

PRE-CLINICAL CLERKSHIP, Year 1
Physical Examination

Session Five
Abdominal and Peripheral Vascular Exams Cheryl
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1. Learning Objectives

- To identify the surface anatomical landmarks of the abdomen and peripheral pulses.
- To understand the differences in the approaches to the examination of the liver and spleen.
- To practice the techniques of percussion and palpation of the liver and spleen.
- To describe and appreciate the defining features of flat, dull, resonant, and tympanitic percussion notes.
- To practice the techniques of palpation and auscultation of the peripheral vessels.
- To describe and appreciate the defining features of the peripheral pulses.
- To develop a flow for the head to toe exam.

2. Student Prep

Abdominal Exam

Read pp.479-482, 490-509, Chapter 17 The Abdomen

View the companion portion of the CD

View the VH Dissector Pro 4.5 exercise on the computers in the Clinical Exam Suites

Practice exercises: You have recently learned the technique of percussion. Practice eliciting notes over different surfaces and begin to compare the duration and pitch of the notes. Try percussing over a muscle, such as in your thigh. The note is short in duration and high pitched. Compare it to the longer and lower pitched note obtained by percussing over your inflated cheek

Peripheral Vascular Exam

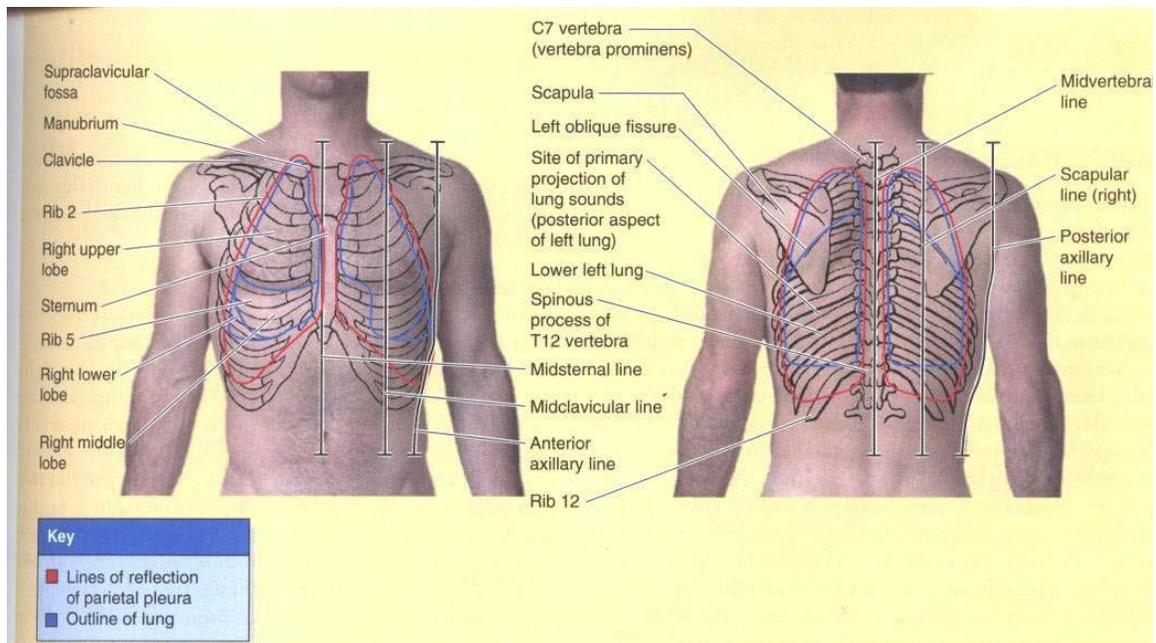
Read pp. 439-440, 443-450, Chapter 15 The Peripheral Vascular System

