GROSS ANATOMY EXAMINATION I

(September 7, 1990)

91½/90 H-H-H

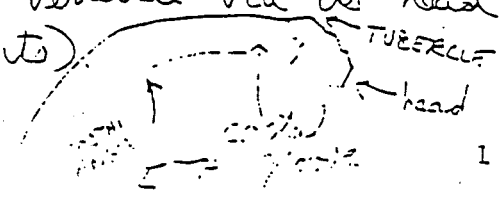
Part I. Answer in the space provided. (36 pts)

1. Discuss the lymphatic drainage of the lung. (6 pts)

The lung is pervaded by capillaries for lymphatic drainage, especially in the alveoli. In the periphery, the capillaries drain into the pulmonary lymph nodes. The pulmonary lymph nodes then drain into the bronchopulmonary nodes at the hilum of the lung. The bronchopulmonary nodes drain into the tracheobronchial nodes that lie along the trachea. The largest nodes of the tracheobronchial nodes, the paratracheal nodes, then merge with the parasternal lymph nodes to deliver the lymph from the lung into what is now called the bronchomediastinal lymph trunk. Up to this point, it is equivalent for the right + left sides, but the rt bronchomediastinal lymph trunk has the option to drain into the ~~thoracic~~ duct (which drains into the angular junction of the left subclavian + left internal jugular) or it can enter the angular junction itself. The ~~rt~~ trunk drains into the right thoracic lymph channel which goes to the right angular junction.

2. Compare the anatomy of the 1st rib with the 5th rib. (5 pts)

The first rib is very broad and almost completely round. Compared to the 5th rib, it is very thick. The 5th rib on the rt hand is long, slender and angular. Unlike the 1st rib (which attaches directly to the sternum the 5th rib is attached to the sternum via a cartilage. The 5th rib has an angle in its length called the costal angle. There is also a groove in the inferior posterior side of the 5th rib called the costal groove that carries the intercostal vein, artery and nerve. The 5th rib articulates to the vertebrae via its head + tubercle (costovertebral + costotransverse joints).



head 3½

1

3. Three prominent ligaments add support and strength to the hip joint. Discuss the anatomy and function of these ligaments. (8 pts)

anterior -

Femoral ligament - this is one of the strongest ligaments in the body. It is also known as the Bigelow or Y ligament because of its Y shape. It's attached to the anterior inferior iliac spine to the greater trochanter and the intertrochanteric line. Because its fibers run medially to the hip joint, it prevents excessive external rotation of the hip and also excessive extension of the hip, as well as holding the legs together. This locking of extension is essential in quiet standing.

) pubofemoral ligament - this lies posterior to the iliofemoral ligament and is tached from the pubis to the iliertrochanteric line. Its fibers run ore laterally to the hip joint and it is because of this that it revents excessive ABDUCTION of the hip joint.

terior

the Ischiofemoral ligament - this ligament runs from the ischial ...ity to the intertrochanteric crest. It helps to hold the osterior side of the hip joint in place as well as to revent excessive internal rotation and excessive ...sion.

Because of the positioning + strength of these ligaments, t is very difficult to dislocate the hip joint.

4. Why does a pneumothorax result in a collapsed lung? (3 pts)

In a normal lung, the pleural cavity ...s a slightly ...ative air pressure in comparison to the outside air. This ...ghtly negative air pressure is necessary for the lungs to ...main inflated, especially on exhaling. When air gets into ...e pleural cavity (pneumothorax), the air pressure increases ...the cavity + it overcomes the elasticity of the lungs to ...lace them. It is the loss of negative air pressure in ...e pleural cavity that collapses it with the increase in air pressure ...cavity.

11

...ollowing of the following: (14 pts)

A. Bronchopulmonary segment (3 pts)

It is a functional segment of the lung. It is the smallest s[egment] that sustains lung function, and removal of it will not damage the rest of the lung. The segment is made up of tertiary bronchi, pulmonary arteries, and lung tissue.

