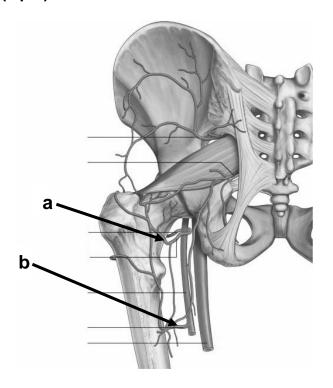
STRUCTURAL BASIS OF MEDICAL PRACTICE

EXAMINATION I

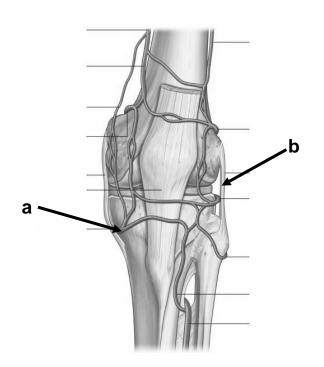
August 27, 2009

PART I. Answer in the space provided. (6 pts)

- 1. Identify the structures. (1 pt)
 - a. Medial femoral circumflex artery
 - b. 1st Perforating artery_____



- 2. Identify the structures. (1 pt)
 - a.___Medial Inferior Genicular_
 - b.___Fibular Collateral Ligament



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3. Identify the nerves. (1 pt)

a.__Lateral femoral cutaneous__

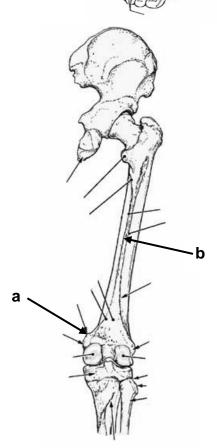
b.__Obturator _____

a b

4. Identify the structures. (1 pt)

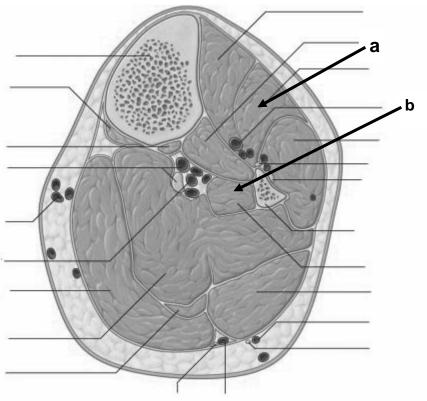
a.__Adductor tubercle__

b.__Linea aspera_____

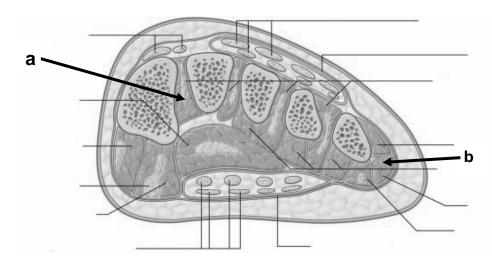


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- 5. Identify the structures. (1 pt)
 - a._Tibialis posterior_____
 - b._Flexor hallucis longus ____



- 6. Identify the structures. (1 pt)
 - a.__Dorsal interosseous____
 - b.__Abductor digiti minimi____



Part II. Circle the correct answer. All, none, or some may apply. (34 pts)

- 1. With respect to the nervous system:
 - **a**. Spinal nerves T1-L3 contain a gray rami communicans that can transmit a post-ganglionic sympathetic nerve.
 - **b**. Parietal pleura has sensations of touch and temperature.
 - **c**. The dorsal horn contains visceral afferent nerves.
 - d. The diaphragm is an example of smooth muscle that is innervated by the sympathetic and parasympathetic nerves.
 - **e**. The parasympathetic division of the autonomic nervous system has originates in part at S2, 3, 4.
 - **<u>f</u>**. Visceral pain is more diffuse and less precise in location than is somatic pain.
 - g. The sympathetic nerves vasoconstrict the coronary arteries.
 - <u>h</u>. The lesser splanchnic nerve consists of pre-ganglionic contributions from T10-11.
 - <u>i</u>. The least splanchnic nerve lies medial to the sympathetic trunk.
 - j. The deep cardiac plexus is formed in part by the sympathetic and parasympathetic nerves.
 - k. Somatic efferent nerves have cell bodies in the dorsal root ganglion.
 - I. The parietal pericardium is innervated by the somatic nervous system.

