

Subject: Anatomy II

Mid Term Assignments.

Semester: DPT 2nd.

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Section A.

Note: Highlight the correct option of the given MCQs from section A. attempt all 3 questions from section B.

- 1. Out of the following bony landmarks to which the Ligamentum teres attached?**
A. intertrochanteric line
B. trochanteric crest
C. Fovea capitis
D. Greater trochanter
- 2. Neck of the femur connects the head of the femur with the shaft. It is cylindrical, projecting in a superior and medial direction. It is set at an angle of _____ degrees to the shaft.**
A. 156
B. 170
C. 135
D. 101
- 3. The proximal area of the femur forms the hip joint with the acetabulum of the pelvis. It consists of a head and neck, and two bony processes the greater and lesser trochanters. There are also two bony ridges connecting the two trochanters; the intertrochanteric line anteriorly and the trochanteric crest posteriorly. Out of all these proximal bony landmarks which one is the most lateral palpable bony landmark?**
A. Greater trochanter
B. Lesser trochanter
C. The intertrochanteric line
D. Trochanteric crest.
- 4. _____ is the site of attachment for iliopsoas muscle.**
A. Greater trochanter
B. Lesser trochanter
C. The intertrochanteric line
D. Trochanteric crest.
- 5. Neck of femur fractures are increasingly common and tend to be sustained by the elderly population as a result of low energy falls in the presence of osteoporotic bone. Classically, the distal fragment is pulled upwards and _____**
A. Medially rotated
B. Externally rotated
C. No rotation occurs
D. None of the above

6. Regarding neck of the femur fracture the medial femoral circumflex artery can be damaged in _____

A. Intracapsular fracture

B. Shaft fracture

C. Extracapsular fracture

D. Femoral epicondylar fracture

7. The shaft of the femur descends in slight _____ for stability.

A. Lateral direction

B. Medial direction

C. Posterior direction

D. Diagonal direction

8. Mr. A met with an accident and his right femur broke at 3 different places. The cut was a clean break and the four pieces were put back together in their original place. What kind of fracture did he have?

A. Contusion

B. Hairline Fracture

C. Multiple Fracture

D. Simple Fracture

9. A closed femoral shaft fracture can result in _____ blood loss.

A. 10-15ml

B. 100-150ml

C. 1000-1500ml

D. 10000-15000ml

10. Which of the following is the medial bone of lower leg?

A. Patella

B. Fibula

C. Tibia

D. Medial cuboid

11. The shaft of the tibia is prism-shaped, with _____

A. One border and one surface

B. Two borders and one surface

C. Three borders and two surfaces

D. Three borders and three surfaces

12. The calcaneus is often fractured as a result of _____

A. Distraction

B. Axial loading

C. Walking

D. Setting

13. The depth of the acetabulum is raised by the _____

A. Fovea captious

B. Capsule of hip joint

C. acetabular labrum

D. ischial Bursae

14. The most powerful ligament of hip joint is?

- A. Iliofemoral ligament
B. Pubofemoral ligament.
C. Ischiofemoral ligament.
D. Transverse acetabular ligament

15. The hip joint is supplied by the branches of the following arteries EXCEPT:

- A. Medial circumflex femoral artery.
B. Lateral circumflex femoral artery.
C. Radial artery.
D. Superior gluteal artery.

Section B

16. Q:1 Describe Hip joint anatomy. (your answer should cover these headings,

(Articular surfaces of hip joint, Ligaments of joint, Stability of hip joint, Blood and nerve supply).

Q:2 Explain the following in detail. a) Cruciate ligaments b) Menisci

Q:3 Write down a comprehensive note on medial and lateral ligaments of ankle joint

Question 1 Describe Hip joint anatomy (your answer should cover these headings articular surfaces of hip joint , ligaments of joints, stability of hip joint , blood and nerves supply?)