View the companion portion of the CD

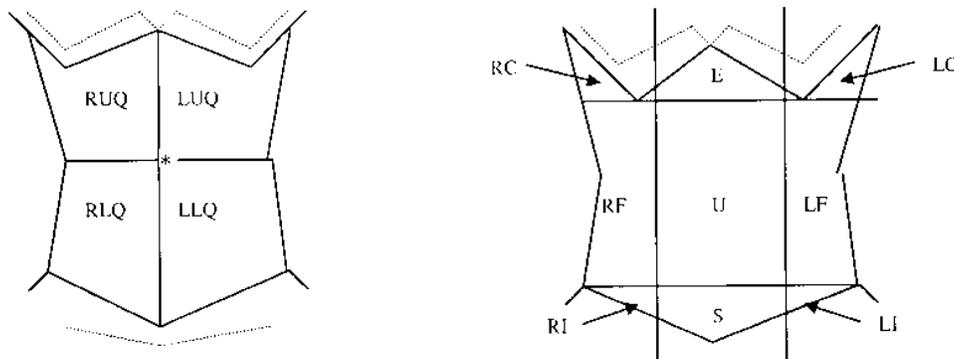
View the VH Dissector Pro 4.5 exercise on the computers in the Clinical Exam Suites

3. Clinical Anatomical Landmarks

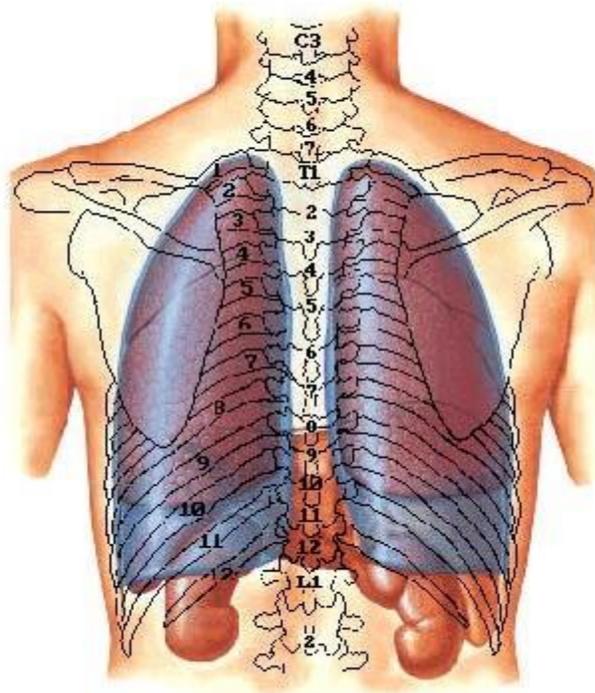
Midsternal line, MCL, AAL



Compare two systems to guide performance and reporting of abdominal findings — four quadrants and costal, epigastric, umbilical, flank, suprapubic, iliac areas.

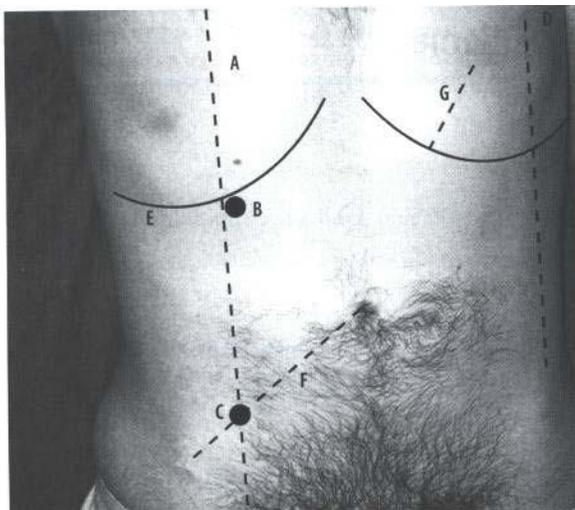


Posterior—costovertebral angle (CVA) between 12th rib and spine

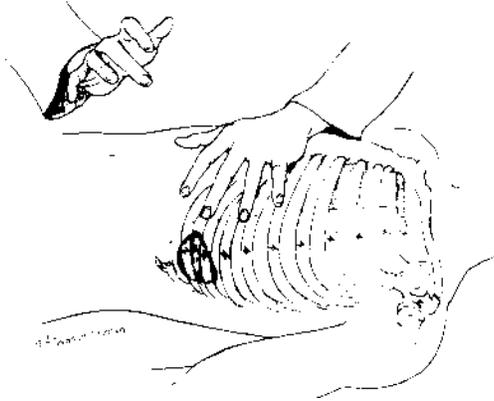


Liver-percussion and palpation along MCL and in relation to the right costal margin (RCM)