2. In regard to respiration:

- a. The lingula is a structure that can be utilized to introduce a needle into the pericardial sac without penetrating the pleural cavity.
- **<u>b</u>**. The "pump-handle" movement of respiration increases the anterior-posterior diameter of the thoracic cage.
- **c**. The oblique fissure of the right and left lungs extends to posterior to the 6th chondrocostal junction.
- d. The bronchial arteries provide the nutrition to the lungs, and are branches of the pulmonary arteries.
- **<u>e</u>**. The right pulmonary artery is longer than the left pulmonary artery.

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- f. A bronchopulmonary segment consists of a 2nd order bronchus, lung tissue, and the pulmonary artery.
- **g**. Foreign objects are more likely to lodge in the right bronchus.
- h. The carina is a keel-like ridge on the bronchi.
- i. The left costodiaphragmatic recess lies between ribs 8-10 on the mid-axillary plane.
- j. The eparterial bronchus is located on the right lung and lies superior to the pulmonary artery but inferior to pulmonary vein.
- **k**. Stimulation of the sympathetic innervation results in dilation of the bronchi.
- <u>I</u>. The left bronchus is smaller in diameter but almost twice as long as the right bronchus.
- **<u>m</u>**. The inferior margin of the parietal pleura is at the level of T10 in the midaxillary line.
- **n**. The right bronchial vein empties into the azygous vein.
- 3. In regard to the subinguinal/femoral region:
 - a. The femoral sheath encloses the femoral nerve.
 - b. The medial femoral circumflex artery arises from the medial aspect of the profunda (deep) femoral artery and turns posteriorly between the pectineus and adductor longus muscles.
 - **<u>c</u>**. The femoral canal is cone-shaped, with its base, the femoral ring, facing into the abdomen.
 - **<u>d</u>**. The descending genicular artery can be found in the adductor canal.
 - e. The superior gluteal artery contributes to the cruciate anastomosis.
 - f. One of the heads of the rectus femoris, as well as the inguinal ligament, arise from the anterior inferior iliac spine.
 - g. The lesser saphenous vein drains into the femoral vein by entering the femoral sheath.
 - **h**. The cribriform fascia is related to the tela subcutanea.
 - The muscular lacunae contains the femoral nerve and lies within the pectineus muscle.

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- j. The neck of a femoral hernia lies inferior and lateral to the pubic tubercle.
- 4. In regard to foot, arches, and gait:
 - a. The medial plantar artery is a branch of the anterior tibial artery.
 - b. Digits 2-5 have an extensor digitorum brevis.
 - c. The heads of the adductor hallucis contain sesamoid bones.
 - **d**. The 5th digit is adducted by the plantar interosseous muscle.
 - **e**. The longitudinal arch includes the cuboid bone.
 - **f**. The peroneus longus, tibialis anterior, and tibialis posterior are associated with suspension of the arch.
 - **g**. The longitudinal arch is supported anteriorly by the heads of the metatarsal bones.
 - **h**. The tendon of the flexor hallucis longus courses inferior to the sustentaculum tali of the calaneus.
 - i. The flexor digitorum brevis and flexor digitorum longus form, in part, the extensor expansion.
 - j. The second lumbrical is innervated by the lateral plantar nerve.
- 5. Contents of the posterior mediastinum include:
 - a. Azygous vein.
 - **b**. Esophageal plexus.
 - c. Esophagus.
 - d. Arch of the aorta.
 - e. Brachiocephalic veins.
 - **f**. Descending thoracic aorta.
- 6. With respect to the gluteal region:
 - **a**. The piriformis courses through the greater sciatic foramen.
 - **b**. The obturator externus is located anterior to the quadratis femoris.

- c. Pelvic sag to the left side of the body may indicate a problem with the left superior gluteal nerve.
- d. Intragluteal injections should be made in the upper and inner quadrant of the buttock.
- **e**. The femoral nerve arises from the lumbar plexus.
- f. The internal pudendal vessels exits through the greater sciatic foramen and courses through the lesser sciatic foramen.

7. "This and that".

- a. The tibialis posterior is innervated by the peroneal nerve.
- b. The peroneus tertius is innervated by the superficial branch of the common peroneal nerve.
- **c**. The line of gravity lies behind the hip joint and in front of the knee and the ankle.
- **d**. The posterior femoral cutaneous nerve lies inferior to the piriformis muscle.
- e. The sternal angle is situated at the level of the 3rd costal cartilage.
- f. The costal margin is formed by the 5th to 7th costal cartilages.
- **g**. "Floating ribs" do not articulate with the sternum.
- h. The aortic arch ascends to the level of T4.
- i. The trachea bifurcates into the bronchi at T8.
- j. The popliteal fossa includes a border by the soleus muscle.
- **k**. The popliteus muscle can rotate the leg medially and rotate the femur laterally.
- I. The anterior cruciate ligament is intrasynovial but extracapsular.
- **m**. The iliofemoral ligament becomes taut in full extension.
- **n**. Abduction at the hip is limited by the pubofemoral ligament.
- o. The synovial membrane of the knee extends over the articular cartilage.
- **p**. The transverse tarsal joint consists of the talonavicular and calcaneocuboid ioints.
- **q**. The adductor hiatus is formed by the adductor magnus muscle.

