

HP 87 (4)  
HP 84

1. Answer in the space provided. (26 pts.)

Indicate your understanding of the following. (15 pts.)

a. Bursa - a protective sac of fluid. Between bone and ligament.  
For example - trochanteric bursa protecting buffering between trochanter and gluteus muscle.

ex - the suprapatellar bursa at knee is protected by articularis genu muscle

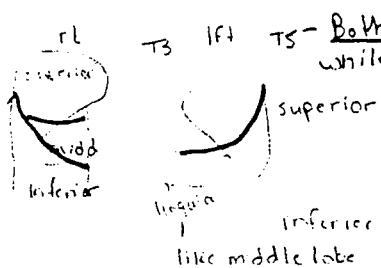
b. Sesamoid bone - w/in tendon of muscles & they aid movement.  
Bone that forms within tendons of muscles to aid movement.

Examples - patella - largest sesamoid in body  
- beneath great toe, 2 sesamoid bones w/in flexor hallucis brevis tendon  
flexor digitorum longus tendon runs between.

c. Ligamentum arteriosum

- the ligamentum arteriosum is the closed remnant of the ductus arteriosum, which in the pre-born child connected the pulmonary artery + aorta. Why - because the blood received from mother was already oxygenated and it was practical to bypass the lungs in the child

d. Oblique fissure



Both left + right lungs have an oblique fissure while right also a horizontal fissure. These divide the lung into lobes. In past - damaged lungs were removed by lobectomy.

e. Endothoracic fascia

- is the layer of fascia outside the parietal pleura which allows the lungs to attach to the thoracic walls. Sort of like glue-tissue.

A specialized fascia - the suprapleural fascia exists in upper-chest - neck area to hold lungs-pleura up which diaphragm pulls down

Answer in the spaces indicated. (5 pts.)

- a. The Obturator nerve splits into anterior and posterior divisions at the superior border of the adductor brevis muscle.
- b. The coronary arteries fill during the diastolic phase of the cardiac cycle.
- c. The oblique sinus is a blind diverticulum posterior to the heart formed by the reflections of pericardium related to the inferior vena cava and pulmonary veins. *blind pouch*
- d. The cutaneous innervation of the anterior lateral leg is provided by the lateral sural nerve. (cutaneous)
- e. The celiac, superior mesenteric, and inferior mesenteric ganglia are constituents of the sympathetic nervous system. *Parasympathetic + Parasympathetic*

3. Define the bronchomediastinal lymph trunks. (4 pts.)

The bronchomediastinal lymph trunks are the result of the confluence of the parabrachial lymph nodes - the largest being the parabronchial lymph nodes @ either side of trachea at its bifurcation - and the parasternal lymph nodes around the internal thoracic arteries. The lungs drain into the tracheobronchial lymph nodes and the heart and drain into the parasternal lymph nodes. The bronchomediastinal lymph trunk can further drain into the right or thoracic lymph duct.

4. Can pericardial paracentesis (e.g., extraction of pericardial fluids) be accomplished without damage to the pleural membranes or a pneumothorax? Explain. (2 pts.)

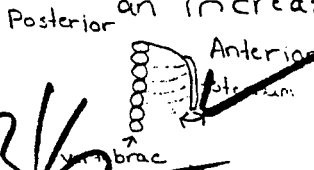
-2 Yes. There is a gap in the pleural lung spaces @ the mediastinum - must enter here. the lung pleura are non-communicating.

*- Yes, the cardiac notch*  
Cardiac notch  
anterior approach.

Part II. Answer in the space provided. (28 points)

Discuss the "pump-handle" movement of respiration. (4 pts.)

Ribs 2-6 are involved in the pump handle movement. During inspiration & expiration there is movement of the synovial joints at vertebrae allowing an increase in the anterior-posterior space of the lung cavity.