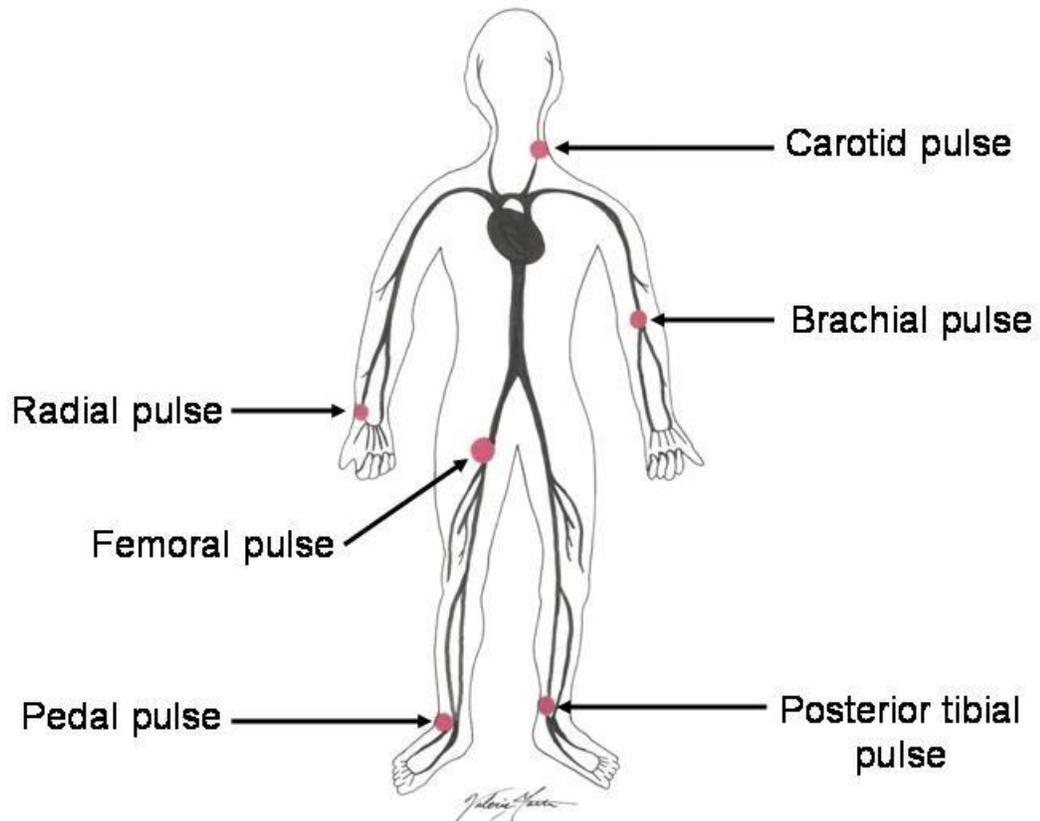
Spleen- percussion along AAL and palpation at right angle to left costal margin (LCM)



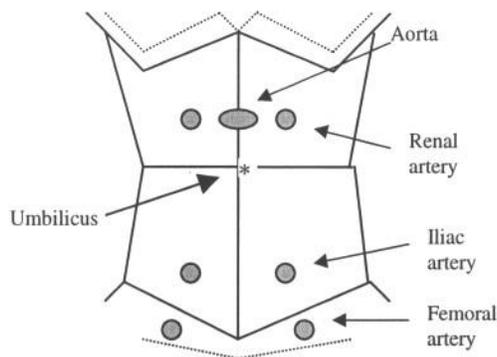
Castell's point for splenic percussion sign: 9th LICS, AAL (normal spleen lies posterolaterally – spleen comes 1st anterior and then medially as it enlarges)



Peripheral Pulses

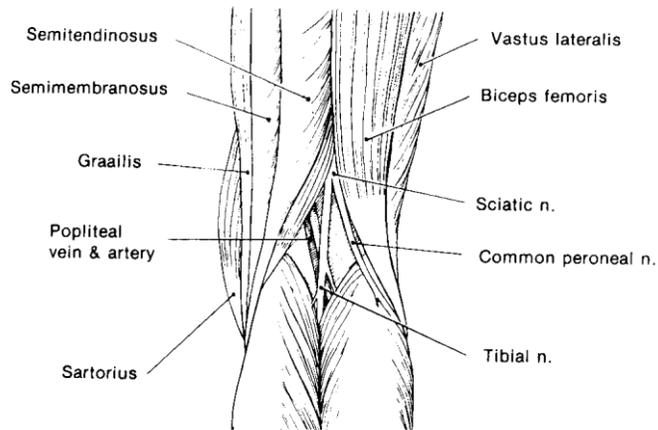


Vascular areas of the abdomen--aorta (bifurcation at umbilicus), renal arteries about 2cm above umbilicus and about 2cm from the midline bilaterally, iliac arteries (from umbilicus to inguinal ligament on a diagonal midway between anterior superior iliac spine and symphysis pubis bilaterally, and femoral arteries just below inguinal ligament

