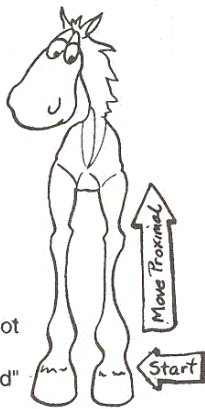


## Lameness - Nerve Blocks

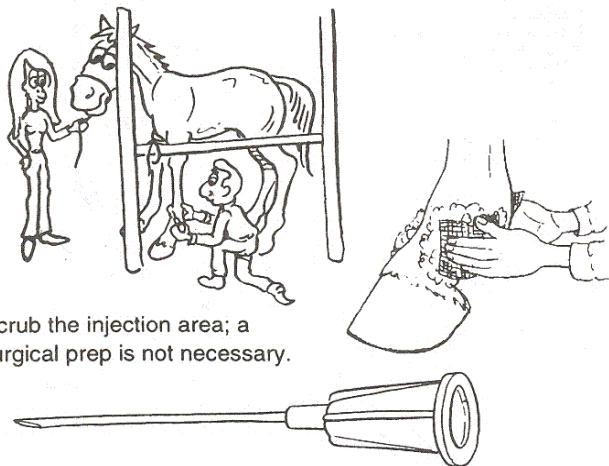
**BLOCKS - LAMENESS DIAGNOSIS:** lameness is the consequence of pain or mechanical interference (rare). Nerve blocks & intrasynovial anesthesia stop pain perception, thus, lameness (horse "goes sound"), helping to localize the problem.

- First identify the lame limb by palpation & observing the animal at rest & in motion. Once the limb has been identified, nerve blocks may be performed to localize the problem area of the limb.
- **Start distally** (lower) & **move proximally** (higher) to localize the problem.
- Block nerves above the area to be anesthetized because the nerve branches spread out as they move distally.
- Block bilaterally (pain doesn't know where the midline is).
- If a limb is blocked sound (no lameness) & the opposite limb is also affected, that limb will then appear lame.
- Look for changes in degree of lameness, not 100% soundness with a block.
- Block higher if the animal doesn't "go sound" with a block.
- Problem is distal to last block performed to achieve soundness.
- Problem is between last 2 blocks used to achieve soundness.
- Blocking to soundness is not a definitive diagnosis, but localizes the source of lameness.
- Thorough radiographic, ultrasound or scintigraphic examination of localized area must follow.



### Procedure for nerve blocks:

- Restrain the horse with the handler & the veterinarian standing on the same side of the animal.
- Do not tranquilize the horse as this will mask the effects of the blocks.
- A twitch may be helpful in some horses during insertion of the needle.
- Blocks can be performed with the horse weight bearing or nonweight bearing, depending on the performer's preference.
- Lifting & flexing the leg gives better control for most blocks.

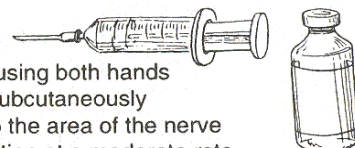


- Scrub the injection area; a surgical prep is not necessary.

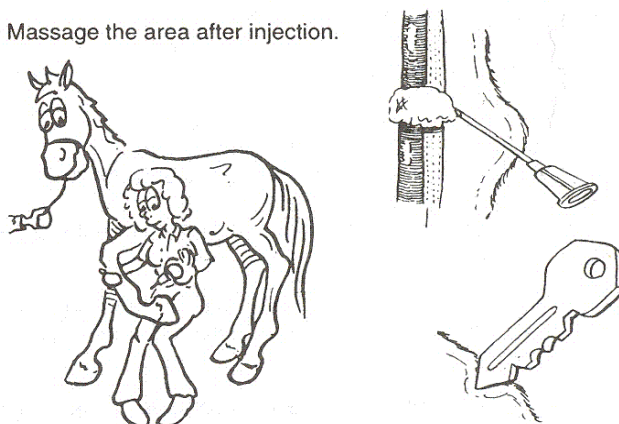
- **Use a small needle** (22 gauge 5/8th inch) to minimize pain.
- Insert the needle quickly upward so if the horse moves, the needle won't be jabbed into the limb.

## NERVE BLOCKS

- Let the animal calm down
- Then attach the syringe using both hands
- Inject a little anesthetic subcutaneously
- Then move the needle to the area of the nerve
- Inject the anesthetic solution at a moderate rate
- Infuse the anesthetic as closely as possible to the desired nerves in order to produce a limited field of anesthesia
- Aspirate before injecting to avoid injecting into a vessel.
- Injection should not be difficult. If it is, then the needle may be interdermal or in a tendon, redirect the needle & try again.

