

GROSS ANATOMY EXAMINATION I

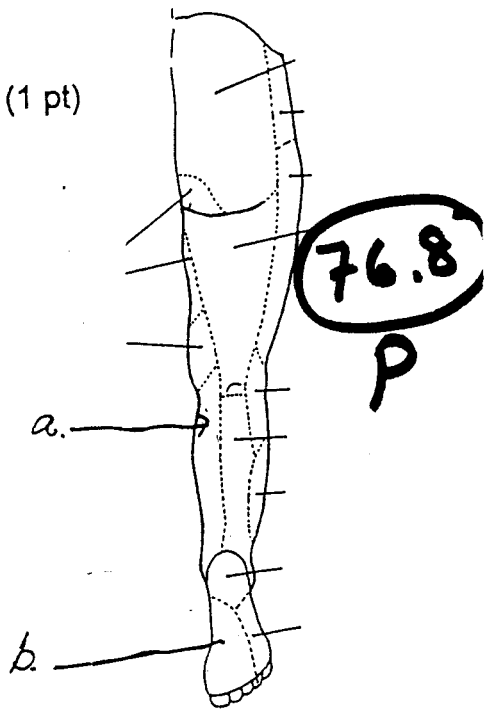
August 29, 1997

HP = $\frac{W}{H} \times 100$
P = P: 66

PART I. Answer in the space provided. (18 pts)

1. Identify the cutaneous innervation to the areas indicated. (1 pt)

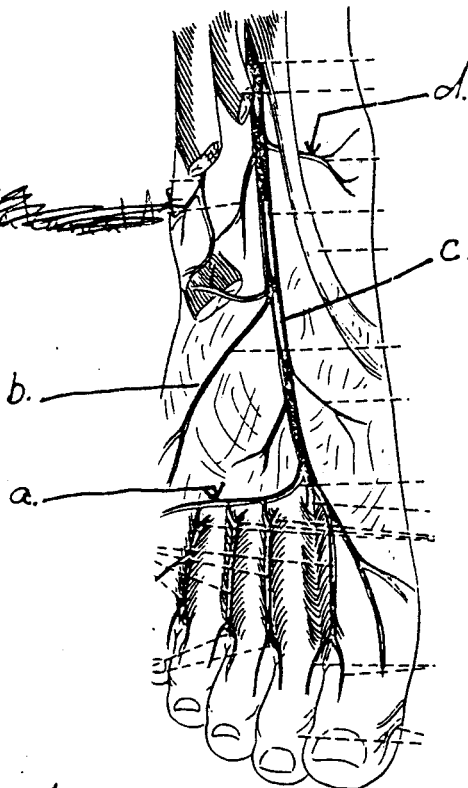
- a. ~~Saphenous Nerve~~ Saphenous Nerve
- b. Medial Plantar Nerve



2. Identify the arteries. (2 pts)

- a. Arcuate Art.
- b. ~~Artery~~
- c. Dorsalis Pedis Arti
- d. Medial Anterior Malleolar Art

lateral Tarsal Art



3. Identify the structures. (2 pts)

a. Posterior Intercostal Art.

~~b. Dorsal Nerve (Asserant).~~

~~c. Subcostal Muscle~~

d. External Intercostal Membrane

Transversus
Thoracis

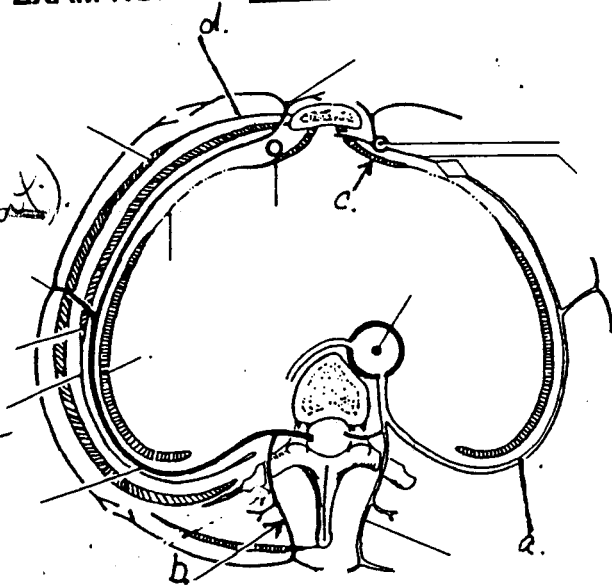


Figure 1.12. Schematic transverse section through thorax.

