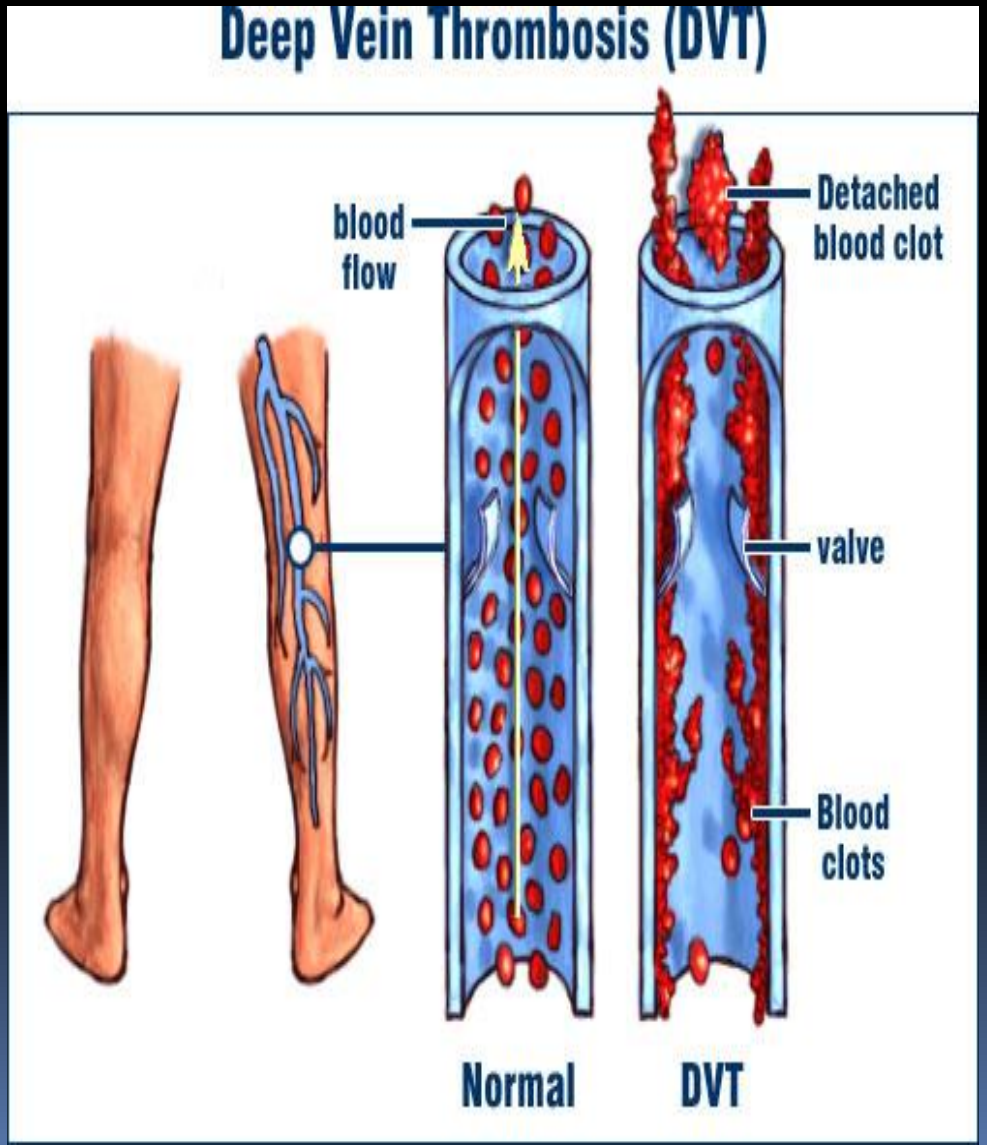
Deep: usually of the femoral, iliac veins of the lower extremity, calf veins or more proximally from the trifurcation of the popliteal vein caudally. Calf vein thrombosis are usually clinically silent and benign without complications, although in 30% of the cases they can extend into more proximal veins. Proximal DVTs are much more likely to result in Pulmonary Embolism

Superficial venous thrombosis of the upper extremity can occur, although it is much less common and is usually seen in people with systemic illness in the presence of an indwelling catheter, such as in the treatment of cancer, malignancy, or hemodialysis.