3

B. Supreme/Highest intercostal artery (2 pts)

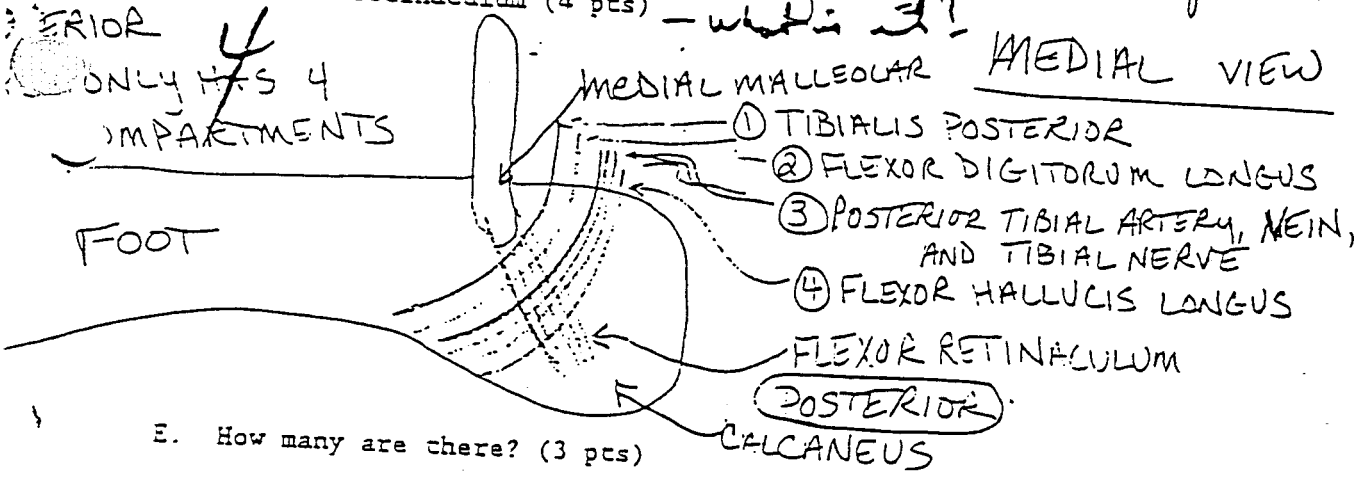
The Supreme intercostal artery supplies blood to the first 2 ~~ex~~terior intercostal ~~spaces~~. It is a branch of the costocervical artery, which is a branch of the subclavian artery.

1C. left + right subclavian → l+r costocervical → l+r supreme intercostal aa.

C. Arterial circulation to the 9th intercostal space (2 pts)

On the posterior half of the thorax, the space is supplied w/ blood from the intercostal artery, which is a branch of the descending thoracic aorta. The anterior half is supplied by intercostal arteries which are branches of the musculophrenic artery (terminal branch of internal thoracic a.)