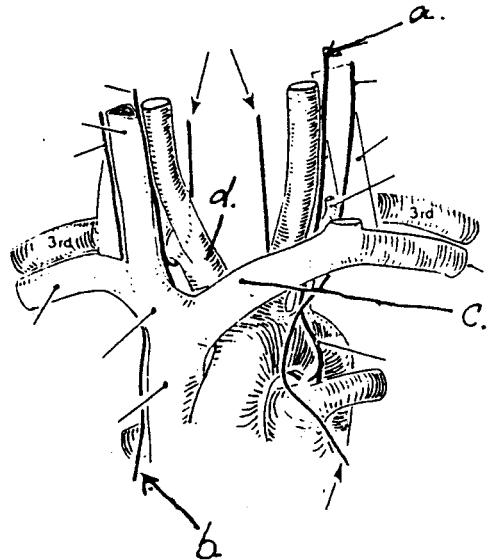
4. Identify the structures. (2 pts)

a. Left Vagus Nerve

b. Right Phrenic Nerve

c. Left Brachiocephalic Vein

d. Brachiocephalic Trunk



5. Identify the structures. (1 pt)

- a. Left Ventricle
- b. Posterior Intraventricular Art.

b. Name this artery

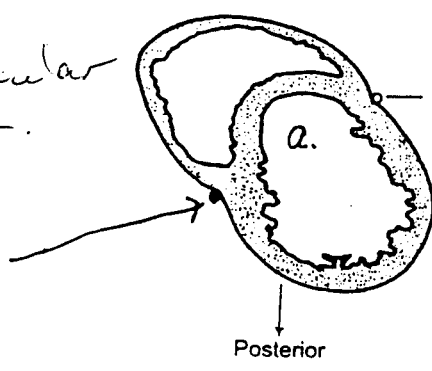
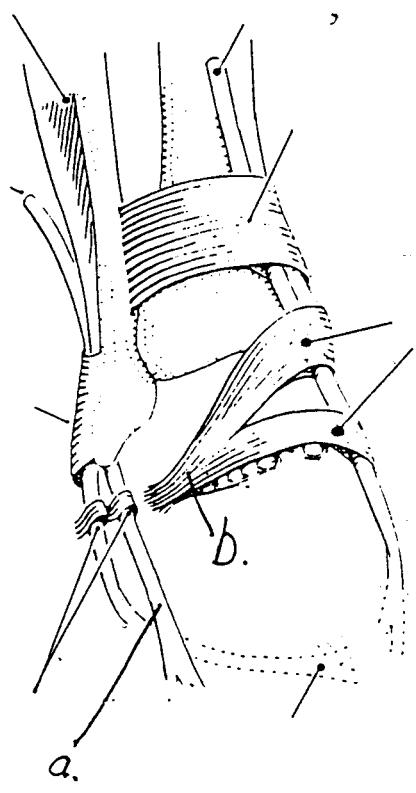


Figure 1. 34. Horizontal section through right and left ventricles.

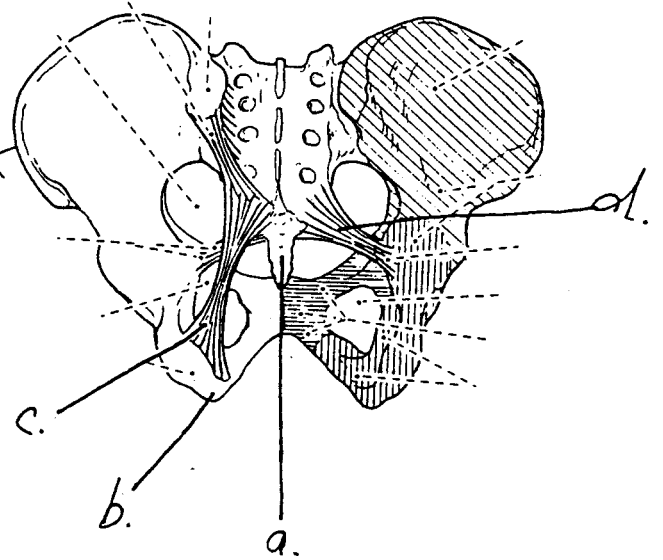
6. Identify the structures. (1 pt)

