

GROSS ANATOMY EXAMINATION I
 SEPTEMBER 6, 1991

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Part I. Answer in the space provided. (36 points)

1. Place your answer in the space provided. (10 points)

a. The cutaneous innervation of the plantar surface of the 2nd digit on the lateral aspect is the deep peroneal med plantar nerve

b. The oblique popliteal ligament helps the posterior part of the capsule resist hyperextension at the knee. Many of the fibers of this ligament are derived from the tendinous insertion of the popliteus muscle. Seminembranous

c. The association of the tendons of the sartorius, gracilis, and the semi-tendinosus is often referred to as the pes anserinus; between the pes anserinus and the underlying tibial collateral ligament is the anserine bursa.

d. The short head of the biceps femoris is innervated by the Common peroneal portion of sciatic nerve.

e. The superior gluteal artery is a branch of the internal iliac artery, a large artery in the pelvis.

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f. The deltoid ligament particularly resists inversion of the foot.

g. The chief blood supply to the posterior muscles of the thigh is the deep femoral artery

h. The sural arteries, paired blood vessels that supply the gastrocnemius and soleus muscles in particular, are branches of the posterior tibial artery popliteal a.

2. Indicate your understanding of the following. (12 points)

a. Medial meniscus.



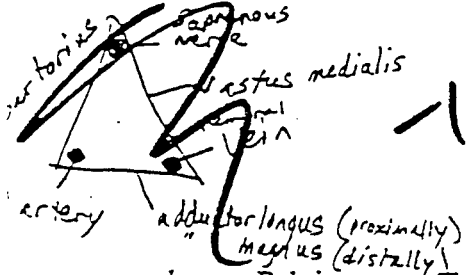
Medial meniscus is a sheath around the medial condyle of the femur. It functions to join the femur with the tibia and fibula with less stress. It is held tight to the condyle by the medial collateral ligament. This fact, in addition to the fact that the medial is inherently weaker than the lateral meniscus, is the reason the medial meniscus is prone to injury from sharp posterior-lateral blows. The medial meniscus is C shaped where the lateral meniscus is O shaped.

excess in flexion

b. Tendon sheath.

Tendon sheaths are synovial membrane coverings over the tendons (esp. in the foot in our case). These sheaths secrete synovial fluid to lubricate the passage of the tendon. They also add protection and rigidity to the tendon.

c. Adductor hiatus.



The adductor hiatus starts ^(opens) just distal to the femoral triangle and proceeds distally to the adductor hiatus, a hole in the adductor magnus. The three vessels start through, just the superficial nerve exits proximally to the hiatus. The blood vessels exit the hiatus to become popliteal vessels.

d. Pelvic sag or Trendelenburg's gait.

Trendelenburg's gait is an anomaly associated with the failure of the gluteus medius/minimus to abduct the hip to keep the person upright. The problem is usually due to the superior gluteal nerve being impaired (supplies these two muscles). The 2 muscles would be working on the side of the body in which the leg is not in the air.

Discuss the anatomy (origin, insertion, anatomical relationships, innervation, blood supply) and function(s) of the popliteus muscle. (7 points)

- origin: lateral epicondyle of femur
- insertion: posterior, medial side of tibia
- innervation: tibial nerve
- blood supply: posterior tibial artery

People with this must lean over their lead side to keep from falling over

The popliteus muscle has important function in that it keeps the knee from hyperextending by a "lock" mechanism. This works by laterally rotating the femur while internally rotating the tibia. When the muscle contracts it unlocks the knee, allowing it to flex freely.

28/2

A 51-year old housewife comes to clinic because of a lump in her right breast. Following examination, your diagnosis is cancer of the breast with axillary metastases. Discuss the lymphatic drainage of the breast and mention why cancer may spread across to the left breast. (6 points)

The breast's primary lymphatic drainage is through the axillary nodes. Also, there are the pectoralis nodes and the intercostal nodes which help. The paraxial, bronchotracheal, and other nodes also help to a minor degree. The reason cancer spreads between breasts is because when the nodes in one breast (or adjacent) are blocked by cancer, the lymph is shunted to the other breast carrying cancer cells with it.