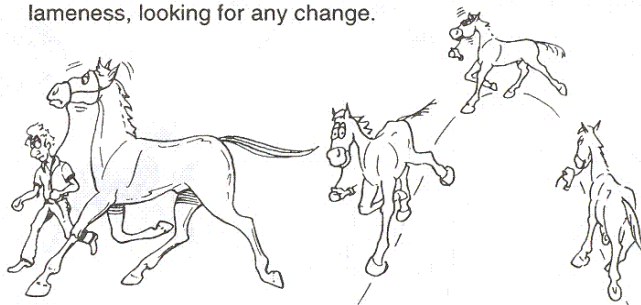


- Massage the area after injection.



- **Check success of block:** by pushing a blunt object (ball-point pen or key) into area of skin that is desensitized by block

- **Exercise:** once the block has been performed & checked, **exercise the horse** in the same manner that showed the original lameness, looking for any change.



Nerve blocks (perineural block), depending on the article or veterinarian, vary in minor ways, especially for the metacarpal region. Distal to the carpus & tarsus nerve blocks are performed in roughly the same manner except that ring blocks are added to for the dorsal metatarsal nerves that have no comparable nerves in the thoracic limb.

### Types of Nerve Blocks: point, line, & ring blocks

- **Point block** (perineural anesthesia): blocking a specific nerve directly at one site. This blocks the nerve & its branches distal to the site of injection.
- **Line block:** produced by infiltrating the anesthetic along a line. This numbs the nerve branches crossing the line.
- **Ring block or field block:** achieved by injecting anesthetic in a complete or partial circle around the limb.

## Heel Block (Palmar Digital Block)

**"Heel block" or Palmar digital (volar) nerve block (PD):** anesthetizes the palmar/plantar digital nerves innervating the palmar/plantar (heel) aspect of the foot.

• **Procedure** (same in front & hindlimbs):

- Put horse in stocks & do block while weight bearing if cooperative. A nose twitch may be necessary. If the horse is fractious lifting the foot & placing the hoof between your knees will give more control.

- 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.

. Neurovascular bundle is arranged VAN (vein, artery & nerve) from dorsal to palmar/plantar.

- **Needle:** Insert the needle just proximal to the ungual cartilage at the level of the pastern joint.
- . Aspirate & inject 1-2 ml of local anesthetic SQ (5/8" 22 gauge) across the vascular bundle.
- . Use a small amount of anesthetic so it doesn't diffuse to the dorsal branch.

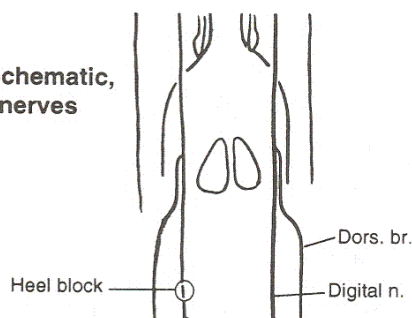
An alternative is to push up the ergot & locate its tensed ligament. Inject through the middle of this ligament to block the nerve passing under it.

• **Check:** 3-5 minutes after injecting with a ball point pen or key into the skin over the **bulbs of the heel**. Also test the coronet over the toe to check that the dorsal branches have not been blocked. Hoof testers are also good for testing to see if deep structures (navicular bone) are anesthetized.

**Boundaries of injection site**

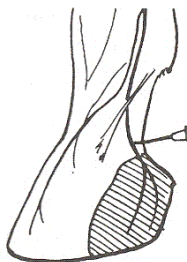
- Palmar/plantar - Flexor tendons
- Distal - Ungual cartilage
- Dorsal - Digital artery

**Schematic, nerves**



**Conditions blocked:**

- Shoeing problems
  - Bruising of palmar/plantar sole
  - Thrush
  - Navicular diz
  - Navicular fxs
  - Palmar fxs of P3
  - Digital cushion & bulb lesions
- Partially blocked
- Coffin joint problems (synovitis, arthritis)
  - Laminitis
- Dorsal portion (toe) of the foot is unaffected