Deep vein Thrombosis

Venous thrombosis involving the formation of a blood clot in a deep vein, most commonly in the legs/pelvis.

Symptoms include pain, swelling, redness and enlarged veins in affected area, some have not symptoms



Two types of thrombus:

- Mural: attached to the wall of the vein and does not occlude the lumen
- Occlusive: begins by attachment to vessel wall and progresses to completely occlude the lumen.

Evolution/resolution:

- Lysis, dissolution or recanalization: thrombus is dissolved and away and blood flow through vein returns
- Organization, potential for removal of thrombus and vein
- Extension: thrombus enlarges either proximally or distally.
- Release of thrombus to form a pulmonary embolism

(Embolus travels through the enlarging vessels and through the right side of the heart to the progressively narrowing pulmonary artery, where it may become lodged and occlude pulmonary circulation.)

If thrombus occludes major vein, the venous pressure and volume rise distally. However, if it occludes a deep small vein, collateral vessels develop and relieve the increased pressure and volume

Symptoms:

Early stages are asymptomatic

90% are in the lower extremity

Upper extremity DVTs present with edema of the involved extremity and pain.

- Dull pain and local tenderness
- Superficial induration (firm or hard cord)
- Redness

Lower extremity presents with dull ache, tight feeling or pain, often misdiagnosed.

- Signs are often absent, and when present and taken alone, they may be variable and unreliable.
- Leg or calf swelling
- Pain or tenderness
- Dilation of superficial veins
- Pitting edema
- Skin may be warmer than the unaffected side
- If obstruction is severe, skin may be cyanotic

(Any of these symptoms can occur without DVTs, possibly associated with other vascular, inflammatory, musculoskeletal or lymphatic conditions.)

Causes

- Age
  - Over 40 yrs
  - Elderly
  - Athletes
  - young , fit people
- Fractures
  - Pelvis
  - Femur
- Venous stasis
- Prolonged immobilization

The image above of a DVT was provided by http://medicine.ucsd.edu/clinicalmed

Causes

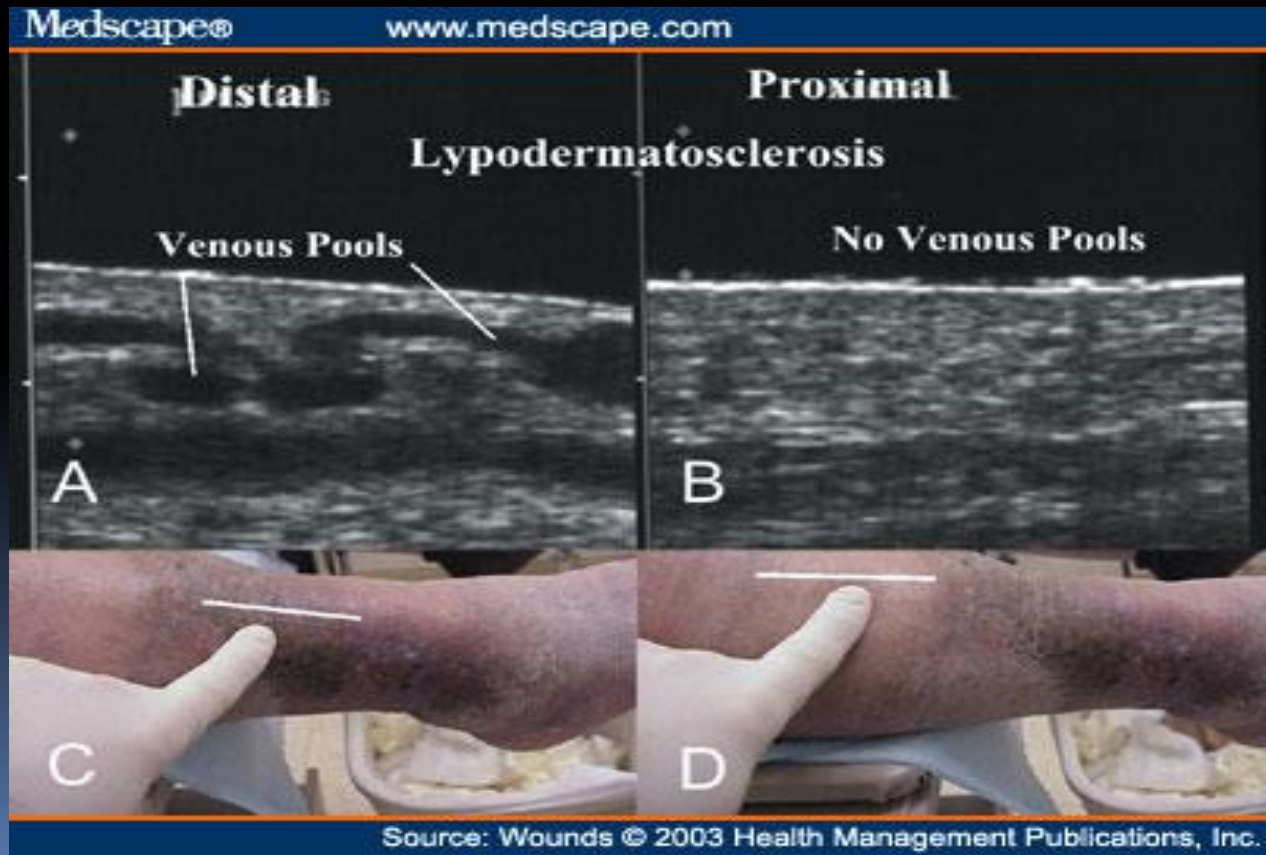
- Cardiac failure, stroke, heart disease
- Anesthesia
- Surgery
- Trauma
- Previous history
- pregnancy/postpartum state
- Oral contraception use (birth control)
- Diabetes
- Cancer
- Clotting disorders

