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Equine distal limb local anaesthesia

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ABSTRACT: Perineural anaesthesia of the equine distal limb is commonly performed in lameness investigations to localise the source of pain. These nerve blocks do not generally indicate the specific structure(s) involved in the lameness, thus their interpretation requires skill. Commonly performed blocks include: palmar/plantar digital nerve block, abaxial sesamoid nerve block, low 4-point/6-point nerve block and subcarpal/subtarsal nerve blocks.

This article will discuss basic perineural anaesthesia of limb regions distal to the carpometacarpal and tarsometatarsal joints in horses.

Diagnostic anaesthesia is an extremely helpful tool in lameness diagnosis; however, the interpretation of the outcome is not always clear or even specific. There are three different types of local anaesthesia regularly performed in the horse: perineural, infiltration and intra-articular anaesthesia. This article will focus on perineural distal limb anaesthesia and infiltration only (**Figure 1**).

Before regional anaesthesia is performed, the horse should be consistently and sufficiently lame so that any improvement in gait can be detected. Lunging or riding the horse may exacerbate a subtle lameness, making it more detectable.

The local anaesthetic temporarily disrupts the function of any nerves or nerve endings that come in contact with it. This results in areas of desensitisation (numbing). The desensitised area is determined by the nerves and nerve endings that are affected.

Lidocaine, mepivacaine and bupivacaine are most frequently used depending on their duration of action. Mepivacaine has 2–3 hours of effectiveness and is therefore commonly used in equine distal limb local anaesthesia. The horse should be restrained appropriately, without the use of sedation. Some clinicians believe sedation can mask lameness, thus affecting interpretation. The desired effect should be maximised in 5–15 minutes. To test for the complete desensitisation of the nerve, the corresponding skin region can be prodded with a blunt object (e.g. pen). Unfortunately this test is not completely accurate and many horses do not show a clear response.

Most nerve blocks can be administered using 21–25 G hypodermic needles. To avoid breaking or bending needles during perineural administration of the local anaesthetic solution, the needle should always be inserted while detached from the syringe. The use of luer-lock syringes is not advisable as they are difficult to attach to the needle after it has been inserted into the skin. Also, if the horse moves, this type of syringe cannot be detached swiftly from the needle and risks being pulled out, bent or broken during the procedure. The needle should be directed distally during insertion when anaesthetising nerves in the distal portion of the limb. Directing the needle proximally may result in an ascending migration of anaesthetic solution with unintended anaesthesia of more proximal branches of the nerve, thus confusing the results of the examination. The needle should be inserted quickly, with a determined thrust. Aspiration before injection is necessary to ensure the needle has not entered a blood vessel.

For subcutaneous and subfascial injections the removal of hair is not necessary, but the hair and skin surface should be thoroughly disinfected for at least 1–5 minutes with chlorhexidine and alcohol solution on gauze swabs (**Figure 2**).

Nerve blocks inserted near a synovial structure will warrant an aseptic preparation. Infections following diagnostic anaesthesia are very rare; however, horse owners should be made aware of the risks. Another hazard is perineural anaesthesia in acute and severe lameness cases: minute fissures can become complete fractures by increased limb load following the desensitisation.

DOI: 10.1080/17415349.2017.1414412

Figure 1. An example of an intra-articular fetlock joint block. The local anaesthetic is administered through the lateral collateral sesamoidea.

The diagnostic result is then interpreted as positive, negative or partially improved. Reduction of lameness by 70–80% is often judged to be sufficiently positive. The occurrence of lameness after local anaesthesia on the contralateral limb (called a "switch") must be considered and is usually judged as a positive result.

Palmar/plantar digital nerve block

The medial and lateral palmar (or plantar) digital nerves should be anaesthetised as close as possible to the proximal edge of the hoof cartilage. The neurovascular bundle, consisting of vein, artery and nerve, can be felt easily if the leg has been picked up. The needle is placed on the palmar/plantar edge of this bundle, parallel to the nerve, subcutaneously and from proximal to distal in direction. Up to 2 ml of local anaesthetic per side should be infiltrated. The entire palmar/plantar portion of the hoof, including the heel bulb, the sole, the distal part of the deep digital flexor tendon and the coffin joint, is desensitised by this nerve block. If the horse's gait does not improve after a palmar/plantar digital nerve block, some clinicians will subsequently administer a semi-ring block around the pastern to anaesthetise the dorsal branches of the digital nerve that supply the foot.