Discuss the "bucket-handle" movement of the ribs during respiration. (4 points)

The "bucket handle" movement is the transverse increase in chest cavity size during inspiration. The lower ribs come up and out to increase the size of the chest cavity. This is not to be confused with the straight anterior-posterior movement of the upper ribs which also increases cavity size. The movement of the ribs occurs along the vertebrae at the transverse and oblique costovertebral connections. It is suspected that intercostal (and subcostals) muscles may aid this, but it is unproven.

The coronary arteries receive blood during diastole. Explain. (3 points)

The coronary arteries branch from the bulb of the aorta. During systole of the left ventricle, the aortic valve is blown open with the pressure of blood. The coronary openings in the sinus of the aorta are covered and receive no blood. Then, during diastole, the blood relaxes back, closing the aortic valve and filling the sinus. The blood in the sinus then flows out the coronary arteries.

4. A slow growing tumor in the posterior mediastinum at the level of T5 eventually occludes (constricts) the aorta at this level. Nevertheless, blood continues to enter the aorta below T5 in quantities sufficient to support the lower body. Explain. (6 points)

The body compensates for this occlusion of the descending aorta by shunting blood out into the intercostal arteries. The intercostals grow and notch the ribs, but blood flow is maintained. The blood rejoins the aorta after the occlusion from a communicating branch of the intercostals.

Define the inferior aspect of the lungs with respect to vertebral level. (3 points)

Midclavicular T 10
Midaxillary T 11
Midscapular T 12

6. Indicate your understanding of the following:

a. Sinoatrial node. (3 points)

The sinoatrial node is just under the epicardium of the right atrium. This node receives signals from the spinal cord on pacing the heart. The sinoatrial node passes its signal to the node located between the ventricles allowing for smooth atrial then ventricular contraction.

b. There are 4 places of narrowing along the esophagus where foreign bodies are prone to lodge. Name 2. (2 points)

1 1/2 Behind tracheal bifurcation
- beginning (in neck)
- at level of upper esoph. sphincter behind left ventricle
- region in contact w/ aortic arch
- crossing to left bronchus
- esophageal hiatus of diaphragm

c. Foreign bodies inhaled into the trachea are more likely to lodge in which bronchus? Explain. (3 points)

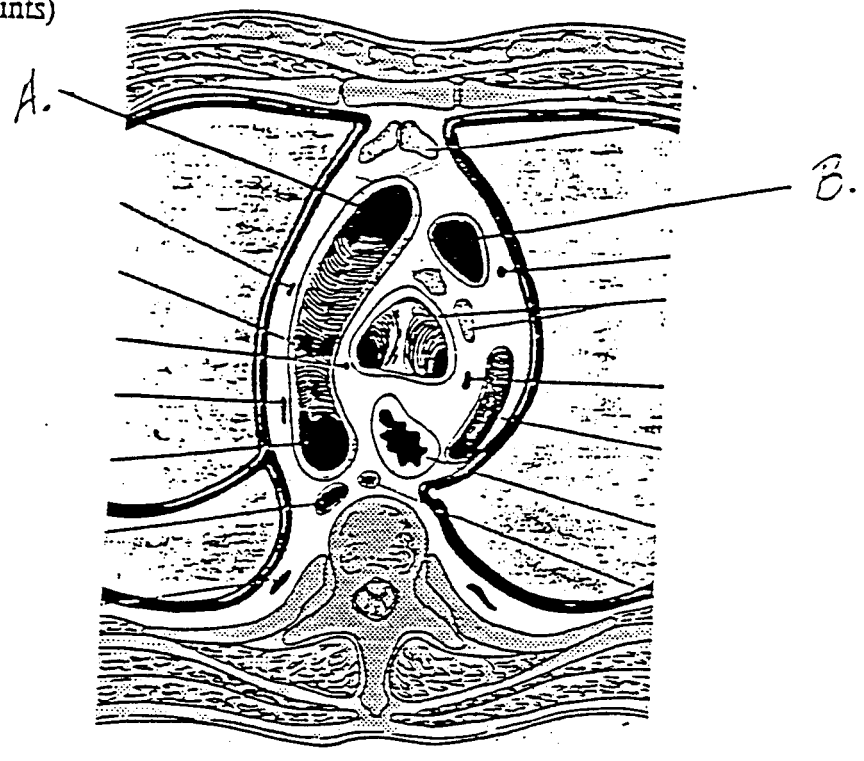
3 They are much more likely to lodge in the right bronchus. This is because it is larger in diameter, shorter, and at a steeper angle than the left bronchus.

d. Iliofemoral ligament. (4 points)

3 The iliofemoral ligament goes from the anterior superior iliac spine to the greater trochanter of the femur. It is one of the three main ligaments holding the hip joint together. Its main function is to prevent the excessive extension of the thigh.