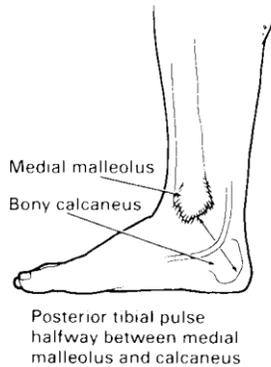


Vascular areas of the lower extremities—popliteal, posterior tibial and dorsalis pedis arteries

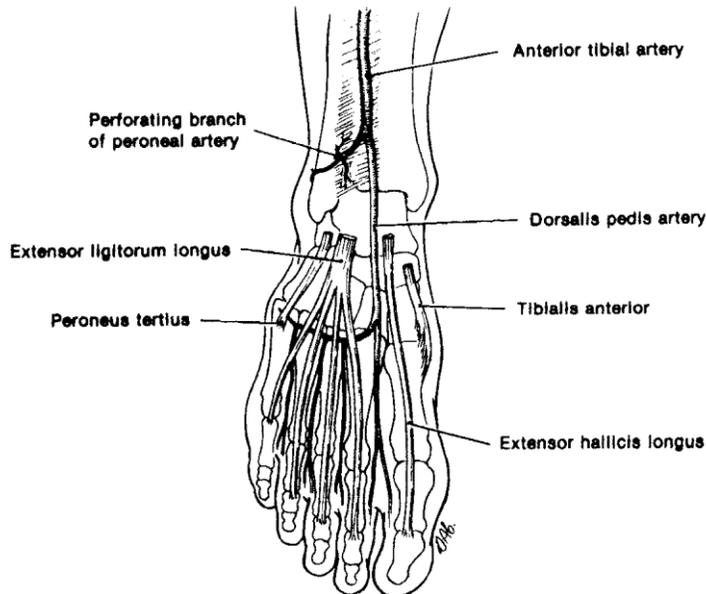
The popliteal artery enters the popliteal fossa medially and then practically bisects the fossa vertically. It is deep and difficult to palpate in most normal patients.



The posterior tibial artery curves behind and below the medial malleolus of the tibia halfway between the medial malleolus and calcaneus.



The dorsalis pedis artery runs along the dorsum of the foot in the first intermetatarsal space.



4. List of Maneuvers to be Demo/Practiced

Abdomen

Inspection of the abdomen with patient supine:

Identify the following landmarks for the abdominal exam on your partner:

Midsternal line, MCL, AAL,RCM, LCM, umbilicus

Four quadrants and costal, epigastric, umbilical, flank, suprapubic, iliac areas

Maps for percussion and palpation of the liver and spleen

Castell's point for splenic percussion

Vascular areas of the abdomen—aorta, renal artery, iliac artery, femoral artery

General Appearance—observe the patient's facial expression and body position for indications of pain. Contour of the abdomen.

Skin - scars, striae, venous pattern, and stigmata of liver disease (caput medusae, cherry angiomas).

Umbilicus—bulging (eversion), Sister Mary Joseph nodes, hemorrhage (Cullen's sign).

Flanks—bulging, ecchymosis (Grey Turner sign). Additional maneuvers are required to distinguish bulging flanks caused by ascites from bulging flanks caused by obesity.

Auscultation of the abdomen with patient supine; with the diaphragm of the stethoscope, and before percussion or palpation:

Listen in each of the four quadrants for presence of bowel sounds or vascular bruits. Presence of bowel sounds is normal. (If you suspect intestinal obstruction, the frequency and quality of the bowel sounds may be useful as supportive evidence.) (bruit= a systolic or systolic-diastolic murmur due to turbulent flow in a blood vessel). Absence of bruits is normal Listen in the right upper quadrant (RUQ) to include the right renal artery area.

Listen in the LUQ to include the left renal artery area.

Listen in the right lower quadrant (RLQ) to include the right iliac artery area.

