Subject: Anatomy II Total Marks 50

Final Term Assignment. Semester: DPT 2nd.

Q:1 *Enumerate muscles in the posterior compartment of the lower leg with clinical significances also write action and innervation of each posterior compartment muscle.*

Ans: POSTERIOR COMPARTMENT MUSCLES OF LOWER LEG:

There are 7 muscles in the posterior compartment of lower leg which are further divided into 2 layers, deep and superficial. A band of fascia works as a wall between these two layers and separates them. These muscles contains the planter flexors.

- *Superficial posterior compartment muscles*
- *Deep posterior compartment muscles*

SUPPERFICIAL POSTERIOR MUSCLES:

the calf shape of the posterior leg is formed by these muscles, there are three muscles in this category.

1. *Gastrocnemius*
2. *Plantaris*
3. *Soleus*

GASTROCNEMIUS:

Gastrocnemius muscle has two heads, lateral and medial head. It is the most superficial muscle than the other two muscles. It is also the most medial one.

ACTION:

- *It helps in the planterflexion of the ankle during the extention of the knee*
- *It assists in lifting the heels when walking*
- *It also works as a flexor at knee joint.*

INNERVATION:

It is innervated by the tibial nerve (S1,S2)

PLANTARIS MUCLES:

The tendon of the plantaris is so long that sometimes it is mistaken for a nerve instead of the tendon. The muscle itself is a small muscle, it s not present in 10% of the people. It originates from the inferior lateral supracondylar line of femur

ACTION:

- *it weakly helps the gastrocnemius mucles in planter flexion of the ankle.*
- *It works as a flexor muscle at the knee.*

Plantaris muscle is not one of the crucial muscles in the body.

INNERVATION:

It is innervated through the tibial nerve (S1, S20

SOLEUS MUSCLE:

Soleus muscle is a flat and large muscle. It is called soleus because it looks like a sole, its located deep to the gastrocnemius at the back of the lower leg and originates at the posterior of the fibular head and medial border of the tibial shaft.

ACTION:

- *It stabalizes the leg on the foot*
- *It planter flexes the ankle*

INNERVATION:

It is also innervated via the tibial nerve (SI,S2)

DEEP POSTERIOR COMPARTMENT MUSCLES:

There are four deep compartment muscles in total.

1. *Tibialis posterior muscle*
2. *Flexor hallucis muscle*
3. *Flexor digitorum longus*
4. *The popliteus*

The first 3 muscles acts on the foot and ankle while the popliteus muscle works on the knee joint only

TIBIALIS POSTERIOR:

It origins is the interosseous membrane, posterior surface of tibia and posterior of fibula.

ACTION:

- ***It helps in planter flexion at the talocrural joint.***
- *At the subtalar joint foot inversion is done by the tibials posterior*

INNERVATION:

It is innervated by tibial nerve (L4,L5)

FLEXOR HALLUCIS MUSCLE:

It is one of the three deep muscles of the posterior campartment.

ACTION:

- *Works a flexor for the big toe*
- *Helps in planter flexion of the ankle*
- *It helps in supporting the medial arch of the foot*

INNERVATION:

IT is furnished by the tibial nerve (SI,S2)

FLEXOR DIGITORUM:

It is one of the deep compartment muscles, it originates from the medial portion of the posterior side of tibia by a wide tendon of fibula

ACTION:

- *It works as a planter flexor for the ankle*
- *It also supports longitudnal archs of foot*
- *It also helps in flexing of lateral four digits*

INNERVATION:

It is also innervated by the tibial nerve (S1,S2)

THE POPLITEUS:

It is a small deep posterior muscle. It is located in the leg behind the knee joint and makes the floor or base of popliteal fossa. This muscle contains a bursa which is present between the popliteal tendon and the back of the knee joint, this bursa is also called as poplitues bursa.

ACTION:

- *It rotates the femur laterally*
- *It helps to rotates the tibia medially*
- *It also helps in knee flexion*

INNERVATION:

It is innervated by the tibial nerve (L4,L5,S1)

CLINICAL RELEVENCE:

RAPTURED CALCANEAL TENDON:

The people with the history of calcaneal tendon weakness may experience this condition in which the tendon tears partially or completely

It is cause by the forceful planter flexion or over stretching of the foot or achilles tendon. This person will not be able to planter flex the foot against resistence as a result the foot will experience permanent dorsi flexion. Achilles tendon rapture affects the back of the lower leg. Ususally a surgery is the treatment to repair the rapture but some people recover even without going through a surgery.