- a. Tendon of Peroneus Brevis
- b. Extensor Retinaculum (Inferior)



7. Identify the structures. (2 pts)

- a. Coccyx
- b. Ishial Tuberosity
- c. Sacrospinous Ligament
- d. Sacrospinous Ligament



8. Identify the structures. (2 pts)

- a. Gracilis Muscle
- b. ~~Biceps Femoris (long head)~~ Muscle
- c. Sciatic Nerve
- d. Vastus Lateralis Muscle

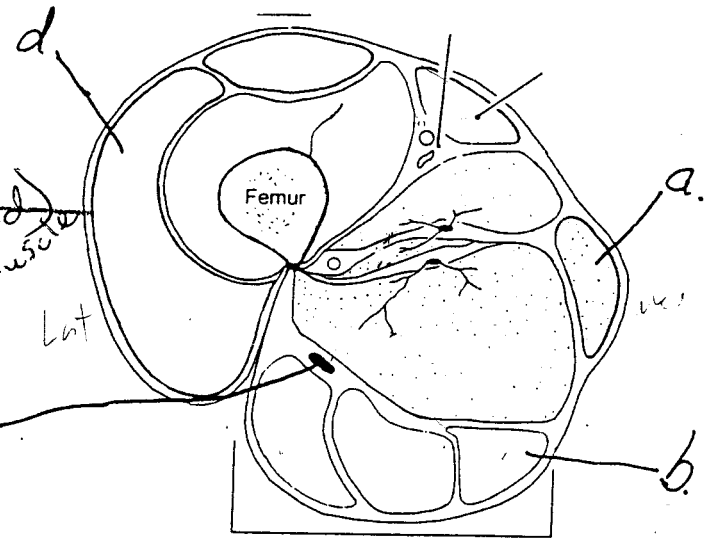
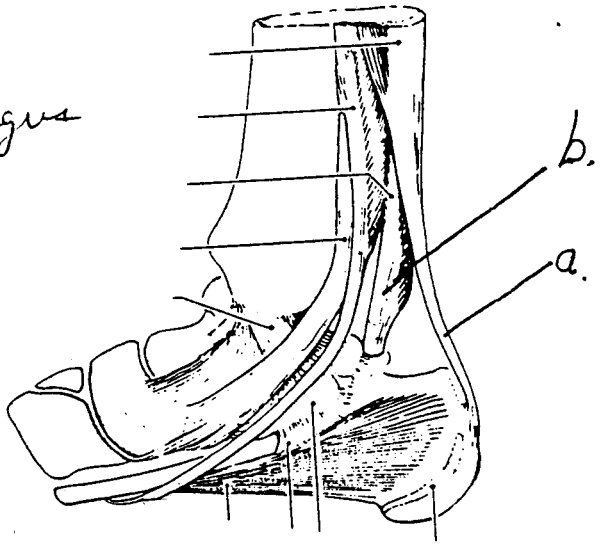


Figure 5.8. Transverse section of the right thigh

9. Identify the structures. (1 pt)

- a. Calcaneal Tendon
- b. Flexor Hallucis Longus



10. Identify the arteries. (2 pt)

- a. Descending Branch of Lateral Femoral Circumflex
- b. Anterior Tibial Recurrent
- c. Descending Genicular
- d. Posterior Tibial