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- **r**. The adductor brevis muscle is innervated by the obturator nerve.
- s. The first and second posterior intercostal arteries in intercostal spaces 1 and 2 arise from the brachiocephalic artery.

The ligamentum capitus contains the posterior cruciate ligament prevents the forward displacement of the femur.

- h. 50% of the weight of the body falls on the calcaneus in the standing position.
- **b**. A spinal tap should be performed at spinal cord levels L4.

- **<u>a</u>**. The heart receives its blood supply by way of the coronary arteries during diastole.
- c. The great and small saphenous vein come are, in part, derived from the plantar venous arch.
- **<u>d</u>**. Blood drains from the superficial to the deep veins in the leg.
- **e**. The foot is more stable in a dorsiflexed position than a plantar flexed position.
- **f**. The posterior cruciate ligament is intracapsular and extrasynovial.
- **g**. The line of gravity falls behind the hip and and in front of the knee and ankle joints.
- i. The esophagus is narrowed in the region where it is in contact with the azygous vein.
- j. Posterior to the 6th rib the internal thoracic vein receives two terminal branches: the musculophrenic and the superior epigastric veins.
- k. The pericardiacophrenic vein drains directly into the brachiocephalic vein.
- I. The fibrous coat of the serous pericardium contains mesothelial cells that secrete pericardial fluid.

Part III. Indicate your understanding (characteristics, importance, function, and/or contents) of the following. Answer in the space provided (including back of page). (24 pts)

1. Breast cancer is the second most common malignancy in women. Determining lymphatic spread of the disease is important in the staging of this cancer in order to determine treatment strategies. **Describe the lymphatic drainage of the breast.** (6 pts)

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2. The vagus nerve enters the thorax at the superior thorasic aperture. **Trace the course of the left vagus nerve in the thorax.** (6 pts)

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3. Pes anserinus or "goose's foot" is commonly used in the repair of injuries to the anterior cruciate ligament (ACL). **Describe the anatomic location and describe the components of the pes anserinus, and its relationship to surrounding structures (bones, muscles, tendons, nerves).** (6 pts)

4. Injury to the gluteus medius and minimus will result in gait abnormalities. **Describe what actions would be affected by injuries to the gluteus medius and minimus. Include in your description the origin/insertion, innervation, and vascular supply to these muscles.** (6 pts).

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Part IV. Answer in the space provided (including the back of the page for each question). (36 pts)

1. A 31 yr old male presents to the Emergency Department with left ankle pain. Earlier that day he was playing golf with a friend when he was struck on the medial aspect of his left ankle by a stray golf ball. He noted immediate pain and swelling in the ankle and had difficulty bearing weight. You are asked by the consulting orthopaedic attending to: Review structures related to the medial region of the ankle. Include bones, muscles, fascia, retinacula, innervation, articulation and movements, medial longitudinal arch, as well their anatomic relationship. Also discuss the effects on foot movement(s) and gait. (12 pts)

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2. A 55 yr. old female is a back seat, belted passager in a car that is involved in a rear end collision. The impact forced the contents of the trunk forward causing a penetrating injury to the patient's right, posterior thigh. Damage to the nerve(s) and vascular structures of the posterior compartment are expected. During exploratory surgery you are asked to define the posterior compartment of the thigh, including all of its structures. **Discuss the anatomy of the posterior compartment of the thigh, and include an account of the muscles (origin/insertion), contents and relationships, fascial specializations, innervation, vascular supply, ligaments, bones and articulations, movements and limitations of movements, and stability.** (12 pts)

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3. As a 2nd year cardiothorasic surgery fellow you are asked to consult on a 56 year old male for possible coronary artery bypass graft surgery (CABG). The man sustained a right ventricular infarct three days prior. When you present the case for review, you must include the structure and function of the right ventricle. Discuss the structure of the right ventricle of the heart, including muscles, innervation, vasculature, relationship to the pericardium, and function. Include a discussion of the atrioventricular and semilunar valuves. (12 pts)

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