Answer:

• **HIP JOINT**

Hip joint is a strong and stable multiaxial synovial joint of ball and socket type. Femoral head is the ball and the acetabulum is the socket Next to the shoulder joint , it is the most movable of all joint

It forms a connection from the lower limb to the pelvic girdle, and thus is designed for stability and weight-bearing.

• **Structure of hip joint**

• *Articular surfaces*

• The hip joint consists of an articulation between the head of femur and acetabulum of the pelvis.

• The acetabulum is a cup-like depression located on the inferolateral aspect of the pelvis. Its cavity is deepened by the presence of a fibrocartilaginous collar – the acetabular labrum. The head of femur is hemispherical, and fits completely into the concavity of the acetabulum.

• Both the acetabulum and head of femur are covered in articular cartilage, which is thicker at the places of weight bearing.

- The capsule of the hip joint attaches to the edge of the acetabulum proximally. Distally, it attaches to the intertrochanteric line anteriorly and the femoral neck posteriorly.

Ligaments

The ligaments of the hip joint act to increase stability. They can be divided into two groups – intracapsular and extracapsular:

- ***Intracapsular***

The only intracapsular ligament is the ligament of head of femur. It is a relatively small structure, which runs from the acetabular fossa to the fovea of the femur.

It encloses a branch of the obturator artery (artery to head of femur), a minor source of arterial supply to the hip joint.

- ***Extracapsular***

There are three main extracapsular ligaments, continuous with the outer surface of the hip joint capsule:

Iliofemoral ligament – arises from the anterior inferior iliac spine and then bifurcates before inserting into the intertrochanteric line of the femur. It has a 'Y' shaped appearance, and prevents hyperextension of the hip joint. It is the strongest of the three ligaments. Pubofemoral – spans between the superior pubic rami and the intertrochanteric line of the femur, reinforcing the capsule anteriorly and inferiorly. It has a triangular shape, and prevents excessive abduction and extension. Ischiofemoral – spans between the body of the ischium and the greater trochanter of the femur, reinforcing the capsule posteriorly. It has a spiral orientation, and prevents hyperextension and holds the femoral head in the acetabulum.

- ***Stabilising Factors***

The primary function of the hip joint is to weight-bear. There are a number of factors that act to increase stability of the joint.

The first structure is the acetabulum. It is deep, and encompasses nearly all of the head of the femur. This decreases the probability of the head slipping out of the acetabulum (dislocation).

There is a horseshoe shaped fibrocartilaginous ring around the acetabulum which increases its depth, known as the acetabular labrum. The increase in depth provides a larger articular surface, further improving the stability of the joint.

The iliofemoral, pubofemoral and ischiofemoral ligaments are very strong, and along with the thickened joint capsule, provide a large degree of stability. These ligaments have a unique spiral orientation; this causes them to become tighter when the joint is extended.

In addition, the muscles and ligaments work in a reciprocal fashion at the hip joint:

Anteriorly, where the ligaments are strongest, the medial flexors (located anteriorly) are fewer and weaker. Posteriorly, where the ligaments are weakest, the medial rotators are greater in number and stronger – they effectively ‘pull’ the head of the femur into the acetabulum

• **BLOOD SUPPLY**

Mainly by -Medial and lateral circumflex femoral arteries

-Deep division of the superior gluteal artery

-Inferior gluteal artery

Head of the femur is supply by – Posterior division of the obturator artery

Nerve Supply Femoral nerve – Via nerve to the rectus femoris muscle

Obturator nerve – Via it’s anterior division.

Sciatic nerve:- – Via the nerve to the quadratus femoris muscle

Superior gluteal nerve – Here the femoral, sciatic and obturator nerves also supply the knee joint, so hip disease may cause a referred pain to the hipjoint.