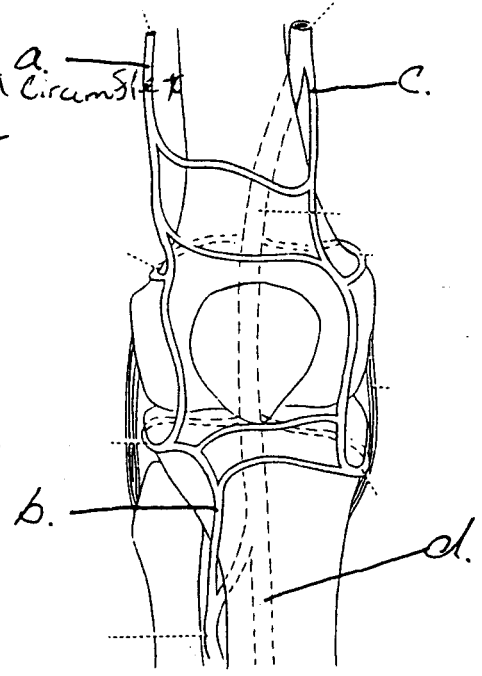
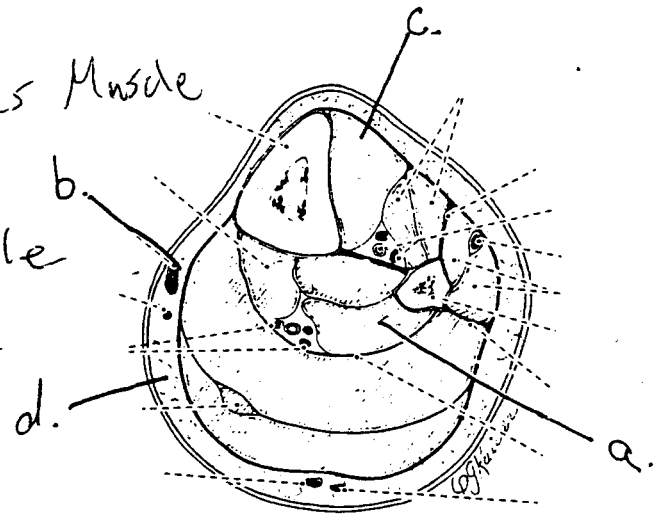


FIGURE 18-43. Diagram of the arteries that form an anastomosis around the knee joint and supply it; anterior view.

11. Identify the structures. (2 pts)

- a. Flexor Hallucis Longus Muscle
- b. Great Saphenous Vein
- c. Tibialis Anterior Muscle
- d. Tela Subcutanea



Part II. Circle the correct answer. All, none, or some may apply. (30 pts)

1. Femoral hernias:

a. Appear inferior and lateral to the pubic tubercle

NO CIRCLE → b. Descend into the thigh anterior to the inguinal ligament

c. Have contents that are restricted laterally by the lacunar ligament

d. Are located in the vascular lacuna

2. With regard to the thigh:

a. The cribriform fascia is derived from the fascia lata

b. The iliotibial tract is derived from the tela subcutanea

c. The saphenous opening provides passage of the great saphenous vein to its termination in the popliteal vein

d. The medial circumflex femoral artery passes to the back of the thigh between the pectineus and iliopsoas muscles

3. With respect to the gluteal region:

a. The gluteus minimus serves to abduct the femur and rotate the thigh medialward

b. The posterior femoral cutaneous nerve is located superior to the piriformis muscle

c. Gluteal injections are given in the upper medial quadrant to avoid blood vessels and nerves

d. The obturator externus passes through the lesser sciatic foramen

4. In regard to the thigh:

- a. Our definition of a hamstring muscle includes muscles originating from the ischial spine
- b. The ischial (posterior) component of the adductor magnus is supplied by the tibial portion of the sciatic nerve
- c. The nerve to the short head of the biceps femoris is the peroneal division of the sciatic nerve
- d. The peroneal division is located in the medial part of the sciatic nerve

5. In the leg:

- a. The popliteus muscle flexes the leg at the knee and rotates it laterally
- b. The popliteus muscle is innervated by the superficial peroneal nerve
- c. The flexor digitorum muscle takes origin from the fibula
- d. The circumflex fibular artery arises from the peroneal artery

6. In the foot:

- a. The extensor digitorum brevis muscle passes diagonally to the lateral four toes
- b. The medial plantar nerve innervates the quadratus plantae muscle
- c. A sesamoid bone is usually located in each head of the flexor hallucis brevis muscle
- d. The flexor digitorum brevis is innervated by the medial plantar nerve