Medical Detection & Prevention

- Ambulation after pregnancy and surgery
  - Exercise to legs in bed or sitting
- Diaphragmatic breathing to assist venous return from legs
- Compression stockings
- Elevate legs 20 degrees whenever possible
- Prevent excessive knee/hip FLEX that can slow blood flow
- Prevent venous stasis
- Already developed DVTs
  - Brief period of bedrest
  - Elevation of leg
  - Anticoagulant
    - Heparin
    - coumadin

Chronic Venous Insufficiency

Is a long term condition in which the blood pools in the veins, straining the walls of the vein, not allowing the blood to flow back to your heart



Contraindications

- If DVT suspected, massage CI'd to affected limb
- Femoral fracture: BiLat legs CI'd. Refer to DR
- Passive/active movt's CI'd in acute stage of DVT
- Suspected DVT, tx discontinued, referred for immediate med attention
- Tx may resume as condition resolves with permission of DR, affected limb still avoided
- Coumadin/heparin meds lead to risk of hemorrhage from any tissue/organ. Consult DR for recommendations and safety of tx

Contraindications

- Remain aware that once a person has history, they are more likely to develop DVT/PE again
  - Be vigilant for symptoms
  - No aggressive techniques to legs
- Extreme temps in contrast hydro avoided to affected limb
- Heat CI'd distal and immediately proximal to DVT to avoid further congestion

ASSESSMENT and Testing

Refer to DR if uncertain, or positive pitting edema present

1. **GIRTH MEASUREMENT**

Take and record measurements proximal to distal along both extremities

To test for edema or venous stasis

+ test = one side larger than the other

SAPHENOUS VEIN COMPETENCY TEST

Palpating distal to knee, and one hand inner thigh. At least 20 cm higher.

Compress vein at thigh, feel for an impulse in lower hand

+ test = backflow palpable at distal point

Incompetent veins will feel nothing, in severe V.V. will feel backflow

Testing

Retrograde filling (Trendelenburg) Test

Raise legs to 90 degrees to empty venous blood

Occlude great saphenous in upper thigh, compress with hand

Patient stands with occlusion

Watch for filling, fills from below

Normal takes about 35 seconds

After 20 seconds remove occlusion, watch for sudden filling, rapid filling is a sign of incompetent valves.

Testing

Homan's Sign For Deep Vein Thrombosis

Combine dorsiflexion of the ankle with squeezing into the belly of muscles gastrocnemius/soleus

+ test = severe pain on pressure

- test = doesn't mean that it isn't present!

Frequently this test results in false positive and false negative results.

