

How Nerve Blocks are done in Equine Medicine

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GENERAL CONSIDERATIONS

- Blocks can be performed with the horse weight bearing or non-weight bearing.
- Block nerves above the area to be anesthetized because the nerve branches spread out as they move distally
- Thorough radiographic or ultrasound examination of localized area should follow blocking.

GENERAL CONSIDERATIONS

- When blocking the needle should be inserted detached from the syringe to decrease the likelihood of it being bent or broken.
- The volume of local analgesic solution used to anesthetize nerves located in the distal portion of the limb is usually less than the proximal limb since distally located nerves are smaller and more superficially located compared to proximal nerves.
 - As such pain relief is faster in the distal portion of the limb compared to the large nerves of the proximal portion of the limb.

GENERAL CONSIDERATIONS

- Restrain the horse with the handler and the veterinarian standing on the same side of the animal.
- Lifting and flexing the leg gives better control of most blocks
- Exercise the horse once the block has been performed, do this exercise in the same manner that showed the original lameness, looking for any change.

PREPARATION OF THE SITE

- Clean the site of injection liberally with chlorhexidine and 70% isopropyl alcohol
- Adjacent structures at risk of being penetrated the site should be scrubbed with an antiseptic soap
 - Aseptic preparation is warrant for nerve blocks near synovial structures
- Clipping the site for regional anesthesia is not necessary unless it aids in palpation of landmarks

COMMON NERVE BLOCKS IN EQUINE

- Palmar Digital (Heel block)
- Abaxial Sesamoid (Pastern/foot block, High Palmar digital block)
- Low Palmar (Fetlock block, Low 4 point block)
- High Palmar (Metacarpal, High 4 point block)

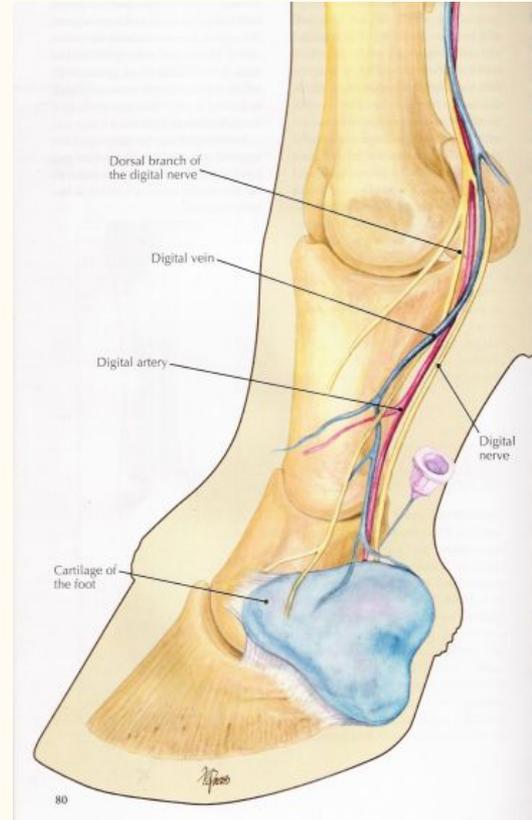
Palmar Digital (Heel block)

Borders:

- Flexor tendon (palmar/plantar),
- Ungual cartilage (distal), digital artery (distal)

Location:

- Palpate the neurovascular bundle (pulse in digital artery) along the dorsal border of the flexor tendons in the pastern region.
- Palpate the lateral cartilages



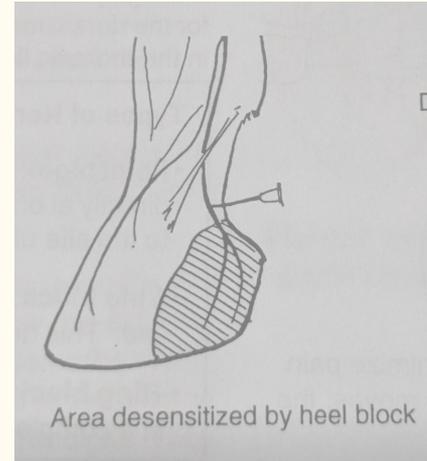
Palmar Digital (Heel block)

Technique: (Same in fore and hindlimb)

- Insert needle directly over the palmar aspect of the palpable neurovascular bundles 1cm above the cartilage of the foot.
- Aspirate and inject the local anesthetic across the vascular bundle as the needle is withdrawn