Listen in the LLQ to include left iliac artery area.

Listen for bruits over the femoral arteries bilaterally.

Percussion of the abdomen with patient supine:

Percuss all four quadrants of the abdomen and the flanks to assess the percussion note and its pattern. In the normal adult, the flanks are dull and all 4 quadrants are tympanitic.

Percuss the liver for size and presence or absence of tenderness.

Start over the right middle lobe of the lung (between 4th and 6th ribs anteriorly) and go down along the mid-clavicular line (MCL).

Assess span, and distance below the RCM in the MCL. Normal liver span should be less than 12-13 cm. Percuss the spleen at Castell's point.

Palpation of the abdomen with patient supine:

General survey-palpate the abdomen very gently in all four quadrants to get a sense of any tenderness or guarding.

Palpate for the liver edge on inspiration in the MCL.

Palpate for splenomegaly using the single-handed technique. [Note: If the splenic percussion sign is negative, then splenomegaly has been effectively ruled out and there is no need to palpate.] Palpate the femoral arteries.

Deep palpation for the width of the aorta.

Inspection posteriorly with the patient sitting:

Identify the following landmark on your partner:

Costovertebral angle (CVA) between 12th rib and spine

Percussion posteriorly with patient sitting:

Percuss the CVA for tenderness.

Palpation of the inguinal canals and digital rectal exam will be covered in the GU exam sessions.

Peripheral Vascular

Inspection with patient supine:

Identify the following vascular landmarks on your partner:

Popliteal fossa, popliteal artery pulse, medial malleolus of the fibula, calcaneus, posterior tibial pulse, first intermetatarsal space, dorsalis pedis pulse

Inspect the extremities for signs of vascular insufficiency --clubbing of the nails, acrocyanosis, edema, venous varicosities, and pigment changes of the skin. Absence of these signs is normal. (If edema is detected, additional maneuvers are required to distinguish pitting from nonpitting edema and to grade the severity of the edema.)

Compare the circumference of the extremities for symmetry. A standard measurement of the calf circumference is made at 10 cm below the tibial tuberosity. A difference in circumference of 3 cm or more suggests deep venous thrombosis.

Palpation with patient supine:

Palpate the right popliteal pulse by deeply palpating with the fingertips of both hands in the midline of the popliteal fossa (optional)

Palpate the left popliteal pulse by deeply palpating with the fingertips of both hands in the midline of the popliteal fossa (optional)

Palpate the right posterior tibial pulse between the medial malleolus and calcaneus with the pads of your index and middle fingers for amplitude

Palpate the left posterior tibial pulse between the medial malleolus and calcaneus with the pads of your index and middle fingers for amplitude

Palpate the right dorsalis pedis pulse on the dorsal surface of the foot along the first intermetatarsal space with the pads of your index and middle fingers for amplitude

Palpate the left dorsalis pedis pulse on the dorsal surface of the foot along the first intermetatarsal space with the pads of your index and middle fingers for amplitude

5. Procedural Tips

Abdominal Exam: Demonstrate with explanation, and observe and guide students through the following steps to promote a general approach to the exam and especially the technique of palpation. Compare and contrast the approaches to the examination of the liver and spleen (liver - MCL landmark for percussion and palpation, palpation more reliable than percussion; spleen - AAL and Castell's point landmark for percussion, LCM landmark for palpation, percussion more reliable than palpation).

General approach to the examination of the abdomen: Encourage the patient to relax, with head on pillow, arms at side. Make sure the examining table or bed is at a comfortable height for palpating and percussing. You will be standing at the right side of the exam table or bed to examine the abdomen. When you begin the exam, be sure you have a full view of the abdomen (drape over the genitalia). Watch the patient's face and body position for signs of pain while you are examining the abdomen. Listening to the bowel sounds has the greatest diagnostic value when performed before proceeding with percussion and palpation. Palpation is the most diagnostically valuable part of the exam, but the technique is extremely subtle and requires a lot of practice to master. It may be thought of as your fingertips bumping up against the organ or mass briefly. Gentleness is the key to successful palpation. Use the pads of your fingers (not the fingertips to avoid jabs). In palpation, the anterior abdominal wall resists the examining fingers because of the strength and the tone of its muscles. Minimize this resistance by gentleness and reassurance to promote relaxation. If the patient is sensitive or ticklish, try placing the patient's hand over your hand. Asking the patient to flex his knees and placing a pillow under the patient's knees may also be helpful.