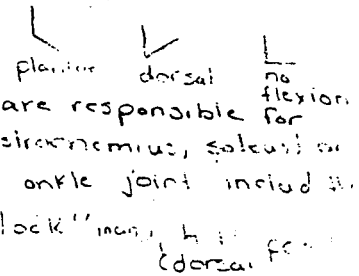
This is not to be confused w/ the "bucket-handle" movement of ribs 7-10 which increases the lateral space of the lung cavity. It is a movement of the costochondral & sternochondral joints.

Discuss the joints involved in movements of the ankle and foot. (7 pts.)

There are two types of joint movement -

the ankle is responsible for the plantar & dorsal flexion.

The muscles of the anterior compartment (i.e. anterior tibialis) are responsible for dorsiflexion and those of the posterior compartment (gastrocnemius, soleus) are responsible for plantar flexion. The bones involved in the ankle joint include the tibia, fibula, calcaneus & talus. The calcaneus & talus can "lock" movement of the foot.



The transverse tarsal joint is responsible for eversion and inversion of the foot. The transverse tarsal joint uses the shapes of the base of the foot (talus, calcaneal, navicular, cuboid & cuneiforms) in conjunction w/ the plantar ligaments (short, long, spring) to control this movement. Muscles involved in inversion & eversion include peroneus longus & brevis (eversion) and posterior & anterior tibialis (inversion) and hence, their tendons are involved the joint of the foot.

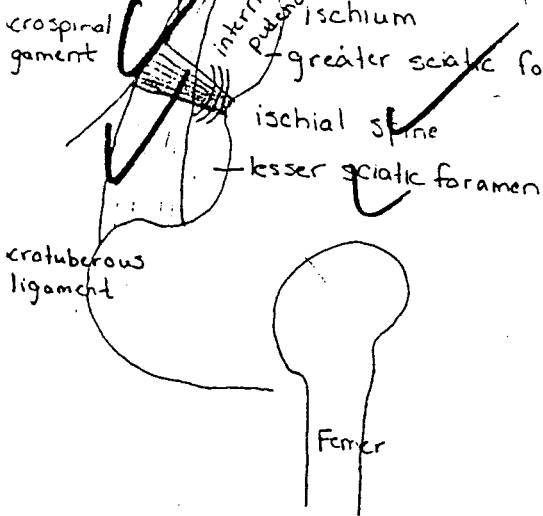
It is more likely than a person will have an inversion sprain than an eversion sprain, because the tripartite lateral ligaments are much weaker than the medial deltoid ligament at the foot.

Discuss the anatomy (boundaries, contents) of the lesser sciatic foramen. (6 pts.)

Lesser sciatic foramen

The lesser sciatic foramen is formed by the sacrospinous & sacrotuberous ligaments. These ligaments connect the ischial spine & sacrum and the ischial tuberosity & sacrum, respectively. The lesser sciatic foramen is formed at the lesser sciatic notch of the ischium, and is inferior to the greater sciatic foramen.

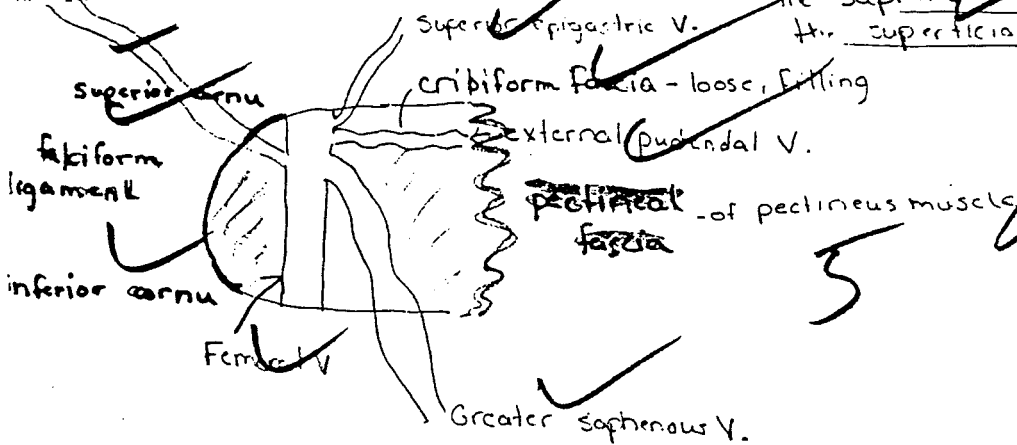
The primary role for the lesser sciatic foramen is to provide a secondary route for the internal pudenda and the pudendal nerve after they have transversed the greater foramen & wish to return to the sacral space. The foramen would be covered by the gluteus maximus.