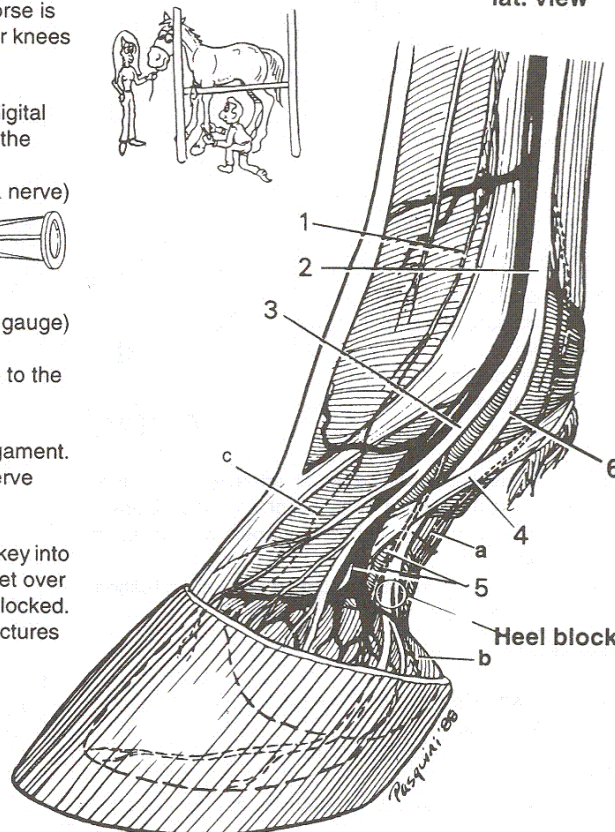


Area desensitized by heel block

## NERVE BLOCKS

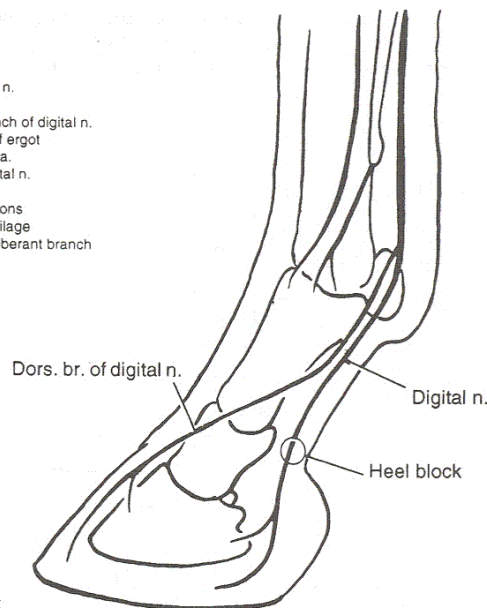
Anatomy - Nerves: pg. 494

Dist. thoracic limb, lat. view



1. Metacarpal n.
2. Digital n.
3. Dorsal branch of digital n.
4. Ligament of ergot
5. Digital v. & a.
6. Palmar digital n.

- a. Flexor tendons  
b. Lateral cartilage  
c. Possible aberrant branch



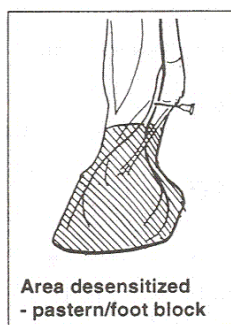
Schematic, lat view



## Pastern/Foot Block - ASNB

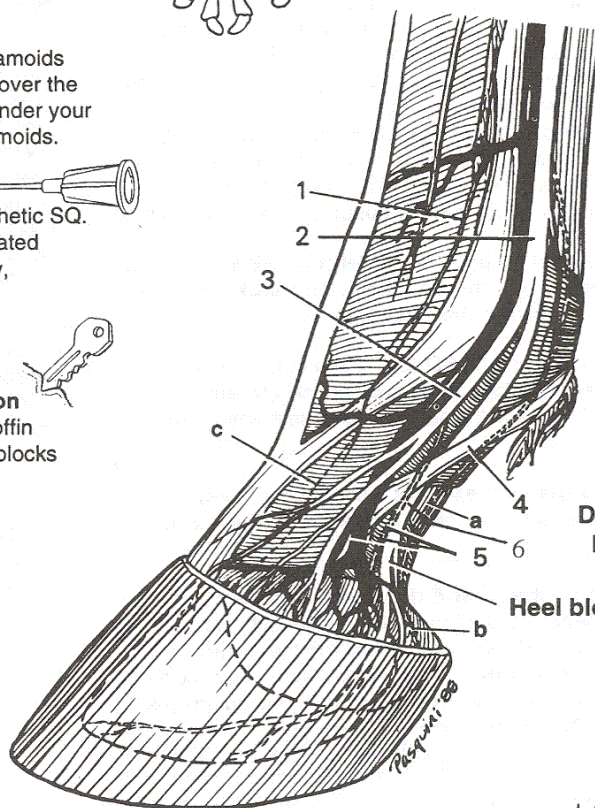
"Pastern/Foot" nerve block,  
Abaxial sesamoidean nerve block (ASNB), High digital  
block

- **Blocks:** pastern & entire foot
- **Procedure:** (same in front & hindlimbs)
  - Do in stock with horse weight bearing or outside stock in nonweight bearing if fractious animal.
- **Location:** abaxial sides at distal end of proximal sesamoids
  - Palpate the palmar digital nerve & its dorsal branch over the sides of the proximal sesamoid bones ("pop" them under your fingers). Move distally & locate the base of the sesamoids.
- **Inject** 3 to 5 ml (5/8" 22 gauge needle) of local anesthetic SQ.
  - Blocking distally from where the nerves can be palpated prevents the anesthetic from going too far proximally, possibly anesthetizing the fetlock area.
- **Check:** with a blunt object over the whole coronet
- **Comment: intrasynovial blocks - further localization**
  - If horse goes sound with a pastern/foot block, the coffin & pastern joints can be blocked after the perineural blocks have worn off (pg 597).



