An overview of the anatomy of the canine hindlimb

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Original photos courtesy of Mary Ferguson
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Video clip by Dr. David Kilroy
Lateral view of the right hip and stifle regions.

1. Biceps Femoris

2. Semitendinosus

3. Superficial Gluteal

4 and 4’. Tensor Fascia Lata

5. Sartorius

6. Vastus Lateralis of Quadriceps

7. Fascia Lata (cut)
The Quadriceps is a large muscle which lies on the cranial aspect of the femur.

It is made up of four heads;
Vastus Lateralis
Vastus Medialis
Vastus Intermedia
Rectus Femoris

The tendons of insertion of all four heads join to form the patellar tendon (often called the patellar ligament) which crosses the stifle joint to insert on the tibial tuberosity.

The patellar tendon contains the largest sesamoid bone, the patella.

All four heads therefore act to extend the stifle joint but only one acts to also flex the hip joint, the rectus femoris. Because this head originates just cranial to the acetabulum of the ilium, it crosses the hip joint and can therefore act to flex it. The other heads originate on the femur and so do not cross the hip joint.
In the dog, we see four sesamoid bones in the stifle joint.

The largest is the patella which is found in the tendon of insertion of the quadriceps femoris on the cranial aspect of the joint. A patella can be found in all domestic species.

However in the dog there are three sesamoid bones found caudal to the stifle joint, the fabellae. Two of these develop in the tendons of origin of the two heads of the gastrocnemius muscle. The other develops in the tendon of origin of the popliteus muscle. These three sesamoid bones are not found in the ox or horse.
Radiograph of the left stifle joint of a dog.

1. Patella
2, 3, and 4. Fabellae
5. Patellar Tendon
6. Tibial Tuberosity

2 and 3 develop in the tendons of origin of the two heads of the gastrocnemius while 4 develops in the tendon of origin of the popliteus. These are absent in the ox and horse.
There are three gluteal muscles;  
Superficial gluteal  
Middle gluteal  
Deep gluteal

They act to extend the hip joint and are the abductors of the hindlimb.

Abduction of a limb is to move it further away from the body.  
Adduction of a limb is to move it closer to the body.

The gluteal muscles are therefore essential for the male dog when it comes to lifting the leg during urination!

The deep gluteal originates on the body of the Ilium. The middle gluteal originates on the wing of the Ilium. The superficial gluteal originates on the gluteal fascia.
<table>
<thead>
<tr>
<th>Muscle</th>
<th>Origin</th>
<th>Insertion</th>
<th>Innervation</th>
<th>Function</th>
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<tr>
<td>Biceps Femoris</td>
<td>Ischial Tuber</td>
<td>Patella, Tibial Crest &amp; Calcaneus</td>
<td>Sciatic Nerve</td>
<td>Extend Hip Joint, Flex or Extend Stifle Joint, Extend Hock Joint</td>
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<tr>
<td>Gluteals (3)</td>
<td>Ilium</td>
<td>Greater Trochanter of Femur</td>
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<td>Tensor Fascia Lata</td>
<td>Ventral aspect of the Wing of the Ilium</td>
<td>Patella</td>
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<td>Tenses the Fascia Lata to Extend and Stabilise the Stifle Joint</td>
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<td>Sartorius (2 parts in Dog)</td>
<td>Wing of the Ilium</td>
<td>Patella and Disto-medial Femur</td>
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<tr>
<td>Quadriceps</td>
<td>See slide number 5</td>
<td>See slide number 5</td>
<td>Femoral Nerve</td>
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</table>
Medial view of the hip and stifle regions of the right hindlimb.

1 and 1’. Sartorius

2. Vastus Medialis of Quadriceps

3. Patellar Tendon

4. Gracilis (large part removed)
Five muscles play a role in adducting the hindlimb. They are:

Adductor
Gracilis
Semimembranosus
Sartorius
Pectineus
Caudal view of the hip and stifle region of the right hindlimb

1. Gracilis
2. Semimembranosus
3. Semitendinosus
4. Biceps Femoris
The biceps femoris, semitendinosus and semimembranosus lie on the caudal aspect of the femur and are often together referred to as the hamstring group of muscles.

All three originate from the ventral aspect of the ischial tuber and are innervated by the sciatic nerve.
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<tr>
<td>Adductor</td>
<td>Ventral aspect of the Pelvis</td>
<td>Medial aspect of the Femur</td>
<td>Obturator Nerve</td>
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<tr>
<td>Gracilis</td>
<td>Pelvic Symphysis</td>
<td>Medial aspect of the Stifle and Calcaneus</td>
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<td>Adduct the Limb and extend the Hock</td>
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<tr>
<td>Pectineus</td>
<td>Prepubic tendon</td>
<td>Medial aspect of the Femur</td>
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<tr>
<td>Semitendinos</td>
<td>Ventral aspect of the Ischial Tuber</td>
<td>Tibial Crest and Calcaneus</td>
<td>Sciatic Nerve</td>
<td>Extend Hip Joint, Flex Stifle Joint, Extend Hock Joint</td>
</tr>
<tr>
<td>Semimembranos</td>
<td>Ventral aspect of the Ischial Tuber</td>
<td>Medial aspect of the Femur and Tibia</td>
<td>Sciatic Nerve</td>
<td>Extend Hip Joint and Flex Stifle Joint</td>
</tr>
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</table>
Notice that three of the adductors of the hindlimb are innervated by the obturator nerve.

This nerve can become compressed and damaged during a difficult birthing in cows as the foetus passes through the birth canal and compresses the nerve against the wall of the pelvic cavity.

This can cause an inability of the newly calved cow to stand, and a ‘splits’ stance can be seen due to the inability to adduct the limbs.

The obturator nerve comes off the lumbosacral plexus and leaves the pelvic cavity through the obturator foramen.
The nerves of the hindlimb arise from the lumbosacral plexus. Starting cranially they are the femoral nerve, obturator nerve, gluteal nerves and the sciatic nerve.

The video on the next slide shows and explains the lumbosacral plexus in a dissected dog.
Double click on the video to play it. It may take a few seconds to start. If it does not play it can be downloaded individually from the OVAM website.

The lumbosacral plexus - the nerves of the pelvic cavity.

Presented by Dr. David Kilroy
Medial view of the hip and stifle regions.

1 and 1’. Sartorius

2. Gracilis (cut)

* Here we can see the External Iliac Artery. This is a direct branch off the aorta and is continued as the femoral artery which supplies blood to the hindlimb.
Lateral view of hip and stifle regions.

1. Biceps Femoris
2. Semitendinosus
3. Adductor
4. Vastus Lateralis
5. Tensor Fascia Lata
6. Superficial Gluteal
7. Sartorius
8. Gastrocnemius
In the previous image we can see the large sciatic nerve running between the biceps and the adductor.

It is continued distal to the stifle as the tibial nerve and the fibular nerve.

The fibular nerve is sometimes called the peroneal nerve. This can be seen in the previous picture crossing the lateral head of the gastrocnemius muscle to innervate the muscles which lie on the cranial aspect of the tibia and fibula.

The tibial nerve branches off the sciatic nerve and dives between the two heads of the gastrocnemius to innervate the muscles on the caudal aspect of the tibia and fibula.

If the sciatic nerve is severed at a point proximal to the stifle, by a broken femur for example, paralysis of all the muscles distal to the stifle may be seen as both the tibial and fibular nerves are continuations of the sciatic nerve.