Innervation of the Knee Joint
The canine knee joint (stifle) is supplied by:

- **The medial articular nerve (MAN).** It arises from the saphenous nerve (SN). Occasionally, it will receive supplementary fibers (SF) from the obturator and/or femoral nerves. It supplies the medial, posterior, and anterior aspects of the joint and may even send branches to the anterior attachment of the posterior cruciate ligament.

- **The posterior articular nerve (PAN).** The posterior articular nerve arises by two separate branches: PAN-1 (arises directly from the tibial nerve) and PAN-2 (arises from a muscular branch of the tibial nerve). It supplies mainly the posterior and posteromedial aspects of the joint.

- **The lateral articular nerve (LAN).** It arises from the common peroneal nerve (CP). It serves the lateral collateral ligament (LCL) and the lateral portion of the joint capsule. (O’Connor and Woodbury, 1982)

Therefore, a combined femoral and sciatic nerve block is capable of providing anesthesia to the entire femorotibial (stifle) joint.

Femoral Nerve Block
This procedure is considered an intermediate-level technique.

**Applied Anatomy**
The femoral nerve arises from the cranial portion of the lumbar plexus and is formed by the ventral branches of the L4, L5, and L6 spinal nerves. The femoral triangle is delimited by the pectineus muscle caudally, the sartorius muscle cranially, and the iliopsoas muscle proximally. Within the triangle, the femoral nerve is located cranial to the femoral artery and vein, running deep to the caudal belly of the sartorius muscle. The lateral circumflex vessels originate from the femoral artery and vein. These vessels cross the femoral triangle in a craniocaudal direction, disappearing between the rectus femoris and vastus medialis muscles.

**Patient Preparation**
Position the patient in lateral recumbency. The limb to be blocked should be positioned on top, abducted 90 degrees and extended caudally.

**Technique (Electrolocation)**

- Palpate the pectineus muscle, which is felt as a tight, triangular-shaped muscular band on the medial aspect of the leg.
- Palpate the femoral artery dorsal and cranial to the pectineus muscle.
- Set the nerve stimulator to deliver a current of 1 mA at 1–2 Hz.
- The puncture site is located within the femoral triangle, cranial to the femoral artery.
- Insert the stimulating needle cranial to the femoral artery and advance it toward the iliopsoas muscle, maintaining a 20–30° angle to the skin.
- Once the tip of the needle is close to the femoral nerve, contractions of the quadriceps muscle will result in stifle extension.
- Once acceptable twitches are seen, incrementally decrease the nerve stimulator current to 0.4 mA, making sure that the same motor responses are elicited. Reposition the needle if necessary, ensuring that the fascia iliaca has been punctured (a pop/click will be felt).
- Before injecting the local anesthetic solution, it is important to verify that the needle is not positioned either intravascularly or intraneurally. Negative blood aspiration should be observed. It is imperative to ensure that no resistance during the injection is encountered.
Clinical Tips

- Recommended volume to be injected: 0.1 mL kg\(^{-1}\) (Campoy et al. 2008).
- Authors commonly use bupivacaine 0.5% combined with dexmedetomidine (0.5 µg mL\(^{-1}\)). This provides approximately 14 (6–24) hours (median [min-max]) until analgesia may be needed after cruciate surgery (Campoy et al. 2012) (usually tramadol p.o. 3 mg kg\(^{-1}\)). Alternatively, ropivacaine 0.75% combined with dexmedetomidine (0.5 µg mL\(^{-1}\)) can be used with similar results.

Technique (Ultrasound)

- The nondominant hand is used to place the ultrasound transducer over the femoral triangle, perpendicular to the course of the femoral artery.
- Glide, rotate, or tilt the transducer until a short-axis view of the femoral vessels and the femoral/saphenous nerves is obtained. The vessels will appear as anechoic (black) round structures and the artery will pulse.
- Identify the round hyperechoic (white or gray, sometimes with a honeycomb-like structure) femoral and saphenous nerves in cross-section.
- Set the peripheral nerve stimulator to deliver a current of 0.4 mA at 1 Hz.
- Once the femoral nerve has been identified, insert the stimulating needle from a cranial-to-caudal direction through the sartorius and rectus femoris muscles. The needle should be advanced “in-plane” with the transducer to allow it to be observed approaching the femoral nerve.
- Monitor for stifle extension that results from contraction of the quadriceps femoris muscles as the femoral nerve is stimulated.
- Before the local anesthetic solution is injected, verify that the needle is not positioned either intravascularly or intraneurally. Negative blood aspiration should be observed.
- As the local anesthetic solution is injected, watch for fluid to spread around the femoral nerve (the anesthetic solution will appear anechoic). No resistance should be encountered during injection.

Sciatic Nerve Block
This procedure is considered an intermediate-level technique.

Applied Anatomy
The sciatic nerve is formed by the ventral branches of the L6, L7, and S1 spinal nerves. The sciatic nerve descends between the greater trochanter and the ischiatic tuberosity. In this region, the sciatic nerve gives rise to the muscular branches that supply the caudal thigh muscles. The caudal gluteal artery and vein lie caudal to these nerve branches. Immediately distal to the greater trochanter and ischiatic tuberosity, the sciatic nerve lies between the biceps femoris muscle laterally and the semimembranosus muscle caudally and medially.

The needle puncture site is located between the greater trochanter and the ischiatic tuberosity.

Patient Preparation
Position the patient in lateral recumbency, with the limb to be blocked on top and extended in a natural position.

Technique (Electrolocation)

- Set the nerve stimulator to deliver a current of 1 mA at 1–2 Hz.
- Identify the greater trochanter (GT) and ischiatic tuberosity (IT). The puncture site is located at a point one-third of the distance from the GT to the IT.
- Insert the stimulating needle perpendicular to the skin and advance it toward the sciatic nerve lying between the GT and the IT.
- Once the tip of the needle is close to the sciatic nerve, dorsiflexion or plantar extension of the foot will result.
- Once acceptable twitches are seen, incrementally decrease the nerve stimulator current to 0.4 mA, making sure that the same motor responses are elicited. Reposition the needle, if necessary.
- Before injecting the local anesthetic solution, it is important to verify that the needle is not positioned either intravascularly or intraneurally. Negative blood aspiration should be observed. It is imperative to ensure that no resistance during the injection is encountered.
Clinical Tips

- Recommended volume to be injected: 0.05–0.1 mL kg\(^{-1}\) (Campoy et al. 2008).

Technique (Ultrasound)

- The nondominant hand is used to place the ultrasound transducer in a craniocaudal position over the lateral aspect of the thigh immediately distal to the ischiatic tuberosity.
- Glide, rotate, or tilt the transducer until a short-axis view of the sciatic nerve is obtained.
- Set the peripheral nerve stimulator to deliver a current of 0.4 mA at 1 Hz.
- Once the sciatic nerve has been identified, insert the stimulating needle in a caudal-to-cranial direction, guiding it through the semimembranosus muscle and medial to the fascia of the biceps femoris muscle. The needle should be advanced “in-plane” with the transducer to allow it to be observed approaching the sciatic nerve.
- Monitor for plantar extension of the foot (corresponding to stimulation of the tibialis nerve component) or dorsiflexion of the foot (corresponding to stimulation of the peroneal nerve component).
- Before the local anesthetic solution is injected, verify that the needle is not positioned either intravascularly or intraneurally. Negative blood aspiration should be observed.
- As the local anesthetic solution is injected, watch for fluid to spread around the sciatic nerve (the anesthetic solution will appear anechoic). No resistance should be encountered during injection.

References