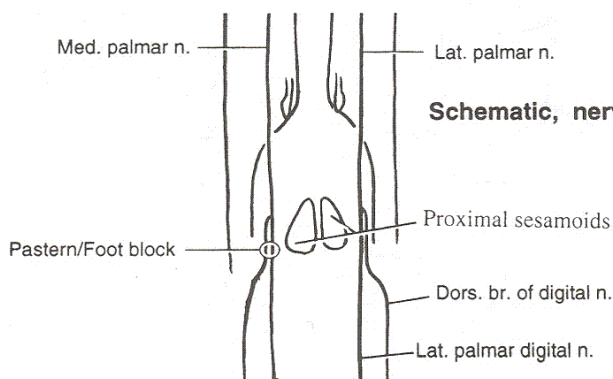
Area desensitized  
- pastern/foot block

1. Metacarpal n.
  2. Palmar n.
  3. Dorsal branch of digital n.
  4. Ligament of ergot
  5. Digital v. & a.
  6. Palmar digital n.
- a. Dist. sesamoid bone  
b. Possible aberrant branch



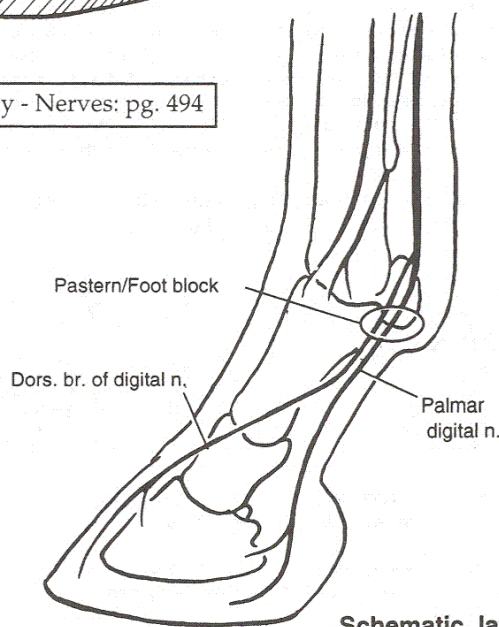
Dist. thoracic  
limb, lat. view

Heel block



Schematic, nerves

Anatomy - Nerves: pg. 494



Schematic, lat view

### Conditions blocked:

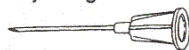
- Pastern joint (synovitis, DJD)
- Pastern area (dist. sesamoidean strain, lacerations)
- Coffin joint (Synovitis, DJD, Subchondral bone cysts)
- Toe of foot (bruises, abscesses, canker, laminitis, seedy toe, shoeing problems, fxs of P3)
- Heel (already ruled out with the heel block)

## Fetlock block, Low palmar block

### Fetlock block, Low palmar (volar) block, or 4-point block

- **Nerves blocked to desensitize the fetlock distally:**
  - **Medial & lateral palmar nerves:** located on each side, between the flexor tendons & the suspensory ligament.
  - **Medial & lateral palmar metacarpal nerves:** found emerging beneath the buttons of the splint bones.
  - **Cutaneous sensation** (many references ignore these branches)
    - . **Dorsal branch of the ulnar nerve:** crosses just dorsal to where the lateral metacarpal nerve emerges from beneath the button of the lateral splint.
    - . **Musculocutaneous nerve branch** (medial cutaneous antebrachial nerve): traveling on the medial surface of the antebrachium near where the medial metacarpal nerve becomes subcutaneous near the button of the medial splint.
- **Procedure:** hold the limb up & flex the fetlock, taking tension off the flexor tendons. Block about 4" above the fetlock (where the epiphysis narrows down to the diaphysis).

- **Palmar nerves:** inject 3 ml SQ (5/8" 22-g) of local anesthetic between the flexor tendons & the suspensory ligament on each side. It is critical to stay in the subcutis to avoid injecting into the tendon sheath.

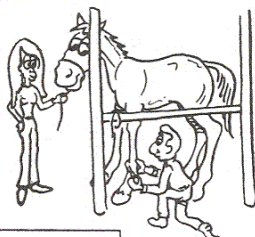
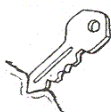


- **Palmar metacarpal nerves:** pass a needle (5/8" 22-gauge) under the buttons of the splints & infuse the area with 3 ml of anesthetic.

- **Dorsal branch of the ulnar & the medial cutaneous antebrachial nerves:** block by leaving a "bleb" subcutaneously as the needle is withdrawn after performing the metacarpal nerve blocks. Many references don't block these, if not blocked realize it may result in only partial blocking of the cutaneous sensation over the fetlock.

