Clinical Anatomy of the Lower Limb – Case Study – Answers

Question 1.

A 79 year old gentleman is brought to A&E after a fall at home.

1. You suspect a fracture of the femoral neck. State one feature of the affected limb appearance that would suggest this. (1)
   
   Shorter leg length
   
or
   Lateral rotation of the affected limb

2. Why must a suspected fracture of the femoral neck be investigated quickly? (2)
   
   An intracapsular fracture of the femoral neck may damage the medial femoral circumflex artery. Disruption of the blood supply for an extended period of time will result in avascular necrosis of the femoral head.

3. Upon radiographic investigation, you discover that the patient actually has dislocated his hip. Posterior dislocations account for 90% of the total number of hip dislocations. Suggest why this is so. (1)
   
   The posterior part of the joint capsule is weakest.
   
or
   Acetabulum is shallower posteriorly

4. Describe two constituents of the hip joint that contribute towards its stability (2)
   
   1. **Acetabular labrum** – Fibrocartilage ring surrounding the acetabulum. It deepens the articular surface of the acetabulum.
   
   2. **Strong Ligaments** – The extracapsular ligaments of the hip joint are strong, and have a unique spiral orientation.
   
   3. **Deep acetabulum** – Encompasses nearly all of the femoral head.

5. The sciatic nerve runs posteriorly to the hip joint. Give the roots of the sciatic nerve. (1)
   
   L4-S3

6. The sciatic nerve has been damaged by the displaced femoral head. Fill in the table (3)
<table>
<thead>
<tr>
<th></th>
<th>Present</th>
<th>Weakened</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension at the Hip</td>
<td></td>
<td>✓ Gluteus maximus still functioning</td>
<td></td>
</tr>
<tr>
<td>Flexion at the Hip</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No hip flexors innervated by sciatic nerve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dorsiflexion of the Foot</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>All dorsiflexors innervated by the sciatic nerve</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. State an area of the leg where the patient will not have sensory loss (1)

Anteromedial area of the leg (innervated by the saphenous branch of the femoral nerve).
Question 2.

A 75 year old lady visits her GP, complaining of a mass in the back of her knee. The mass measures approximately 4 cm in diameter.

1. Give two possible causes of a swelling in the posterior knee region (2x ½ Mark)
   - Baker’s cyst
   - Popliteal aneurysm
   - Arterial adventitial cyst
   - Deep vein thrombosis
   - Others; lipoma, neuroma, sebaceous cyst

2. Label this diagram of the popliteal fossa (2 Marks)

3. The lady reports that she is unable to properly flex her knee due to the swelling. State the name of two muscles, with different innervations, that produce flexion at the knee joint (2x ½ Mark)

   **Sciatic Nerve:**
   - Semimembranosus
   - Semitendinosus
   - Biceps femoris

   **Femoral Nerve:**
- Sartorius

**Obturator:**

- Gracilis

**Tibial:**

- Gastrocnemius

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4. Later on, the lady complains of a “tingly” pain, located on the lateral sides of her right leg and foot. How might this be related to the popliteal swelling? (2x ½ Mark)

Nerve compression from the popliteal swelling.

Lateral sides of the leg and foot supplied by branches of the tibial and common fibular nerves, which are both located within the popliteal fossa.
Question 3

A man presents to A&E with excruciating pain in the thigh

1. You suspect a blood clot has occluded a blood vessel in the lower limb. Name the major artery of the anterior thigh. (1)

Femoral Artery

2. Describe the anatomical path of the femoral artery, from origin to termination (2)

1. Femoral artery begins when the external iliac artery moves underneath the inguinal ligament.
2. It descends through the femoral triangle, adductor canal and adductor hiatus to reach the posterior surface of the leg.
3. Upon reaching the posterior compartment of the leg, it becomes the popliteal artery.

3. Name two muscles in the anterior compartment of the thigh (1)

Quadriceps femoris – rectus femoris, vastus medialis, lateralis, intermedialis
Sartorius
Pectineus
Iliopsoas

4. State a location where you would check the pulse to confirm or arterial occlusion. (1)

Popliteal – medial aspect of popliteal fossa
Dorsalis pedis - dorsum of the foot, lateral to extensor hallucis longus tendon

5. The patient reports a loss of sensation on ‘the front of his thigh’ – which nerve is damaged? (1)

Femoral nerve (anterior cutaneous branches)

6. You need to administer an intramuscular injection into the gluteal region. State the safe region to do so. (1)

Upper lateral region
7. Another possible diagnosis for acute limb pain is compartment syndrome. State two other symptoms that would suggest this diagnosis. (2x ½ Mark)

Compartment syndrome is increased pressure within one of the body’s compartments, resulting in insufficient blood supply to muscles and nerves.

6 Ps
- Pain
- Paresthesia
- Pallor
- Paralysis
- Pulselessness
- Poikilothermia (or Perishingly cold)