Approach to the examination of the liver: Percussion and palpation of the liver is performed along the midclavicular line (MCL). First percuss the liver for size and presence or absence of tenderness. Start over the right middle lobe of the lung and go down along the MCL. Assess span, and distance below the right costal margin (RCM) in the MCL. Normal liver span should be less than 12-13 cm. Palpate for the liver edge. This is the most reliable maneuver for estimating liver size. Ask the patient to take a deep breath, and gently press the pads of the fingers of your dominant hand in and up along the MCL beginning somewhat below the level of liver dullness edge estimated by percussion. It may be thought of as your fingertips bumping up against the organ briefly. If you start too high you may override the liver surface and miss the edge. Try palpating several times in this manner moving closer to the costal margin to assess the distance of the liver edge below the RCM. Normal liver may not be palpable or may descend a couple of fingerbreadths below the costal margin. The liver edge should be firm, regular, and have a smooth surface.

Approach to the examination of the spleen: Percuss the spleen (very difficult). Normally the spleen is hidden posterolaterally behind the rib cage. As the spleen enlarges, it first comes anterior and then medially. Percuss over Castell's point in the lowest left intercostal space (the 8 or 9th) at the anterior axillary line (AAL) with the patient breathing at rest, and continue to percuss that same spot as you instruct the patient to take a deep inspiration. This is the most sensitive and specific maneuver for detecting splenic enlargement. A consistently dull note or a change from a tympanitic note to a dull note is

a positive splenic percussion sign. If you do find dullness, it is important to palpate for splenomegaly. [Note: If the splenic percussion sign is negative, then splenomegaly has been effectively ruled out and there is no need to palpate.] Palpate for splenomegaly using the single-handed technique with the patient in the supine position. Ask the patient to take a deep breath, and palpate for a spleen tip beginning in the RLQ and moving upward and medially along a diagonal line at a right angle to the LCM. This technique is much more sensitive and specific for detecting splenic enlargement than the two-handed technique which increases false positives (when compared with gold standard diagnostic imaging studies).

6. Perceptual Tips

Percussion Notes: Reinforce and build on what we learned in percussing the lung, by illustrating a broader range of percussion notes along the continuum from flat to tympanitic note. Emphasize the defining features of duration and pitch, and encourage students to describe their findings.

<u>Duration</u>	<u>Pitch</u>	
Short	High	Flat—thigh muscle
↓	↓	Dull—over fluid, consolidation, dense organ like liver
↓	↓	Resonant—lung
↓	↓	Hyperresonant—air trapping—deep breath and hold or obstructive lung disease
↓	↓	
Long	Low	Tympanitic—over inflated cheek or abdomen

Dullness to percussion over the abdomen suggests fluid, fat, organomegaly, stool, or mass. Suprapubic mass may be due to distended bladder or gravid or enlarged uterus. Additional focused maneuvers may then be performed which you will learn in the future when you see ill patients with your tutors.

Grading the amplitude of the pulses: Introduce the most widely accepted grading system for describing the amplitude of the pulses:

<u>Grade</u>	<u>Amplitude</u>
0	Absent
1+	Diminished
2+	Normal
3+	Increased
4+	Bounding (reflecting a wide pulse pressure or difference between the systolic and diastolic blood pressure)

7. Description of Key Features

Abdominal Exam

Appearance: contour, vascular pattern, skin

Auscultation: bowel sounds (presence or absence—comment on quality if suspecting obstruction), bruits, rubs

Percussion: tympany—dullness, with or without shifting, organ size (liver, spleen, bladder)

Palpation: consistency of the abdomen, tenderness (presence/absence, location), with or without rebound, organs (location, contour, tenderness of liver edge, location of spleen tip only if positive splenic percussion sign), masses (location, size, tenderness), hernias (ventral, umbilical, incisional), width of the aorta

CVA tenderness (presence or absence)

Palpation of the inguinal canals and digital rectal exam will be covered in the GU exam sessions.

Peripheral Vascular Exam

Peripheral pulses: palpation (grade 0 to 4+), presence/absence of bruits: femoral
popliteal (optional) PT DP

R

L

Edema (presence/absence; distribution)

Clubbing

Cyanosis

Venous varicosities

Pigment changes of skin

Calf circumference (symmetry)