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- **Alternate procedure**
  - Direct the needle (3" 22-gauge) from the palmar aspect of the limb dorsally to the palmar nerve between the flexor tendons & the suspensory ligament. Inject the palmar nerve (3 ml). Without removing the needle, push the flexor tendons to the side & direct the needle dorsally under the button of the splint (3 ml). Inject the metacarpal nerve. As you withdraw the needle leave a "bleb" of anesthetic under the skin to get the cutaneous nerve. Repeat this on the other side.
- **Check** after 3 to 5 minutes by pressing a blunt object (ball point pen, key) into the skin around the fetlock.



#### Boundaries of injection site:

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



**Since 90% of all lameness is in the foot,** most lameness will be isolated with these blocks (Heel, Pastern/foot & Fetlock). If the horse is still lame, continue up the limb.

## NERVE BLOCKS

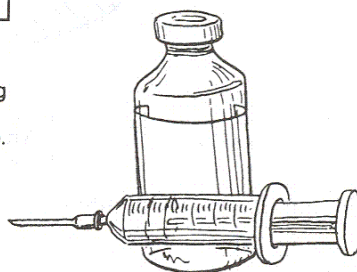
### Low plantar block - hindlimb

- **Similar to the low palmar block of the forelimb, except:**
  - **Ring block of dorsal metatarsus:** desensitizes the 2 additional nerves (dorsal metatarsal nerves) that have no comparable nerves in the thoracic limb.
- **Nerves to hindlimb fetlock** (comparable nerves in the thoracic limb are in parentheses).
  - Medial & lateral plantar nerves (medial & lateral palmar)
  - Medial & lateral plantar metatarsal nerves (medial & lateral metacarpal)
  - **Medial & lateral dorsal metatarsal nerves** from deep peroneal (no comparable nerves in the thoracic limb) pass between the dorsal surfaces of the splint bones & cannon bone.
  - Caudal cutaneous sural nerve (found laterally on the tibia) (dorsal branch of ulnar)
  - Saphenous nerve (on medial side) (medial cutaneous antebrachial)

- **Procedure:**
  - Block plantar nerves as in forelimb (metatarsal nerves - block under the buttons of splint)
  - **Dorsal ring (field) block instead of bleb** to desensitize dorsal metatarsal nerves & caudal cutaneous sural & saphenous nerves to desensitize the entire dorsal surface of the fetlock distally

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- **Inject:**
  - Plantar nerves between the flexor tendons & suspensory ligament
  - Metatarsal nerves under the buttons of the splints
  - Cutaneous nerves with a ring block of the dorsal surface of the cannon bone



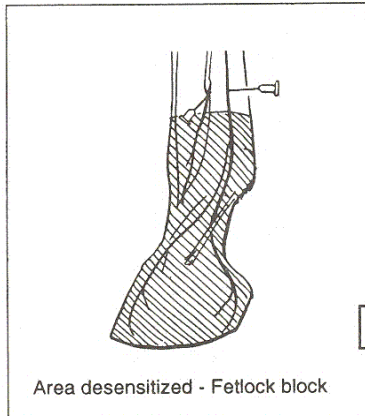
#### Conditions blocked:

- Fetlock joint (subchondral bone cysts of P1, McIII. Synovitis, DJD, septic arthritis)
- Collateral ligament strain/sprain
- Sesamoiditis
- Prox. sesamoid fractures
- P1 fractures
- Condylar fractures - McIII (cannon bone)