7. Regarding the nervous system, which statement(s) is(are) correct:
- a. Each and every spinal nerve contains a white rami communicans in order to transmit a pre-ganglionic sympathetic nerve
 - b. Parietal pleura has sensations of touch and temperature
 - c. The dorsal root ganglion is a collection of cell bodies of efferent nerves
 - d. The diaphragm is skeletal muscle and is not innervated by the autonomic nervous system
8. With respect to the heart:
- a. The circumflex branch arises from the right coronary artery
 - b. The posterior interventricular artery provides blood to the anterior surface of the left ventricle
 - c. Chordae tendinae contract to maintain the atrioventricular valve when blood is transmitted from the atria to the ventricle
 - d. The SA node is located deep to the epicardium
9. With respect to the joints of the lower extremity:
- a. A syndesmosis is present between the tibia and fibular near the lateral condyle of the tibia
 - b. The anterior cruciate ligament is intracapsular but extrasynovial
 - c. The lateral meniscus is attached to the fibular collateral ligament
 - d. A portion of the popliteus muscle is extracapsular but intrasynovial

10. More questions about joints of the lower extremity:

- a. Inversion takes place at the subtalar joint
- b. Eversion takes place at the transverse talar joint
- c. Eversion sprains at the ankle are more common than inversion sprains
- d. Dorsiflexion and plantar flexion take place at the talocrural joint

11. Formulating an inventory of structures in the thorax:

- a. There are 12 pair of external intercostal muscles
- b. There are 12 intercostal spaces
- c. There are 9 pair of posterior intercostal arteries arising from the thoracic aorta
- d. The anterior intercostal nerves arise from the internal thoracic nerve

12. With respect to the mediastinum:

- a. The trachea is located in the superior mediastinum
- b. The thymus lies in the anterior mediastinum
- c. The phrenic nerves are situated in the middle mediastinum
- d. The thoracic duct is located in the posterior mediastinum

13. With regard to the Angle of Louis (sternal angle):

- a. Receives the third rib
- b. Marks the level of the 4th thoracic vertebrae
- c. Overlies the bifurcation of the trachea
- d. Defines the caudal border of the superior mediastinum

14. Structures which pass through the greater sciatic foramen:

- a. Pudendal nerve
- b. Obturator nerve and artery
- c. Superior gluteal nerve and artery
- d. Superior gemellus tendon

15. Concerning the great saphenous vein:

- a. Empties into the deep femoral vein
- b. Usually drains blood from the deep veins
- c. Begins at the dorsal venous arch
- d. Ascends anterior to the medial malleolus

Part III. Answer in the space provided. (52 pts)

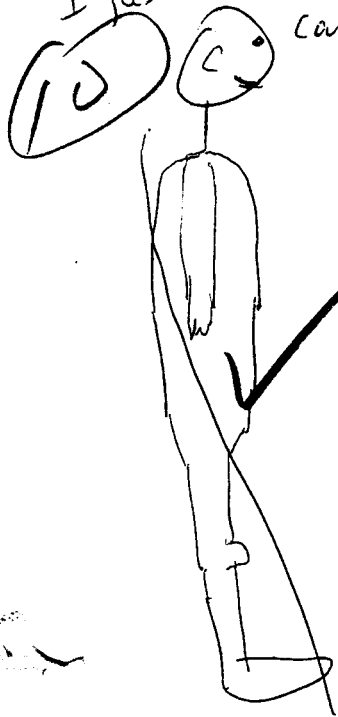
1. Serving as a resident in emergency medicine a patient is admitted with an aortic aneurysm that appears to impact on the left vagus nerve. Discuss the course of the left vagus nerve in the thorax, and mention how perturbation of this nerve might be manifested in clinical symptoms. (8 pts)