STABILITY OF THE HIP JOINT

The firmness of the hip joint is supplied by the following factors which help prevent its dislocation:

- The depth of the acetabulum and narrowing of its mouth by the
- acetabular labrum.
- 3 powerful ligaments (iliofemoral, pubofemoral, and ischiofemoral)
- reinforcing the capsule of the joint.
- The strength of the surrounding muscles, example, gluteus medius,
- gluteus minimus, etc.
- Length and obliquity of the neck of femur.

ARTERIAL SUPPLY

The hip joint is supplied by the branches of the following arteries:

- Medial circumflex femoral artery.
- Lateral circumflex femoral artery.
- Obturator artery.
- Superior gluteal artery.
- Inferior gluteal artery.

Question 2

Answer

CRUCIATE LIGAMENT

The cruciate ligaments of the knee are the anterior cruciate ligament (ACL) and the posterior cruciate ligament (PCL). These ligaments are two strong, rounded bands that extend from the head of the tibia to the intercondyloid notch of the femur. The ACL is lateral and the PCL is medial. They cross each other like the limbs of an X. They are named for their insertion into the tibia. The ACL attaches to the anterior aspect of the intercondylar area, the PCL to the posterior aspect. The ACL and PCL remain distinct throughout and each has its own partial synovial sheath. Relative to the femur, the ACL keeps the tibia from slipping forward and the PCL keeps the tibia from slipping backward.

➤ The anterior cruciate ligament can be torn by hyperextension of the knee joint. To test for this, you can perform an anterior drawer test, where you attempt to pull the tibia forwards, if it moves, the ligament has been torn.

➤ The most common mechanism of posterior cruciate ligament damage is the 'dashboard injury'. This occurs when the knee is flexed, and a large force is applied to the shins, pushing the tibia posteriorly. This is often seen in car accidents, where the knee hits the dashboard.

➤ To test for PCL damage, perform the posterior draw test. This is where the clinician holds the knee in flexed position, and pushes the tibia posteriorly. If there is movement, the ligament has been torn.

MENISCUS

A meniscus is a piece of cartilage found where two bones meet (joint space). Menisci (plural of meniscus) protect and cushion the joint surface and bone ends.

The medial and lateral menisci are fibrocartilage structures in the knee that serve two functions:

- To deepen the articular surface of the tibia, thus increasing stability of the joint.
- To act as shock absorbers by increasing surface area to further dissipate forces.

They are C shaped, and attached at both ends to the intercondylar area of the tibia. In addition to the intercondylar attachment, the medial meniscus is fixed to the tibial collateral ligament and the joint capsule. Damage to the tibial collateral ligament usually results in a medial meniscal tear. The lateral meniscus is smaller and does not have any extra attachment.

Question 3

The Deltoid ligament (or the medial ligament of talocrural joint) is a strong, flat and triangular band. It is attached above to the apex and anterior and posterior borders of the medial malleolus. The Deltoid ligament is composed of superficial and deep components.

The superficial components:

The tibiocalcaneal ligament,

The tibionavicular ligament

The posterior superficial tibiotalar ligament

The tibiospring ligament

The deep components:

The anterior tibiotalar ligament

The posterior deep tibiotalar ligament.

Ligaments

- There are two main sets of ligaments, which originate from each malleolus.

Medial Ligament

- The medial ligament is attached to the medial malleolus. it is a bony prominence projecting from the medial aspect of the distal tibia
- It consists of four ligaments, which fan out from the malleolus, attaching to the talus, calcaneus and navicular bones. The primary action of the medial ligament is to resist over- eversion of the foot.

Lateral Ligament

The lateral ligament originates from the lateral malleolus (a bony prominence projecting from the lateral aspect of the distal fibula). It resists over-inversion of the foot, and is comprised of three distinct and separate ligaments:

- Anterior talofibular – spans between the lateral malleolus and lateral aspect of the talus.
- Posterior talofibular – spans between the lateral malleolus and the posterior aspect of the talus.
- Calcaneofibular – spans between the lateral malleolus and the calcaneus.