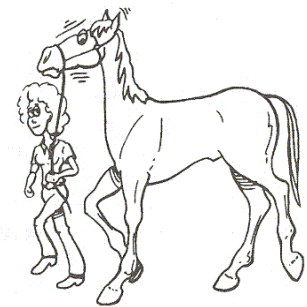
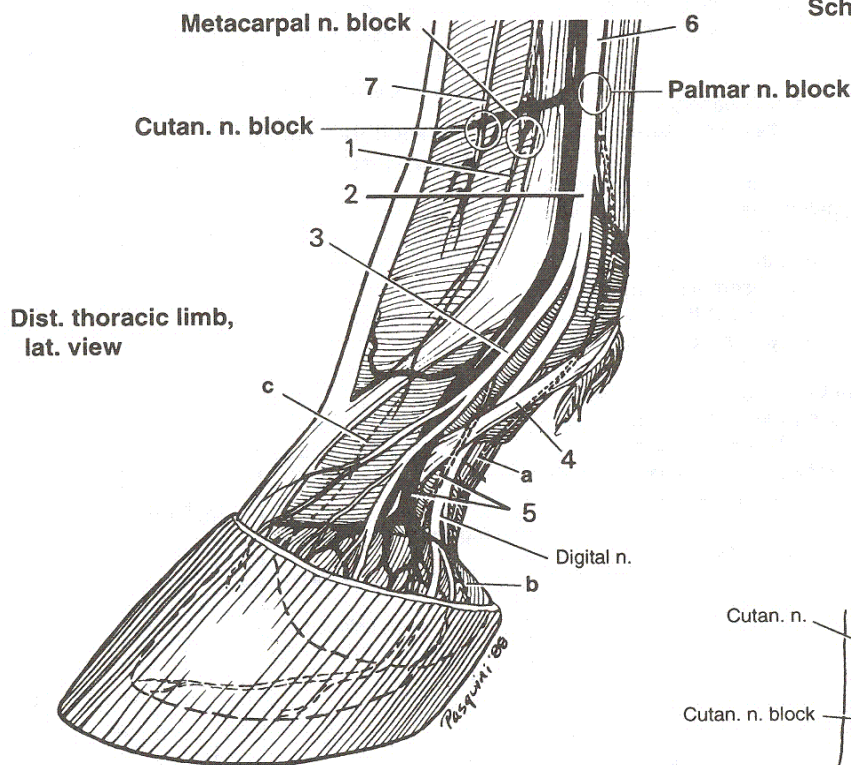
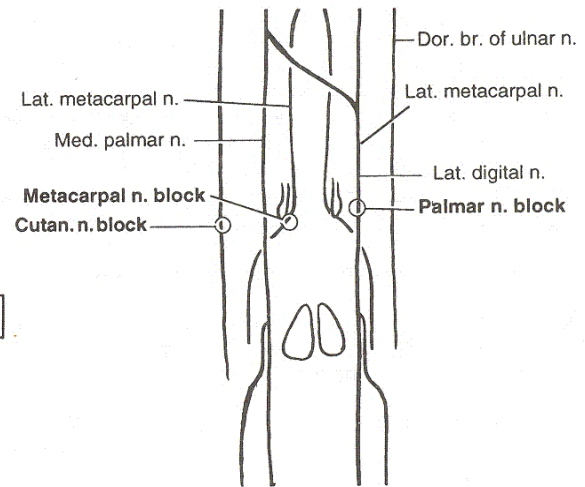


## Fetlock Block, Low Palmar Block

## NERVE BLOCKS

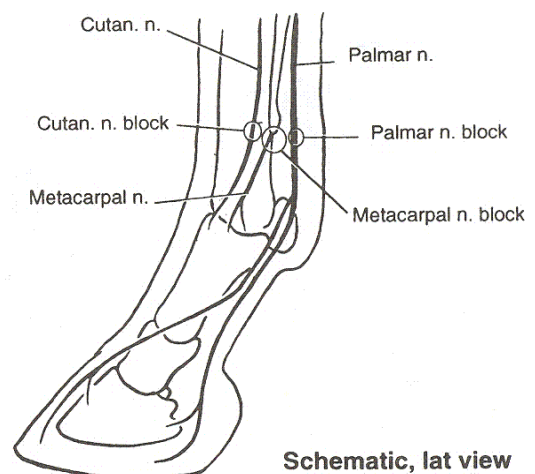
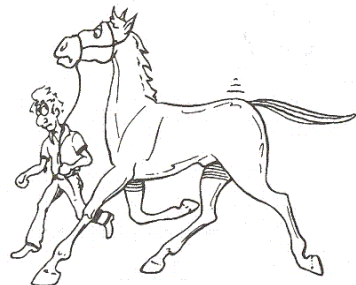


Anatomy - Nerves: pg. 494



1. Metacarpal n.
2. Digital n.
3. Dorsal branch of digital n.
4. Ligament of ergot
5. Palmar digital v. & a.
6. Palmar n.
7. Cutan. n.

- a. Flexor tendons  
b. Lateral cartilage  
c. Possible aberrant branch



## Metacarpal block, High 4 point block

**Metacarpal blocks:** confusing & varied. Different people use different block locations & different combinations. The palmar & metacarpal nerves supply most of the metacarpus. They may be blocked separately to desensitize the deep or superficial structures of the metacarpus. Blocked together they desensitize all or most of the metacarpus depending on how proximally they are performed. All metacarpal blocks are done above the mid-cannon region because of the communicating branch between the medial & lateral palmar nerves. The communicating branches can be felt on the palmar surface of the superficial digital flexor tendon.

### High palmar 4 point block (palmar & metacarpal nerves)

- **Blocks:** metacarpal region, except the origin of the suspensory ligament, inferior check ligament of deep digital flexor & the proximal splints and cannon.
- **High palmar block:** used to anesthetize the superficial metacarpal structures by blocking the medial and lateral palmar nerves at the proximal metacarpus.
- **High metacarpal block:** anesthetizes the metacarpal nerves, thus, most of the suspensory ligament and the interosseous ligaments of metacarpal bones
- **Procedure:** nonweight bearing or weight bearing
  - **Palmar nerves:** on the sides of the flexor tendons, below the deep fascia
    - Insert a needle (5/8" 22 gauge) above communicating branch, through the deep fascia to the palmar nerve located between the deep digital flexor and the suspensory ligament.
    - Inject 5 ml of local anesthetic & repeat on the other side.
    - This anesthetizes the superficial metacarpal region, but will not desensitize all of the deep structures of the metacarpus.
    - If a SQ bleb is seen while injecting you are too superficial since the nerves are deep to the deep fascia.
  - **Metacarpal nerves:** in the junction between the cannon bone & the splints, deep to the suspensory ligament
    - Insert a needle (1" 22-gauge) distal to the carpus, between the splints (metacarpal II & IV) & the suspensory ligament down to the cannon bone (metacarpal III) on both sides.
    - Inject 3 to 5 ml of local anesthetic.
    - **Blocks:** Deep structures of the metacarpus, except proximal metacarpus