D. Flexor retinaculum (4 pts) — what is it?



E. How many are there? (3 pts)

i. Intercostal spaces 11

ii. Intercostal nerves 11

1/2 iii. Posterior intercostal arteries (pairs) arising from the aorta 9

iv. External intercostal muscles 11

v. Lumbricals 4

vi. Pulmonary veins that terminate in the left atrium 4

11 4
1 12 10
9 8 9
11 2 1
4
4 6 8

4/

1 1/2

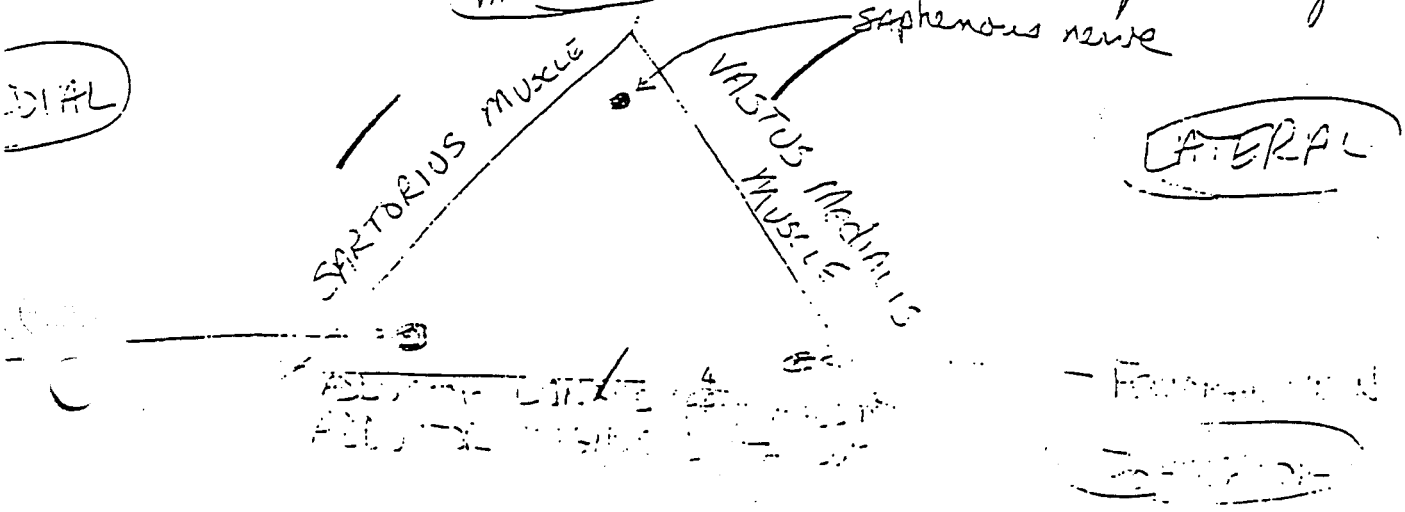
1. Describe the anatomy and function of the gluteus minimus and medius. (6 pts)

The gluteus medius (gm) and gluteus minimus (gmi) are the ...ry ABDUCTORS of the hip joint. They are innervated and supplied by ...erior gluteal nerves + arteries, which lie under gm and on top ... gmi. gm's origin is on the anterior gluteal line of the coxal bone, ...d it inserts on the greater trochanter. gmi's origin is the inferior ...uteal line and it inserts also onto the greater trochanter of the ...mur. gm lies posteriorly over gmi on the ilium. gm is also ...ger than gmi. Both muscles can also laterally rotate the femur.

It is in walking that they play a vital role because they ...p to keep the pelvis level when the opposite leg is in the air. When ... left leg is raised, the right gm + gmi ABDUCT the right hip ...ing the pelvis level + preventing falling to the left side. Loss of ... and gmi or damage to the superior gluteal nerve leads to ...ductor limp.

2. Discuss the structure and contents of the adductor canal. (7 pts)

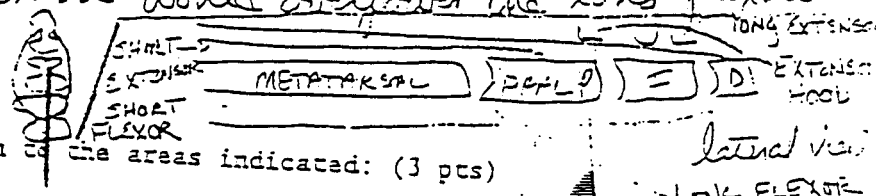
The adductor canal begins proximally at the apex ...e femoral triangle and continues distally where it ...minates at the adductor hiatus (a break in the insertion ... the adductor magnus. It contains the femoral artery + vein ... the saphenous nerve. The femoral artery + vein go through ... adductor hiatus to become the popliteal vessels. The ...henous nerve exits the canal superiorly to the hiatus to ...round the medial side of the knee. See picture for ...ucture + content:



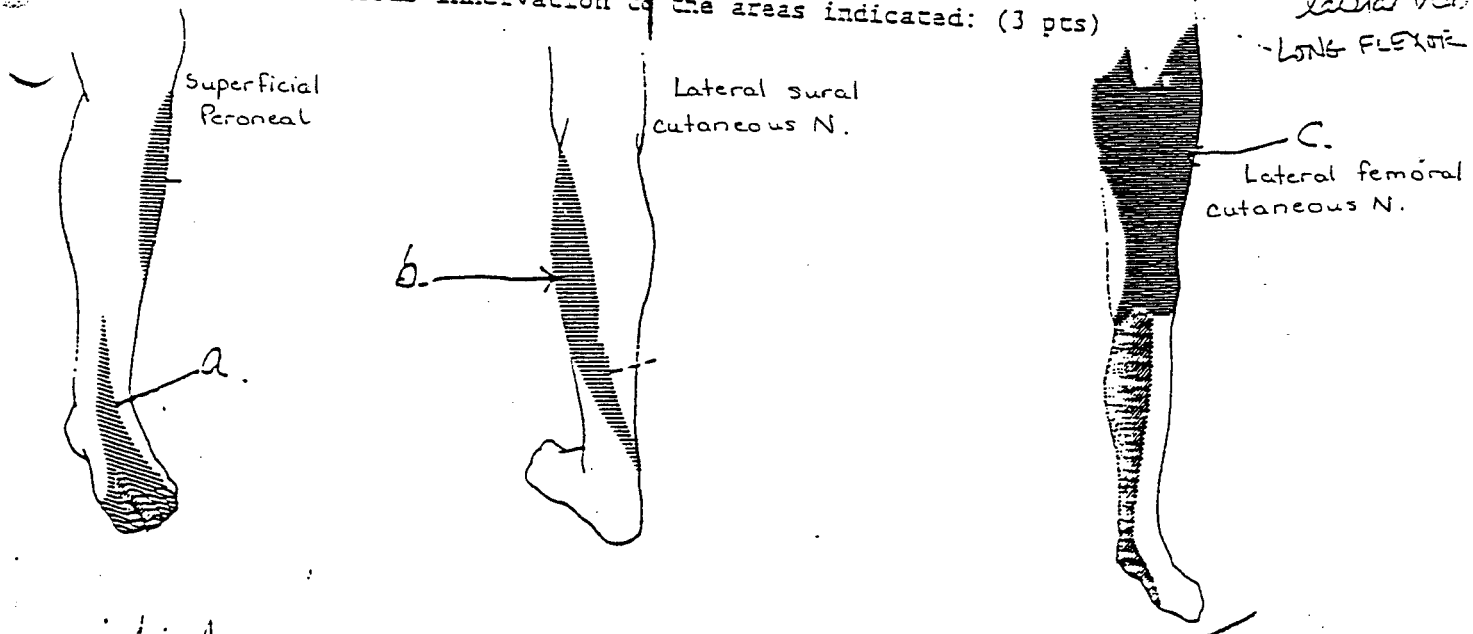
3. Compare the insertions and functions of the long and short flexor muscles in the lower limb with the extensor muscles. (8 pts)

The extensor dorsus muscles (digitorum + hallucis) both create extensor around the 3 phalanges (2 for big toe) as they insert into the dorsal aponeurosis of the toes. The two extensor brevis tendons insert into the proximal phalanges, but they contribute to the extensor hoods. Therefore, the extensor longus muscles can extend the MP and PIP joints via the hoods + w/ help from the brevis muscles.

The long flexor muscles insert into the plantar side of the distal phalanges where they flex the MP joint. The short flexors insert into the plantar side of the proximal phalanges with some fibers going on the lateral + medial side. Because there isn't as much fiber connection as on the dorsal side, the short flexors pull out and the long flexors as much. For example, if the short extensors were cut, the long extensors could still extend the toes, but if the short flexors were cut, the extensors would overpower the long flexors + claw toe would result.