Q:2 *Explain the following*

a) ***Foot drop:***

In foot drop the anterior compartment muscles are paralyzed, foot drop can happen because of the damge, irritation or weakness of the fibular or sciatic nerve. As the muscles of the anterior campartment are under paralysis, there is no force to stop or appose the pull of

the planter flexor muscles which then results in permanent planter flexion. Foot drop is not an illness itself but it can be a sign or symptom of bigger issuess in the body. This condition makes it hard of the person to lift the front part of his foot so the front part then drags on the floor while walking so it is crucial to visit a doctor because it is temporary but it can ve permenent

CAUSES:

- *It can be cause due to a compression of a nerve.*
- *It can occur due to weakness of a muscle in yout leg*
- *Another common cause can be a nerve damage.*

b) <u>Deep venous thrombosis:</u>

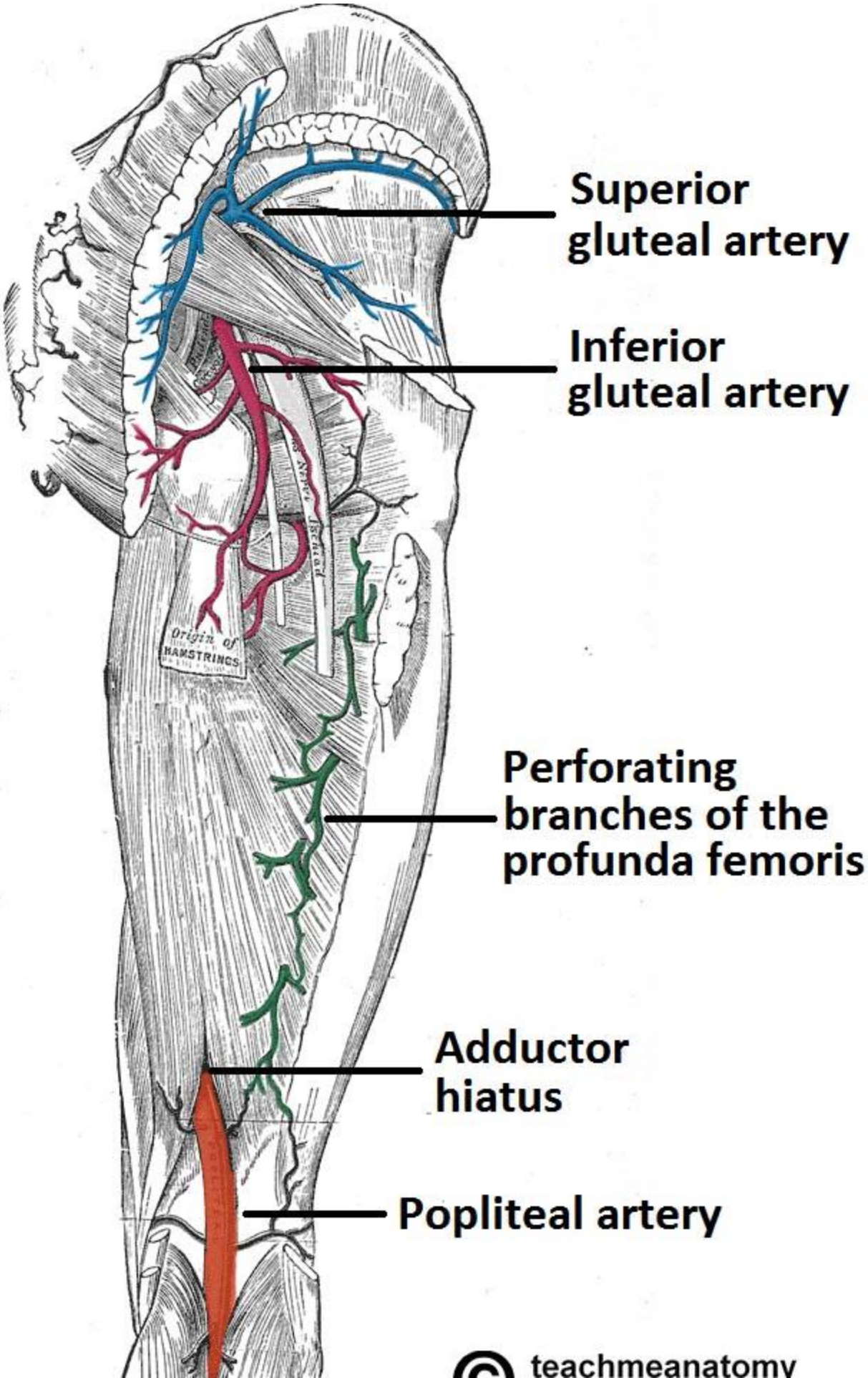
Deep venous thrombpsis also known as DVT. Is a common condition in which thee patients blood starts clotting(becomes solid) in the deep veins of the lower limb. Blood can also clot in other veins but blood clotting in the thigh region are more common than in other veins. Deep venous thrombosis causes the blood vessels to be blocked by these clots. Blockage in the veins can result in pain, tenderness and swelling in that area. The patients which are under the risk of developing DVT undergo a treatment called prphlactic treatment to protect them from thrombosis