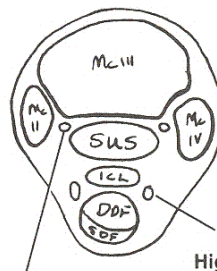
- **Conditions blocked:**
  - Bowed tendon (tendonitis) & tenosynovitis
  - Stress fractures of cannon bone (McIII)
  - Bucked shins
  - Splint bone fractures
  - Middle & low desmitis of suspensory lig.
- **Not blocked:**
  - High suspensory desmitis
  - Splints
  - High splint fractures
  - Inferior check ligament

## NERVE BLOCKS

Dist. thoracic limb, lat. view

High metacarpal block

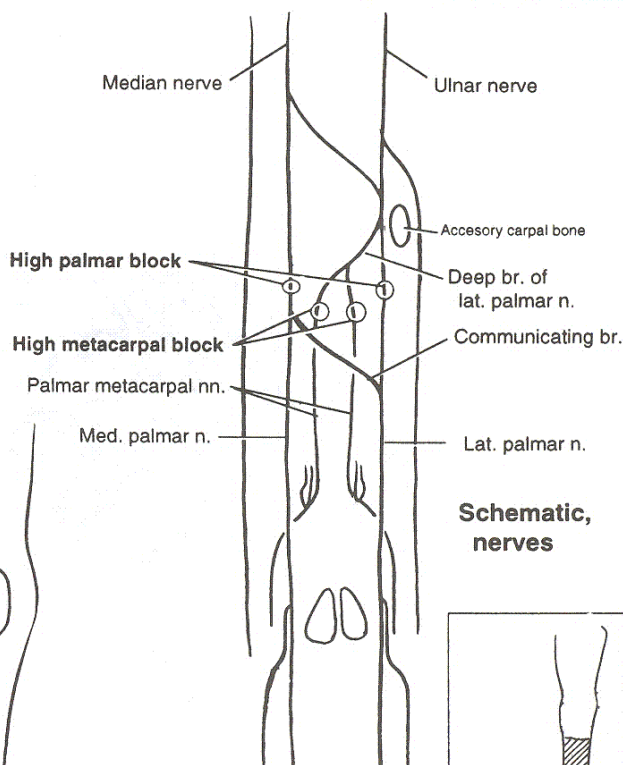
High palmar block



High metacarpal block

Cross section through metacarpal region, schematic

Anatomy: pgs. 484, 491

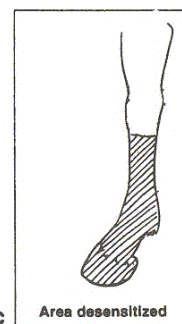


Schematic, nerves

High palmar block

High metacarpal block

Nerves carpus, lat. view, schematic



Area desensitized

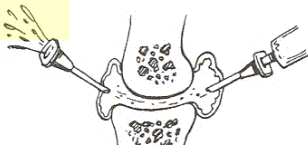
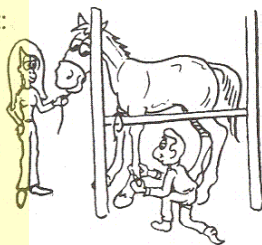


## Joint Blocks

**Arthrocentesis** (ar'thro-sen-TEE-sis): the puncturing & aspiration of a joint

### Reasons to arthrocentesis a joint:

- To remove a sample for visualization (e.g., viscosity of synovial fluid) or lab work
- To administer therapeutic drugs (e.g., antibiotics)
- To administer a diagnostic substance (dye) for radiographic contrast studies
- To administer an anesthetic



Joints & bursae are blocked to localize pain to a specific blocked structure. The higher risk in these injections over nerve blocks necessitates the observation of total surgical asepsis to prevent contamination. There is also the danger of damaging articular cartilage, thus, causing degenerative joint disease or acute arthritis. Nevertheless, they are very valuable diagnostic tools.

An injection of an anesthetic into a joint of a lame horse which then goes sound localizes the problem to that joint. If the horse remains lame, that joint is not the problem; or it was not properly anesthetized.

## JOINT BLOCKS

**Surgical access to a joint:** arthroscopic surgery is becoming popular & requires knowing where to access joints. More than one entrance is often necessary for such surgeries.