Success of block:

- Loss of skin sensation at the coronary band in the palmar portion of the foot indicates that the palmar digital nerve block was successful



ADVANTAGES OF PALMAR DIGITAL BLOCK

Blocks the palmar/plantar digital nerves innervating the palmar/plantar (heel) aspect of the foot

Desensitizes:

- The entire sole
- Navicular apparatus
- Soft tissues of heel
- Entire distal interphalangeal joint (coffin joint)
- Distal portion of the deep digital flexor tendon
- Distal sesamoidean ligaments

ADVANTAGES OF PALMAR DIGITAL BLOCK

Conditions blocked:

- Shoeing problems
- Cruising of palmar(plantar sole
- Thrush
- Navicular disease
- Navicular fractures
- Palmar fractures of P3
- Digital cushion and bulb lesions

DISADVANTAGES OF PALMAR DIGITAL BLOCK

- Dorsal portion (toe) of the foot is unaffected

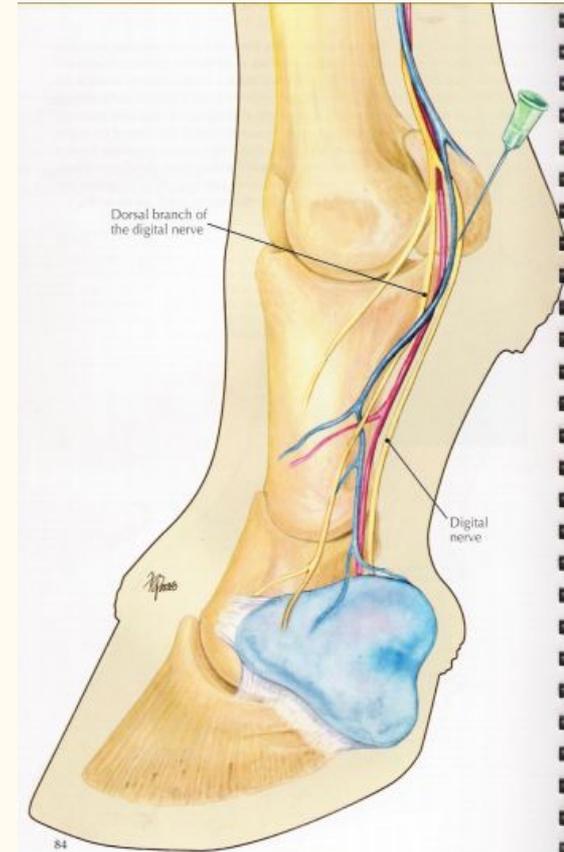
Partially blocked

- Coffin joint problems (synovitis, arthritis)
- Laminitis

Abaxial Sesamoid (Pastern/foot block, High Palmar digital block)

Location:

- Abaxial sides at distal end of proximal sesamoids
- Palpate the palmar digital nerve and its dorsal branch over the sides of the proximal sesamoid bones. Move distally & locate the base of the sesamoids



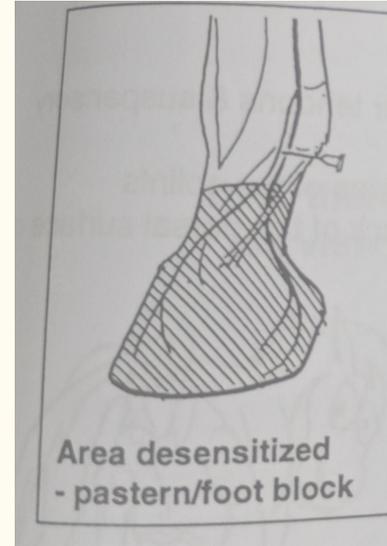
Abaxial Sesamoid Nerve Block

Technique: (Same in fore and hindlimb)

- Anesthetize the palmar digital nerves along the abaxial border of each proximal sesamoid bone where the neurovascular bundle containing the palmar digital nerve can be easily palpated.