Pulmonary embolism is a huge problem caused by Deep venous thrombosis. The blood clot is sometimes forced to move forward or leave its pace and it then travels into the pulmonary circulation and pulmonary closing of the blood vessel stops the clot from coming back to the heart causing mechanical shock

<u>CAUSES:</u>

- *Cancer*
- *Pregnancy*
- *Bone fracture*
- *Varicose veins*

***<u>Q:3</u>** Explain blood supply of thigh and gluteal region with the help of diagram.*



EXPLANATION:

Lower limb's primary artery is the femoral artery it arises from the external illiac artery. The external illiac artery is then modified into femoral artery, When entering into the femoral triangle after passing through a ligament called the lingiual ligament. Then the femoral artery in the femoral triangle gives rise to the profunda femoral artery (profunda means deep) this artery then moves further distally and posteriorly and gives birth to three more arteries

ARTERIES OF THE THIGH:

There are three main branches.

Medial femoral circumflex artery:

This artery supplies the head of the femur and is wrapped around the posterior side of femur. If a fracture of the neck or head of femur occurs MCFA can easily be damaged because it is located there and damaging of this artery can cause avascular necrosis

Lateral femoral circumflex artery:

This artery wraps the anterior, lateral side of the femur. It is also a sourse for supplying the blood to some mucles which are present on the lateral side of the thigh

Perforating branches:

This contains 3 or 4 arteries which furnishes anterolateral and posterior muscles of thighs like adductor magnus , vastus lateralis and hamstring.

The femoral artery continues its journey even after exiting the femoral triangle it goes t the anterior thigh through the adductor canal(A TUNNEL) the adductor canal goes to the adductor haitus which is an opening. The femoral artery then moves forward to the posterior compartment of thigh to the knee where it is now called popliteal artery

***Q 4**: Describe anatomical course, motor and sensory function of Sciatic Nerve*

Ans: ***SCIATIC NERVE:***

The sciatic nerve has a great significance and is a crucial nerve of the lower limb. It is 2cm wide with a flat band shape, also it is the largest nerve in the body. The sciatic nerve start and branches out for our lower backs and passes through our hip and buttocks into both legs. The sciatic nerve is a mixed function nerve, which means that it is composed of motor ans sensory neurons

ANATOMICAL COURSE:

Sciatic nerve is extracted from the lumbosacral plexus, when it is formed, it leaves the pelvis and sets foot in the gluteal region through the greater sciatic foramen. It then

appears inferiorly to the piriformis muscle and goes down in an inferolateral direction, moving through the gluteal region, it crosses the poosterior superior gemellus,inferior gemellus, obturator intermus and quadratus femoris and then goes to the posterior side of the thigh after that it goes deep to the bicep femoris.

The nerve then gives rise to some branches to the adductor magnus and hamstring muscles in the posterior thigh. After reaching the popliteal fossa, the sciatic nerve ends by dividing in tibial and fibular nerves

MOTOR FUNCTIONS:

The muscles of the posterior region of the thigh like biceps femoris, semimembranosus and semitendinosus and also the hamstring part of the adductor magnus are provided blood through the sciatic nerve. The foot and legs are also indirectly supplied by the sciatic nerves through its branches.

- *So the sciatic nerve supplies the posterior thigh, foot and leg.*

SENSORY FUNCTIONS:

It secondarily supplies sensation to the skin of the lateral leg, planter and dorsal surfaces of the foot and heel. Sensation to skin to the sole of the foot is given by the tibial ***nerve.***

- *The sciatic nerve does not provide the thigh with any primary sensory function.*

Q 5*: Enumerate Muscles of the medial compartment of thigh, what is tarsal tunnel syndrome?*
ANS: ***MUSLES OF THE MEDIAL COMPARTMENT OF THIGH;***
There are 5 muscles of the medial compartment of thigh they are also known as hip adductor
1. Gracillis
2. Adductor brevis
3. Obturator externus
4. Adductor longus
5. Adductor magnus
Tthe obturator nerve supplies there 5 muscles and the arterial supply is done through the obturator artery.
GRACILLIS MUSCLE:

It crosses at the knee and hip joints. It can be transplanted to the forarm or hand for replacing a damaged muscle this muscle helps in knee flexion and hip adduction is done by it.

TARSAL TUNNEL SYMDROME:

It is a condition in which the tibial nerve experiences squeezing or compression from the inside of the ankle. Carpal tunnel syndrome and tarsal syndrome are same the difference is that one occurs in the wrist and the other in the ankle

CAUSES:

There are many causes but the main three are following:

- *Osteoarthritis*
- *Rheumatoid arthritis*
- *Post trauma ankle deformities*

Patients usually feel tingling or prickling senssation in the ankle and foot, it becomes worse when in action but lessens during rest.

This syndrome can be treated by some anti inflammatory medicines and this treatment does not work surgery can be the other option in which the flexor raticulum is cut in order to release pressure