4. Identify the cutaneous innervation to the areas indicated: (3 pts)



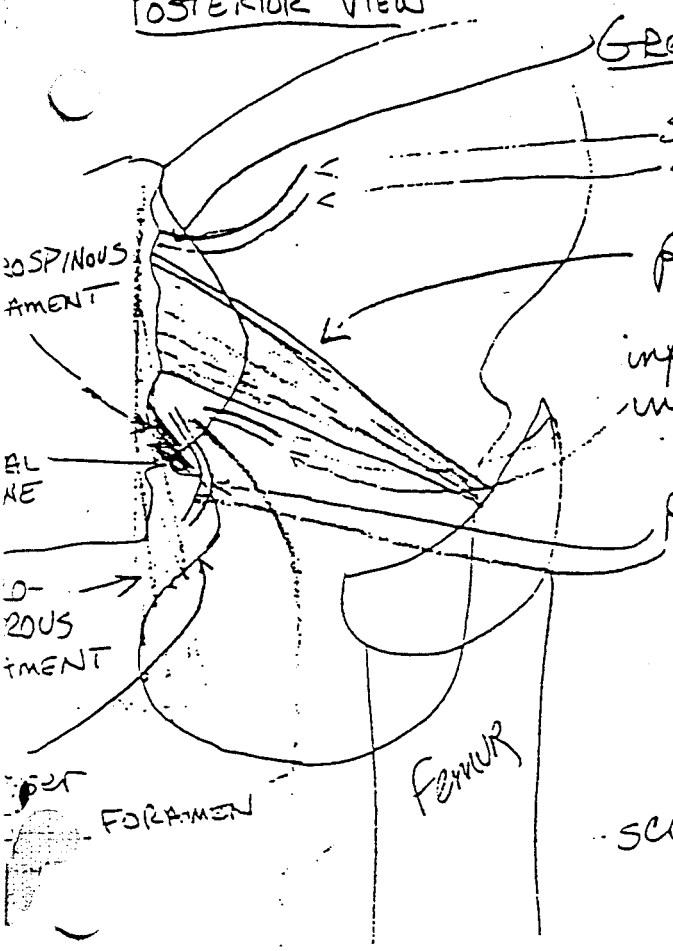
a. superficial peroneal nerve

b. lateral sural cutaneous nerve

c. lateral femoral cutaneous nerve

5. Discuss the structure, relationships, and contents of greater sciatic foramen. (7 pts)

POSTERIOR VIEW



GREATER SCIATIC FORAMEN

superior gluteal artery
superior gluteal nerve
} feed + innervates the gluteus medius, minimus & tensor fascia lata

piriformis muscle.

inferior gluteal artery
inferior gluteal nerve
} feed + innervate the gluteus maximus

pudendal nerve
internal pudendal artery
} come out of the greater sciatic foramen + go into the lesser sciatic foramen. They wrap around the sacrospinous ligament.

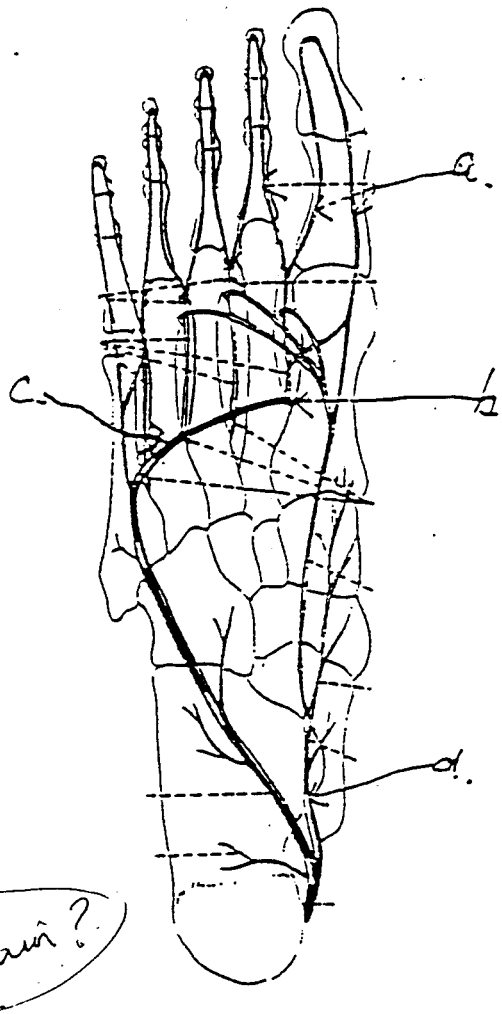
sciatic nerve - Major nerve supply of back of thigh + leg

The greater sciatic foramen is split in half by the presence of the piriformis muscle. It is formed by the greater sciatic notch of the coxal bone. It is made into a foramen by the presence of one ligament which originates from the sacrum; the sacrospinous ligament attaches to the ischial spine. The sacrotuberous ligament helps create the lesser sciatic foramen which transmits the pudendal nerve + internal pudendal - They which come out of the greater sciatic

Part III. Answer in the space provided. (33 pts)