①

The left vagus nerve is a preganglionic parasympathetic efferent nerve that traverses down the left thorax near the left phrenic and left cardiac sympathetic nerves. It gives off a branch ~~in~~ posterior and lateral to the ligamentum arteriosum which ~~has~~ connects the inferior aspect of the aortic arch with the superior aspect of the pulmonary trunk. This branch is called the left pharyngeal recurrent nerve, and is pushed on during aortic aneurysms giving a clinical symptom of hoarseness in the voice box. The left vagus continues down ~~to the~~ ^{underneath the} aortic arch with its branches to the superficial cardiac plexus, where it mixes with sympathetic postganglionic nerves. It also will then come out of the ~~plexus and~~ ^{out to the heart} join nerves at the deep cardiac plexus. Branches from the cardiac plexus have innervated the heart ~~itself~~ and would normally induce ~~vasoconstriction~~ ^{vasodilation} of coronary arteries and ~~an increase~~ ^{an increase} of the heart rate because of branches to the SA and AV nodes in the heart. After innervating the heart, it continues on to the posterior pulmonary plexus, then to the anterior pulmonary plexus and finally down by the anterior aspect of the esophagus to the esophageal plexus ~~at~~ near the diaphragm (esophageal hiatus). It becomes ^(after this plexus) the anterior vagus. The vagus nerve thus controls the lower $\frac{2}{3}$ of the esophagus as well as ~~the~~ bronchioles and heart ~~itself~~. If the vagus was ~~contracted~~ ^{contracted} ~~it would~~ ^{it would} affect ~~inferior~~ ^{the} ~~parasympathetic~~ ^{parasympathetic} effects of "fight, flight, and fright" and the visceral organs would not be able to ~~slow~~ ^{slow} down or in the case of peripheral blood \rightarrow

2. Discuss the lines of gravity as it relates to the lower extremity, and the anatomy of relaxed standing. Include consideration of the stabilizing influences upon the hip, knee, and ankle joints, with particular reference to ligaments and muscles. (12 pts)

I just can't draw, can I.



Anyway, the drawing's pitiful but the line of gravity is beneath (post) the hip and anterior to the knee and ankle joint.

At the hip the iliofemoral and pubofemoral ligament prevent falling backwards; at the knee, the capsule, the tibial and fibular collateral ligaments, and the posterior ligaments (oblique, arcuate popliteal lig.) prevent from falling forward; at the ankle the calcaneal tendon (getting its strength from the triceps surae muscles) prevents from falling forward.

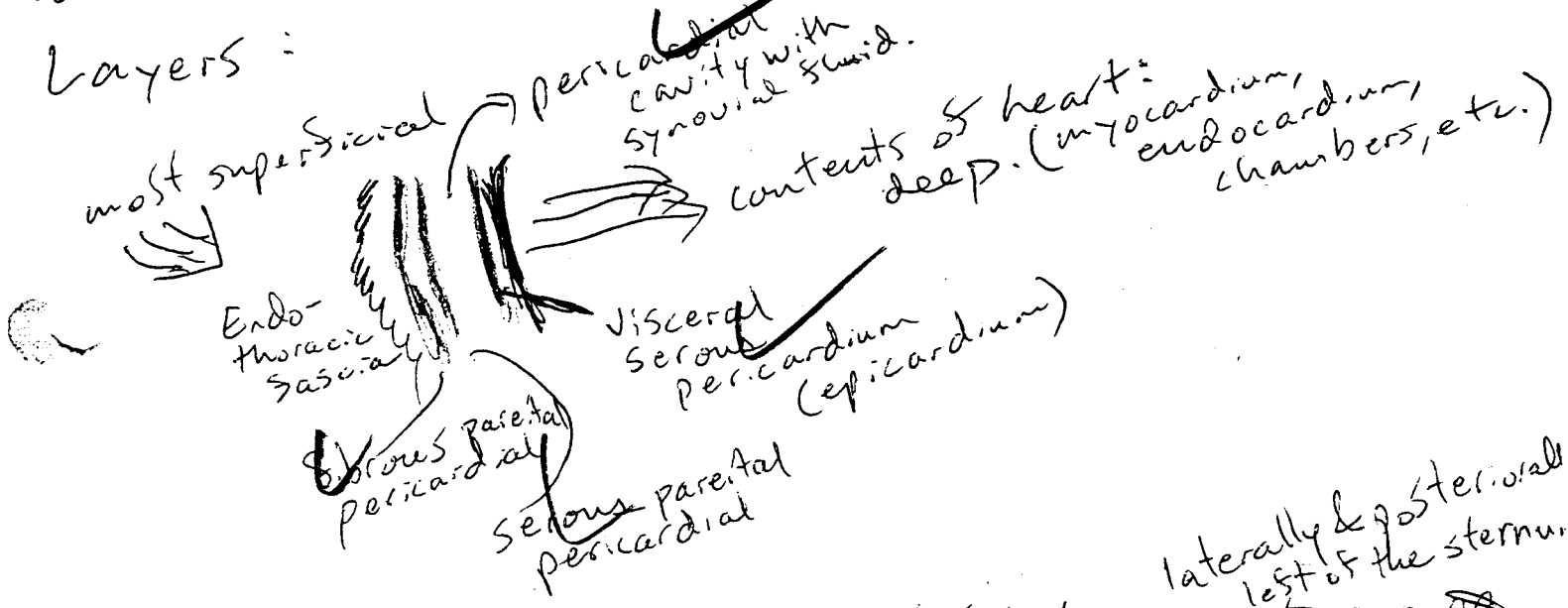
At the hip the iliopsoas (and ~~and~~ somewhat the pectineus) contribute to standing and countering the line of gravity. At the knee ~~the hamstrings and the quadriceps~~ the hamstrings ^{the popliteus,} and the quadriceps are contracted giving a net contraction of locking the knee ~~to~~ in its most stable position with the leg extended fully. At the ankle the medial (talar) and lateral (fibular) malleoli ~~also~~ also contribute to the stability of the ankle by prevent eversion & inversion in relaxed standing position.