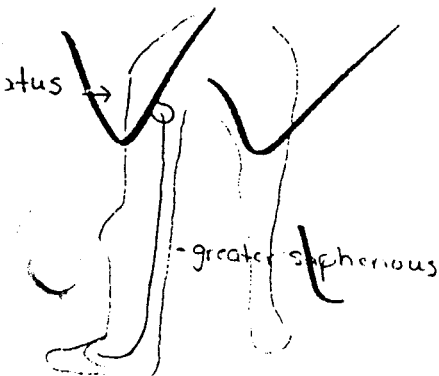
mm 5 ?

Indicate your understanding of the structure, relationships, and importance of the saphenous hiatus. (5 pts.)

The saphenous hiatus is an opening of the fascia lata of the thigh. It is where the greater saphenous vein joins the femoral vein on the anterior thigh. The saphenous vein is a venous return for the superficial portion of the leg.



Why is it there?  
What is its function?



10 1/2

Discuss the longitudinal arches of the foot. (6 pts.)

There is a medial & a lateral longitudinal arch of the foot. The medial arch is higher, allowing the blood flow far from the foot somewhere to go while the foot is being used for standing. The lateral arch is flatter & to the ground, supporting the weight of the foot.

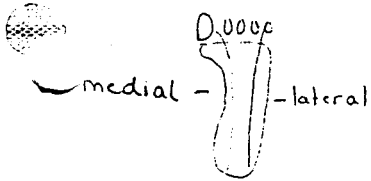
The bones involved in the medial arch are the - 1-3 metatarsals and phalanges, the 3 cuneiforms, the navicular bone, and the talus.

The lateral arch involves metatarsals & phalanges 4-5, the cuboid bones and the calcaneus.

Additionally, there is a transverse arch of the foot involving the bases of the metatarsals, the cuneiforms, cuboid, & talus.

The arches are maintained by bone shape (talus is the keystone of arch), the ligaments holding bones together (short, long, spring), the support of the plantar aponeurosis and muscles <sup>contained in</sup> foot, and the tendons of peroneus longus or flexor hallucis longus providing suspension.

↑ curvature of the arch compared to that of the bridge - exactly like a bridge.



111. Answer in the space provided. (22 points)

Stenosis = narrowing

Discuss collateral circulation of the arterial supply to the thorax as a result of a slowly occurring stenosis of the aorta. (6 pts.)

If there is stenosis of the aorta, the upper half of the body is receiving too much blood, and the lower body is not receiving enough. The objective of the body is to get blood to the descending aorta by a new route. This is possible by sending blood from the inner thoracic & musculophrenic arteries to the anterior intercostal arteries, which can anastomose with the posterior intercostal arteries - which connect to the descending aorta, and hence blood flow returns.

The collateral circulation must occur over time, as the <sup>forming</sup> anastomosis of the anterior & posterior intercostal arteries is a slow event.

The appearance of the intercostal arteries in someone w/ a stenosis would be tortuous & large compared to those in a person not dependent on collateral circulation.

-1/2

2. Pericarditis (acute inflammation of the pericardial sac) associated with such disorders as bacterial, viral, or tuberculosis infection may result in pericardial effusion (passage of fluid) from the pericardial capillaries into the pericardial cavity. If the effusion is extensive, it may embarrass (compromise) the action of the heart. Explain. (2 pts.)

The enlarged pericardial cavity will compress the coronary arteries & veins, limiting circulation to the heart and its action-regulating nodes.