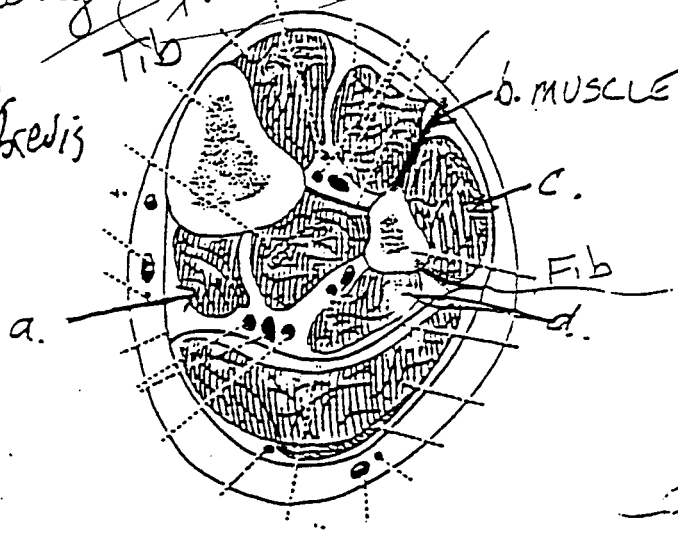
1. Identify the structures. (4 pts)

a. Common digital branches
b. deep plantar artery
c. plantar arch
d. medial plantar artery



Identify the ~~arteries~~: (4 pts) STRUCTURS

a. flexor digitorum longus
b. tibialis anterior ?
c. peroneus longus & brevis
d. flexor hallucis longus



-1
-3
-4

29

a. A plantar interosseous muscle adducts the 2nd digit
b. A dorsal interosseous muscle abducts the 5th digit
c. A lumbrical muscle extends the interphalangeal joint of the 2nd digit
d. The peroneus tertius inverts the foot
e. The lumbricals flex the metatarsophalangeal joint

4. In the thorax:

a. The left pulmonary artery is located posterior to the left bronchus
b. The bronchial veins drain into the internal thoracic veins
c. The bronchial arteries are derived from the musculophrenic artery
d. The eparterial bronchus is located superior to the right pulmonary vein
e. Foreign objects inhaled into the trachea are more likely to lodge in the right bronchus

5. Concerning the great saphenous vein:

a. Ascends posterior to the medial malleolus
b. Empties into the femoral vein
c. Lies deep to the fascia lata in the thigh
d. Ascends along the posterior aspect of the calf
e. Usually conducts bloods from the superficial to deep veins by way of communicating (perforating) veins

6. In regard to the heart:

a. The S.A. node is located in the endocardium
b. The chordae tendinae attach to the cusps of the semilunar valves
c. There are no pectinate muscles in the ventricles
d. Flow of blood in the coronary arteries occurs during diastole
e. The left atrioventricular valve has 2 cusps

7. In the heart:

a. The right coronary artery gives rise to the posterior interventricular artery
b. The small cardiac vein is located in the interventricular sulcus
c. The left coronary artery gives rise to the anterior interventricular artery and the sinoatrial artery (nodal artery)
d. The coronary sinus opens to the right of the anterior papillary muscle
e. The first heart sound is produced by the closing of the atrioventricular valves

8. In regard to the nervous system:

a. The autonomic nervous system contains somatic afferent and visceral efferent nerve fibers
b. The parasympathetic nervous system constricts the pupil
c. The sympathetic nervous system vasodilates the coronary arteries
d. The phrenic nerve is part of the autonomic nervous system
e. There are white rami in the lumbar region

The superior mediastinum contains: T4↑

(a) The aortic arch
(b) Trachea
(c) Phrenic nerves
(d) Right and left brachiocephalic veins
(e) Vagus nerves

10. The sternal angle is at a level where: T5/T4 rib 2 T4–T5

(a) The 2nd rib articulates with the sternum
(b) The trachea bifurcates into the right and left bronchi
(c) The arch of the aorta begins and ends
(d) The inferior border of the superior mediastinum is demarcated
e. The xiphoid process and body of the sternum interact

11. The right primary bronchus:

(a) Is larger in diameter than the left bronchus
(b) Receives more foreign bodies through the trachea
(c) Gives rise to the eparterial bronchus
d. Is longer than the left bronchus
(e) Contains cartilage

12. The left recurrent laryngeal nerve:
(a) Courses below the aortic arch and lies lateral to the ligamentum arteriosum at its origin
(b) May be damaged by aortic aneurysms, leading to hoarseness
c. Forms the major part of the esophageal plexus
d. Is a branch of the phrenic nerve
(e) Ascends in the neck between the trachea and esophagus