9

3. A 40-year old female complains of being constantly tired. You suspect problems involving the pericardium. Discuss the anatomy of the pericardial sac, including mention of the layers, relationships, stabilization, vascularization, innervation, and lymphatic drainage. Comment on the clinical ramifications of excessive fluid in the pericardial cavity. (10 pts)

The pericardial sac surrounds the heart and is in the middle inferior mediastinum (borders: ant. inf. mediastinum, transverse level plane at T4/Angle of Louis, contents of post. inf. mediastinum, trachea, esophagus, etc) and the central tendon of the diaphragm.

Layers:



The sac also pushes into the left lung by intercostal spaces 4-6, creating the cardiac notch, a displacement laterally of the left lung. Parietal becomes visceral pericardium at the venous and arterial mesocardium which is at the ~~point~~ exiting of the great ~~arteries~~ vessels. It is stabilized by a tendon attaching ~~at the~~ the base to the ~~central tendon~~ the diaphragm. It receives its blood supply from ~~branches of the~~ anterior intercostal arteries as well as the left and right pericardiophrenic arteries which lie in the endothoracic fascia. →

4. As part of your responsibilities as a resident in pulmonary medicine, you are asked to give a concise report on the mechanisms of breathing. Discuss the mechanics of breathing. Include a discussion of joints, rib movements, innervation and vasculature, and mention how a pneumothorax will alter these mechanics. (10 pts)

JOINTS

- Costrotransverse (tubercle of rib & transverse process of vertebra)
- Costovertebral (head of rib ^{sup 2 ribs vertebra} & intervertebral disk)
- Costochondral and costosternal joints important

RIB MOV'TS

Diaphragm

Ribs 2-6 pump handle mov't - anteroposterior mov't of ribs pushing sternum out and up. ~~Due to downward mov't of rib/vertebra joint.~~

Ribs 7-11 lateral bucket handle mov't of ribs pushing ribs out. Due to front/back mov't of articulating surfaces of rib & vertebra.

INNERVATIONS

Controlled by somatic & autonomic nerves. ~~phrenic nerve~~ Intercostal nerves control the intercostal muscles. Branches of vagus (parasymp) and sympathetic branches will also innervate other musculature.

VASCULATURE

Ant & Post intercostal arteries deriving from the R & L internal thoracic arteries (ant) & descending aorta (post.)