Success of block:

- Check with blunt object over the whole coronet



ADVANTAGES OF THE ABAXIAL SESAMOID BLOCK

Blocks the pastern and entire foot

Desensitizes

- Foot
- Middle phalanx
- Proximal interphalangeal joint
- Distopalmar aspects of the proximal phalanx
- Distal portion of the superficial and deep flexor tendons
- Distal sesamoidean ligaments
- Digital annular ligament
- Sometimes the palmar portion of the metacarpophalangeal joint

ADVANTAGES OF THE ABAXIAL SESAMOID BLOCK

Conditions blocked:

- Pastern joint (synovitis, degenerative joint disease/DJD)
- Pastern area (distal sesamoidean strain, lacerations)
- Coffin joint (synovitis, DJD, subchondral bone cysts)
- Toe of foot (bruises, abscesses, canker, laminitis, seedy toe, shoeing problems, fracture of P3)
- Heel (ruled out with heel block)

DISADVANTAGES OF THE ABAXIAL SESAMOID BLOCK

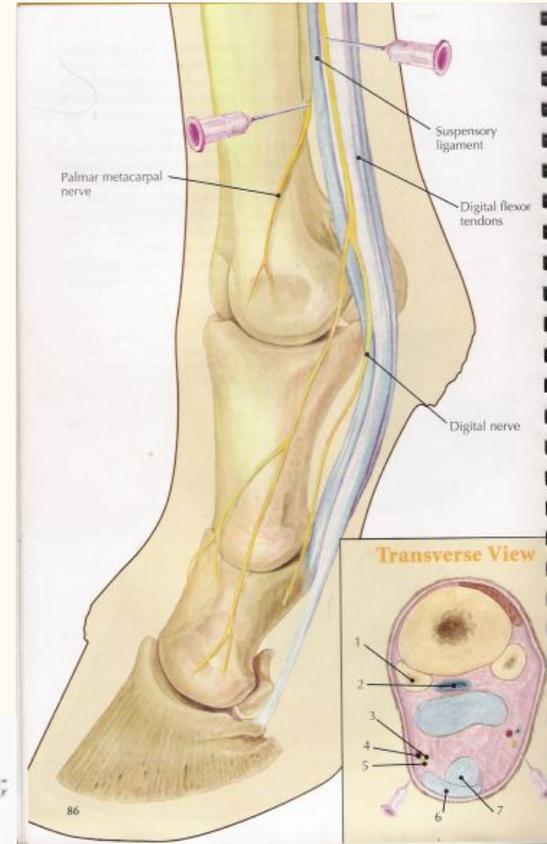
- Performing the nerve block at the base of the proximal sesamoid bones decreases the likelihood of partially desensitizing the metacarpal joint.
- Using a small volume of local anesthetic solution and directing the needle distally, rather than proximally, may also decrease the likelihood of partially anesthetizing the metacarpal joint

Low Palmar (Fetlock block, Low 4 point block)

Borders:

- Palmar nerves between the flexor tendon and suspensory ligament
- Metacarpal nerves under the buttons of the splints
- Cutaneous nerves as you withdraw from buttons of the splints

Key to inset at left: 1 = medial splint bone; 2 = palmar metacarpal vein; 3 = medial palmar vein; 4 = medial palmar artery; 5 = medial palmar nerve; 6 = superficial flexor tendon; 7 = deep flexor tendon

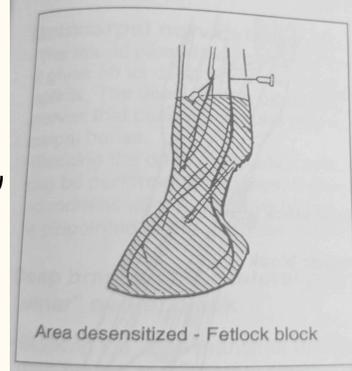


Low Palmar (Fetlock block, Low 4 point block)

Technique:

- Hold the limb up and flex the fetlock. Block 4" above the fetlock.
- Anesthetize the medial and lateral palmar metacarpal nerves at the level of the distal end of the second and fourth metacarpal bones
 - Palmar nerves - inject local anesthetic between the flexor tendons and suspensory ligament on each side
 - Palmar metacarpal nerves - pass the needle under the buttons of the splints and infuse the area with anesthetic
 - Dorsal branch of ulnar and medial cutaneous antebrachial nerves - as you withdraw the needle from the metacarpal nerve leave a 'bleb' of anesthetic under the skin to get the cutaneous nerve. Do this on both sides of the fetlock.