Testing

Ramirez's Test - For DVT

Patient is supine, affected knee in FLEX, foot flat on table, wrap blood pressure cuff around the thigh and inflate it to 40mm Hg, maintain pressure for at least 2 minutes

+test = increase in pain as cuff inflated and inability to tolerate cuff inflation and sustained pressure for 2 minutes

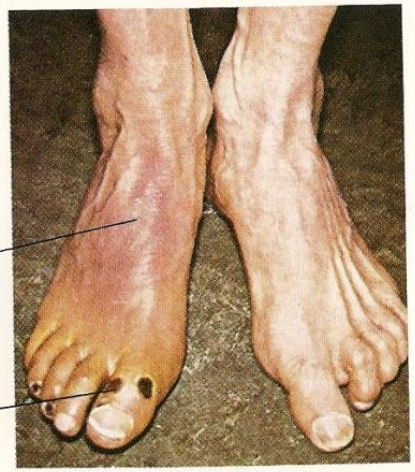
This is a medical emergency and should be referred to MD ASAP!!!

Assessment

- HH questions
- Where is location of pain/cramping?
  - Active dorsiflexion of the ankle can be aggravating, ankle achy at rest
- Has massage been approved?
- Observation:
  - Inflammation
  - Edema distal to obstruction
  - Leg pallor noted
  - Distal veins distended in lower leg
- Deep palpation
  - Local tenderness when thrombus present
  - absent/diminished dorsi pulse palpated

Color Plate 16-2 Common Ulcers of the Feet and Ankles

	ARTERIAL INSUFFICIENCY	CHRONIC VENOUS INSUFFICIENCY	TROPHIC ULCER
			
LOCATION	Toes, feet, or possibly in areas of trauma (*e.g.*, the shin)	Inner, sometimes outer ankle	Pressure points in areas with diminished sensation, as in diabetic polyneuropathy
SKIN AROUND THE ULCER	No callus or excess of pigment, may be atrophic	Pigmented, sometimes fibrotic	Caloused
PAIN	Often severe, unless neuropathy masks it	Not severe	Absent (and therefore the ulcer may go unnoticed)
ASSOCIATED GANGRENE	May be present	Absent	In uncomplicated trophic ulcer, absent
ASSOCIATED SIGNS	Decreased pulses, trophic changes, pallor of the foot on elevation, dusky rubor on dependency	Edema, pigmentation, stasis dermatitis, and possibly cyanosis of the foot on dependency	Decreased sensation, absent ankle jerks

	CHRONIC ARTERIAL INSUFFICIENCY *(Advanced)*	CHRONIC VENOUS INSUFFICIENCY *(Advanced)*
		
PAIN	Intermittent claudication, progressing to rest pain	None to an aching pain on dependency
PULSES	Decreased or absent	Normal, though may be difficult to feel through edema
COLOR	Pale, especially on elevation; dusky red on dependency	Normal, or cyanotic on dependency. Petechiae, then brown pigmentation appear with chronicity.
TEMPERATURE	Cool	Normal
EDEMA	Absent or mild; may develop as the patient tries to relieve rest pain by lowering the leg	Present, often marked
SKIN CHANGES	Thin, shiny, atrophic skin; loss of hair over foot and toes; nails thickened and ridged (trophic changes)	Often brown pigmentation around the ankle, stasis dermatitis, and possible thickening of the skin and narrowing of the leg as scarring develops
ULCERATION	If present, involves toes or points of trauma on feet	If present, develops at sides of ankle, especially medially
GANGRENE	May develop	Does not develop

(Sources of photos: *Arterial Insufficiency*—Kappert A, Winsor T: Diagnosis of Peripheral Vascular Diseases, p 15. Philadelphia, FA Davis, 1972; *Venous Insufficiency*—Marks R: Skin

- **Pulmonary embolism**: most devastating complication of DVTs and can occur without apparent warning, signs and symptoms depend on the size and location and may include:
  - Possible sudden death
  - Pleuritic chest pain
  - Diffuse chest discomfort
  - Tachypnea
  - Tachycardia
  - Hemoptysis
  - Anxiety, restlessness, apprehension
  - Dyspnea
  - Persistent cough

Therapeutic Exercise:

- Active ankle pumps done throughout the day while immobilized
- Isometric exercises
- AROM/PROM of all the joints of the extremities
- A graded exercise program with support stockings

Hydrotherapy:

- No deep heat to involved extremity unless with MD consultation
- Mild contrast foot baths (VV)
- Mild contrast affusions (VV)