Identify the labeled structures. (2 points)

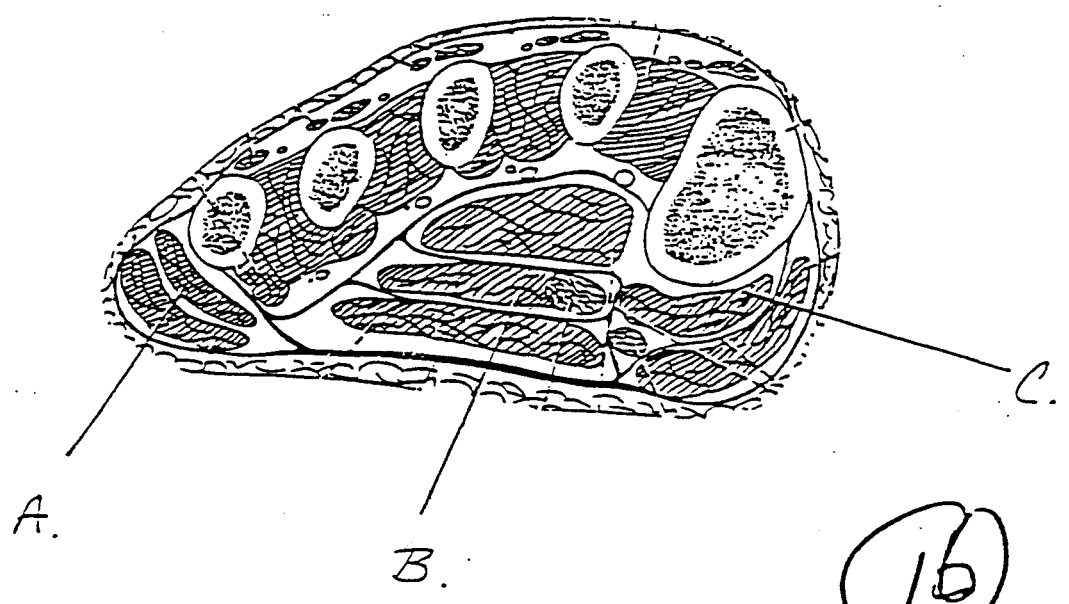
- A. ascending aorta
- B. superior vena cava



2. Identify the labeled structures. (3 points)

- ~~X~~ 1st metacarpal segment
- ~~X~~ 2nd metacarpal segment
- ~~X~~ lateral segment

flexor digiti minimi brevis muscle
 What is this? flexor digitorum longus muscle
 About flexor hallucis brevis muscle



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In regard to joints of the lower extremity:

- a. The plantar calcaneonavicular ligament is called the "spring" ligament. T
- b. The subtalar joint includes the articulation between the talus and the underlying calcaneus. T
- c. The talocrural joint is formed by the trochlea tali and the lower ends of the tibia and fibula. T
- d. The ankle is a synovial joint of the hinge (ginglymus) type. T
- e. The lower end of the fibula is attached to the lower end of the tibia by a syndesmosis joint. T

4. With regard to the pericardium:

- a. The visceral layer of serous pericardium lines the inner surface of the fibrous pericardium. F
- b. The visceral layer of serous pericardium forms the epicardium. T
- c. The phrenic nerve serves as innervation for the fibrous layer of the pericardium. T
- d. The pericardial sac with its contents comprises the middle mediastinum. T
- e. To extract pericardial fluid, a pericardial tap can be performed in the area of the cardiac notch located at the 8th intercostal space; this will avoid pneumothorax. T

5. The azygous vein:

- a. ascends through the posterior and superior mediastina. T
- b. is commonly formed by the junction of the right subcostal and right ascending lumbar veins. T
- c. ends in the inferior vena cava. T
- d. the word azygous means unpaired, or lacking a mate. T
- e. receives drainage of the supreme (highest) intercostal vein. F - branches superior

6. The endothoracic fascia:

- a. covers the thoracic surface of the diaphragm. T
- b. is related to Sibson's fascia (suprapleural membrane) T
- c. provides a natural cleavage plane for the surgical separation of the visceral pleura from the thoracic wall. T
- d. invests the subcostal and transversus thoracis muscles, but not the innermost intercostal muscles. T
- e. separates the parietal pleura from the fibrous pericardium. F