- Resistance to movement of heart pumping -  
no longer acting as shock absorber

-1/2

A patient with a suspected tumor compressing the right common peroneal nerve is referred to your office. Discuss the effects on gait, sensory deficits, and how you would distinguish between problems in the major branches of this nerve. (7 pts.)

The common peroneal nerve has two major branches - the deep & superficial peroneal. The deep peroneal N. supplies the anterior compartment of the leg (extensor hallucis longus, extensor digitorum longus, anterior tibialis and peroneus tertius). The main function of these muscles is dorsiflexion, and a damaged deep peroneal N. would impair dorsiflexion - and there would be a characteristic foot drop (when walking dorsiflexion couldn't occur in affected foot - so it would be lifted high and slapped to the ground during its swing phase). The deep peroneal innervates the skin between the 1st and 2nd digits, so a pinprick there would allow one to know if damage had occurred to deep peroneal.

L2  
The superficial peroneal branch supplies the lateral compartment of the leg - Peroneus brevis & peroneus longus. These muscles are primarily evertors of the foot, and damage to the superficial peroneal would result in a characteristically inverted foot. The foot would be pushed flat after the heel strike of each stance phase. The superficial innervates the skin between the 2nd, 3rd, and 4th digits - so a pinprick here could determine if damage to the superficial had occurred.

-0

Discuss the course and function of the vagus nerve in the thorax.

(7 pts.)

The vagus nerve is parasympathetic nerve (10th cranial). It is an intrinsic nerve supplying the heart, it contributes to innervating the smooth muscle portion of the esophagus, it contributes to the esophageal & cardiac plexi.

The left vagus appears at the level of the vertebra, and gives off a left recurrent laryngeal N at the ligamentum arteriosum and continues along the esophagus & descending aorta.

The right vagus nerve gives off a right recurrent laryngeal N above the thorax, and continues into the thorax.

The vagus nerves are found posterior to the pericardium, in the mediastinum.

- 2



IV. Answer in the space provided. (24 points)

Circle the correct answer. All, none, or some may apply. (17 points)

a. Contents of the posterior mediastinum include:

- 1. Hemiazygous vein
  - 2. Esophageal plexus
  - 3. Thoracic duct
  - 4. Phrenic nerve
  - 5. Trachea
- } Superior

b. The following vessels contribute in some manner to the geniculate anastomosis except:

- 1. 1st perforating branch of the profunda femoris artery
- 2. Middle genicular artery
- 3. Medial femoral circumflex artery
- 4. Obturator artery
- 5. Sural artery

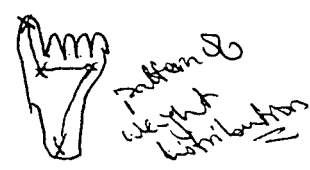
c. With respect to the femoral triangle:

- 1. The femoral vein lies medial to the muscular lacunar.
- 2. The adductor magnus muscle provides the roof of the triangle.
- 3. The adductor longus muscle provides part of the floor or posterior wall of the triangle.
- 4. The falciform ligament forms the upper border of the triangle.
- 5. Contains the lateral femoral cutaneous nerve.

d. In terms of the lines of gravity and weight distribution of the body when standing upright:

- 1. the line of gravity passes behind the ankle joint
- 2. 50% of the body weight is distributed to the calcaneus
- 3. the line of gravity passes in front of the knee joint
- 4. the first metatarsal typically bears about twice the weight of the second metatarsal
- 5. the line of gravity passes in front of the hip joint

12 pts total



$$\begin{array}{r}
 24 \\
 -4.5 \\
 \hline
 19.5
 \end{array}$$

behind the hip  
in front of knee  
in front of ankle

19.5

Upper Lumbar  
Thoracic

e. In regard to the autonomic nervous system:

- ~~1.~~
- ~~2.~~
- 3.
- 4.
- 5.

gray and white rami are present at all levels of the sympathetic trunk  
 the sympathetic system causes vasodilation of the coronary arteries  
 the sympathetic trunk terminates caudally at L3  
 pre-ganglionic fibers of the sympathetic system terminate directly on cells of the heart<sup>no</sup>  
 the superficial cardiac plexus contains postganglionic fibers of the vagus nerve

f. In regard to the heart:

- 1.
- ~~2.~~
- 3.
- 4.
- 5.

chordae tendinae are tendinous strands from the ventricular walls to the underside of the cusps of the atrioventricular and semilunar valves.  
 the transverse sinus passes posterior to the aorta and pulmonary artery  
 the fibrous layer of the visceral pericardium is also referred to as the epicardium  
 the base of the heart is represented by its diaphragmatic surface  
 the AV node is found in the muscular interventricular septum

Apex

atrioventricular

↳ numerous aspect of the interventricular septum

g. In relating surface anatomy to underlying structures, which of the following is (are) true?

- 1.
- ~~2.~~
- 3.
- ~~4.~~

the sternal angle demarcates the position of the aortic arch  
 The horizontal fissure follows the course of the 6th rib  
 In normal posture after expiration, the trachea bifurcates at the level of the sternal notch  
 the junction of the manubrium and the xiphoid process occurs at T8/9

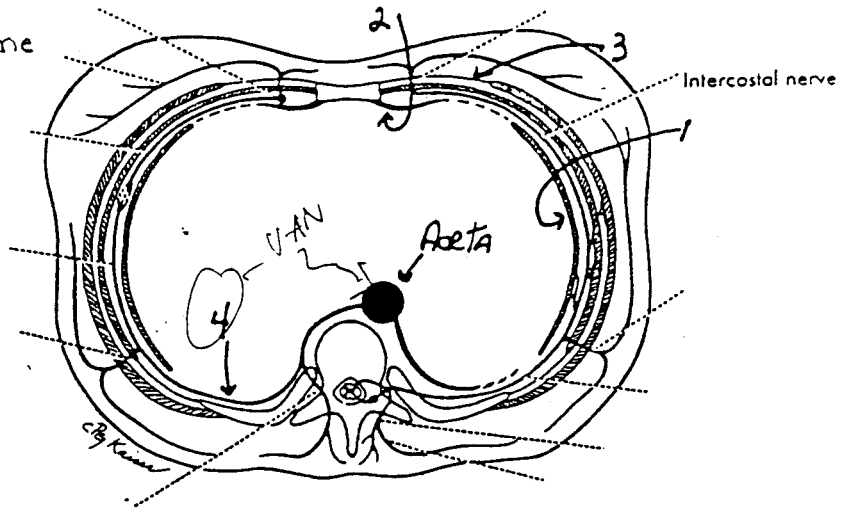
Identify the labeled structures. (4 pts.)

1. innermost intercostal muscle

2. Thoracic transverse muscle

3. external intercostal membrane

4. Posterior intercostal artery



See what it is going to come

- VAN sandwiched

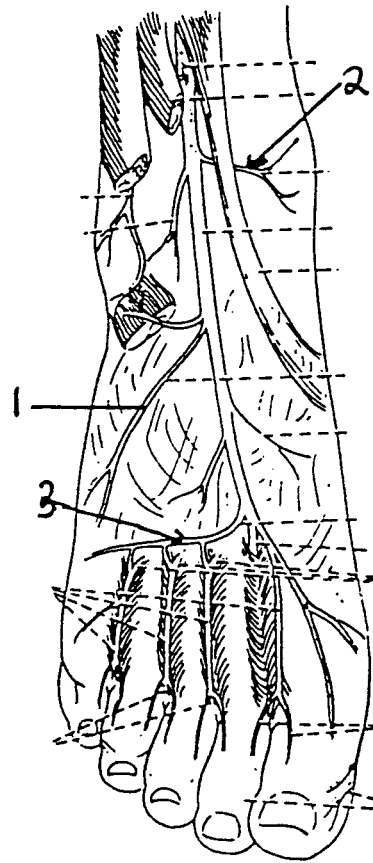
between the innermost intercostal &

3. Identify the labeled structures. (3 pts.)

1. lateral tarsal artery

2. medial malleolar artery

3. Arcuate artery



Intercostal A. from