ADVANTAGES OF THE LOW PALMAR BLOCK



- Localizes pain causing lameness that has not improved after anesthetizing the palmar digital nerves at the level of the base of the proximal sesamoid bones

Desensitizes :

- The foot or pastern regions for surgery
- The superficial and deep digital flexor tendons
- Distal aspect of the branches of the suspensory apparatus



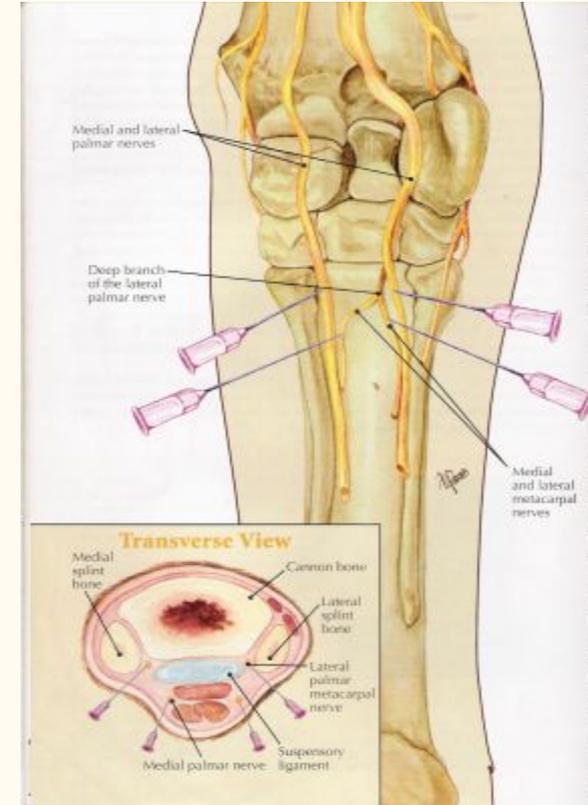
DISADVANTAGES OF THE LOW PALMAR BLOCK

- Inadvertent penetration of the deep flexor tendon sheath is high
- Potential hemorrhage from medial palmar vein and artery

High Palmar (Metacarpal, High 4 point block)

Location:

- Palmar nerves on the sides of the flexor tendons the deep fascia
- Metacarpal nerves in the junction between the cannon bone and the splints, deep to the ligament



High Plantar Nerve Block

Technique:

- To anesthetize each palmar nerve slightly below the level of the carpometacarpal joint insert a needle through heavy fascia where the palmar nerve lies adjacent to the dorsal surface of the deep digital flexor tendon.
- Anesthetized the lateral and medial palmar metacarpal nerves slightly below the carpometacarpal joint where the nerves lie between the palmar surface of the third metacarpal bone and the axial surface of the second or fourth metacarpal bone. Hold the limb during this procedure



ADVANTAGES OF HIGH PALMAR BLOCK

Blocks the metacarpal regions except the origin of the suspensory ligament, inferior check ligament of deep digital flexor and the proximal splints and cannon.

- High palmar block
 - Anesthetizes the superficial metacarpal structures by blocking the medial and lateral palmar nerves at the proximal metacarpus
- High metacarpal block
 - Anesthetizes the metacarpal nerves therefore most of the suspensory ligament and the interosseous ligaments of metacarpal bones

ADVANTAGES OF HIGH PALMAR BLOCK

Conditions blocked

- Bowed tendon (tendonitis) and tenosynovitis
- Stress fractures of cannon bone (McII)
- Bucked shins
- Splint bone fractures
- Middle and low desmitis of suspensory ligament

DISADVANTAGES OF HIGH PALMAR BLOCK

Conditions not blocked

- High suspensory desmitis
- Splints
- High splint fractures
- Inferior check ligament

COMPLICATIONS OF NERVE BLOCKS

- Broken needles
- Subcutaneous infection
- Septic synovitis caused by inadvertent synoviocentesis
- Local anesthetic solution used for regional anesthesia is detectable systemically and could create a problem for the owner or trainer if the horse is tested
- Hematoma
- Cellulitis
- Local Anesthetic toxicity

CONTRAINDICATIONS OF NERVE BLOCK

- Tranquilizing the horse will mask the effects of the blocks and confuse the lameness evaluation.
- Dispersion of the local anaesthetic agent may decrease the specificity of the block

RESOURCES:

- Moyer WW. Guide to equine joint injection and regional anesthesia. Chadds Ford: Academic Veterinary Solutions; 2007. Pg 74-81, 84-89
- Pasquini C, Spurgeon TL, Pasquini S. Anatomy of domestic animals: systemic and regional approach. Pilot Point, TX: Sudz Pub.; 2003. Pg 587-592