7. In regard to the nervous system:

- a. the preganglionic neuron cell bodies of the autonomic nervous system are located in the dorsal root ganglion. F
- b. general visceral afferents of the autonomic nervous system always consists of 2 neurons. F
- c. gray rami are present at levels T1-L3 T
- d. the deep cardiac plexus contains postganglionic fibers of the vagus nerve T
- e. the right recurrent laryngeal nerve loops around the right branchiocephalic artery T

In regard to the heart:

- ~~a.~~
- ~~b.~~
- c.
- ~~d.~~
- ~~e.~~

both left and right ventricles contain moderator bands
 the fibrous skeleton of the heart is associated with the atrioventricular, but not the semilunar, openings.
 the SA node is found in the epicardium at the cephalic end of the sulcus terminalis
 the right coronary artery gives rise to the marginal and anterior interventricular arteries.
 the deep cardiac plexus lies adjacent and anterior to the SA node

9. The external intercostal membrane:

- a.
- ~~b.~~
- ~~c.~~
- ~~d.~~
- ~~e.~~

lies ventral (anterior) to the transversus thoracic muscles
 lies dorsal (posterior) to the internal intercostal muscles
 has a transition to external intercostal muscle at the angle of the rib
 is present in all 11 intercostal spaces
 is penetrated by the posterior cutaneous perforating arteries and nerves

10. In regard to the saphenous hiatus and the femoral sheath the:

- ~~a.~~
- ~~b.~~
- c.
- ~~d.~~
- ~~e.~~

cribriform fascia is part of the iliotibial tract
 femoral canal is medial to the femoral ring
 femoral sheath contains the femoral nerve
 herniation of abdominal contents (femoral hernia) passes through the femoral ring
 the femoral vein lies in the muscular lacuna

11. Forced abduction and lateral rotation of the leg as encountered by football plays may rupture or damage the following structures:

- ~~a.~~
- ~~b.~~
- c.
- d.
- ~~e.~~

lateral meniscus
 posterior cruciate ligament
 medial collateral ligament
 medial meniscus
 anterior cruciate ligament

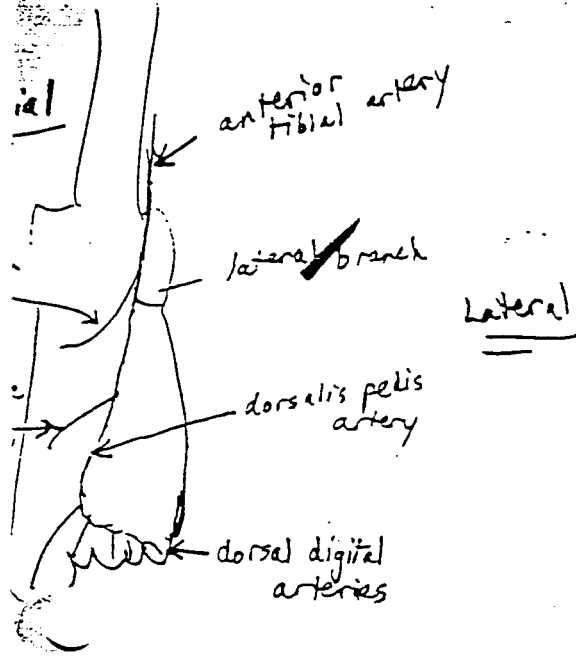
12. Vessels involved in the cruciate (crucial) anastomosis include:

- ~~a.~~
- b.
- c.
- ~~d.~~
- ~~e.~~

second perforating artery
 lateral circumflex femoral artery
 medial circumflex femoral artery
 profunda femoris vein
 descending genicular artery

} } 1st perf a.
 inf genit a.

Discuss the arterial supply to the dorsal aspect of the foot. A drawing might be helpful. (7 points)



The arterial supply to the dorsal side of the foot originates from the anterior tibial artery. This becomes known as the dorsalis pedis on the dorsal foot. It runs from the lateral, anterior leg over the lateral malleolus and out towards the great toe. It gives off a medial and lateral branch to supply the proximal end of the foot. The ~~artery~~ artery comes off to supply the middle medial area. The dorsalis pedis then divides to become digital arteries for the toes.