Abaxial sesamoid nerve block

The medial and lateral palmer (or plantar) nerves are anaesthetised at the level of the bottom of the sesamoid bones, with the neurovascular bundle easily palpable. The needle is inserted at the palmar/plantar edge of the bundle, subcutaneously and parallel to the nerve. Special care is required due to the immediate proximity of the tendon sheath. Local anaesthetic (2–3 ml) should be injected each side. The entire leg distal to the fetlock joint is thereby anaesthetised. Depending on the level of injection, the sesamoid bones and the fetlock joint can be partially anaesthetised as well.

Low 4-point (forelimb)/ low 6-point (hindlimb) nerve block

Again, the medial and lateral palmer (or plantar) nerves are anaesthetised proximal to the fetlock joint. This can be done on the level of the sesamoid apex or further proximally. There, the neurovascular bundle runs dorsally to the deep digital flexor tendon and cannot be palpated. During injection, special care is required because of the direct proximity to the tendon sheath. Alternatively, the injection can be placed 1–2 cm proximal to the tendon sheath. The medial and lateral palmar nerve and palmar metacarpal nerve next to the button of the splint bones are anaesthetised. The nerves themselves are not palpable. The injections can be performed on weight-bearing or lifted limbs. Performing a low 6-point nerve block on a hindlimb adds anaesthetising the dorsal branches of the plantar metatarsal nerves to the 4-point nerve block. Local anaesthetic (2–3 ml) should be injected per nerve. These nerve blocks anaesthetise the entire distal limb (**Figure 3**).

Figure 2. Sterile prep for a distal nerve block.

Figure 3. Low 4-point nerve block with needle at lateral palmar metacarpal.

Figure 4. Subcarpal local infiltration with a view to desensitising the suspensory ligament.

High 4-point nerve block

With the limb bearing weight, the medial and lateral palmar and palmar metacarpal nerves are anaesthetised slightly distal at the level of the carpometacarpal joint. To anaesthetise a palmar nerve, a needle is inserted through fascia to where the nerve lies near the dorsal border of the deep digital flexor tendon, and 3–5 ml of local anaesthetic is injected along the nerve. Anaesthetising the medial and lateral palmar nerves alone desensitises the flexor tendons and inferior check ligament. With the limb held or bearing weight, the palmar metacarpal nerves are anaesthetised slightly distal to the level of the carpometacarpal joint by inserting the needle into the angle formed by the junction of the third metacarpal bone and the second or fourth metacarpal bone. Anaesthetising the medial and lateral palmar metacarpal nerves alone desensitises the splint bones and their interosseous ligaments and the proximal aspect of the suspensory ligament. An easier alternative to the high palmar nerve block, when the site of pain causing lameness is suspected to be in the proximal portion of suspensory ligament, is the lateral palmar nerve block, which is performed, with the limb lifted up or bearing weight, by inserting the needle over the lateral palmar nerve where it courses over the medial aspect of the accessory carpal bone. The needle is inserted in a medial to lateral direction at the distal third of a palpable groove, and 2 ml of local anaesthetic solution is deposited. Because the medial and lateral palmar metacarpal nerves arise from the deep branch of the lateral palmar nerve distal to this site, the structures they innervate, such as the proximal aspect of the suspensory ligament, are desensitised.

Direct infiltration of the proximal suspensory ligament

In case of suspected proximal suspensory desmitis, the origin of the ligament can be infiltrated directly. Respectively, the injection is very similar to the high 4-/6-point nerve block, but the needle is directed more axially, directly into the centre of the suspensory ligament and 4–6 ml of local anaesthetic are injected. This infiltration can be done with the horse bearing weight or the leg being picked up (**Figure 4**).

Lameness accounts for a significant amount of a vet practice's workload. Further investigation of orthopaedic conditions will frequently involve the use of nerve blocks. Being able to administer and interpret them effectively will help in reaching an accurate diagnosis.

Further reading

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