**Joint pouches:** focal points where the joint capsule protrudes between osseous & soft tissue structures. The pouches may or may not be swollen, thus, may or may not be palpable. The joint is accessible through these pouches. Avoiding the articular cartilage is desirable, but not always possible. Protrusion of the joint capsule (pouches) sometimes allows a needle to enter the joint cavity away from the articular cartilages. If it becomes necessary to enter between the articular cartilages, use a small needle & restrain the animal to minimize movement & possible scarification of the cartilage.

### To locate the injection site:

1. Locate the level of the joint by palpating the regional structures
2. Locate the injection sites by palpating their boundaries
3. Insert the needle & aspirate synovial fluid
  - If you are injecting a large quantity of local anesthetic, remove the same amount of synovial fluid before injection.

## Navicular (podotrochlear) bursa block

Anatomy - Joints: pg. 117

Anesthetizes the navicular bursa and, by diffusion, the navicular bone. This block is difficult & rarely done because of the probability of deep infection. If performed, it is done after the heel block has worn off.

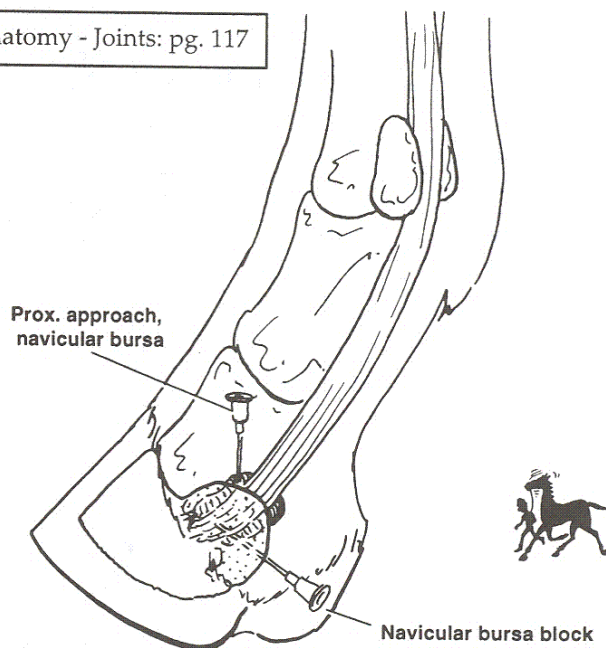
### • Procedure:

- Make a SQ injection under the skin on midline, just above the bulbs of the heel
- Direct the needle (2 inch, 20-gauge) through this point, dorsally & parallel to the ground until it hits bone (navicular bone)
- Back off slightly & inject 5 ml of anesthetic into the bursa

### Proximal approach, alternate procedure:

#### • Procedure

- Insert the needle above the lateral cartilage of P3
- Angle the needle towards the opposite heel between the middle phalanx & DDF tendon
- Use radiographic control



## Dorsal Approach - Fetlock, Pastern, Coffin

## JOINT BLOCKS

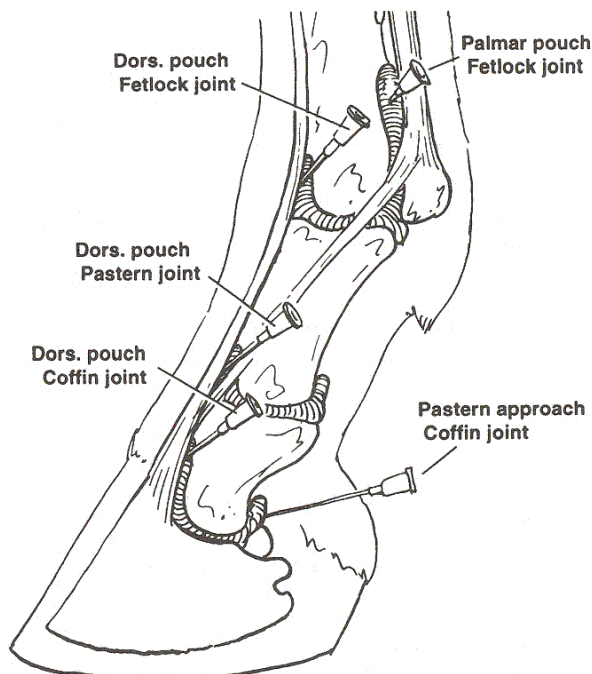
### Dorsal approach to the fetlock, pastern & coffin joints:

- **Procedure:** same for all 3 joints
  - Insert the needle (1 1/2" 20-gauge) proximal to the joint, under the common/long digital extensor tendon laterally, & pass obliquely into the dorsal pouch
  - Inject 5 ml of local anesthetic
- Coffin joint is within the hoof wall, therefore it cannot be palpated, but only mentally visualized. Insert the needle above the coronet, lateral to & under the extensor tendons into the dorsal pouch.

### Palmar approach to coffin joint

- **Procedure:**
  - Spinal needle placed slightly above deepest indentation of the fossa above the bulbs of the heel
  - Direct needle dorsally & distally toward midpoint between the coronet & toe of the foot

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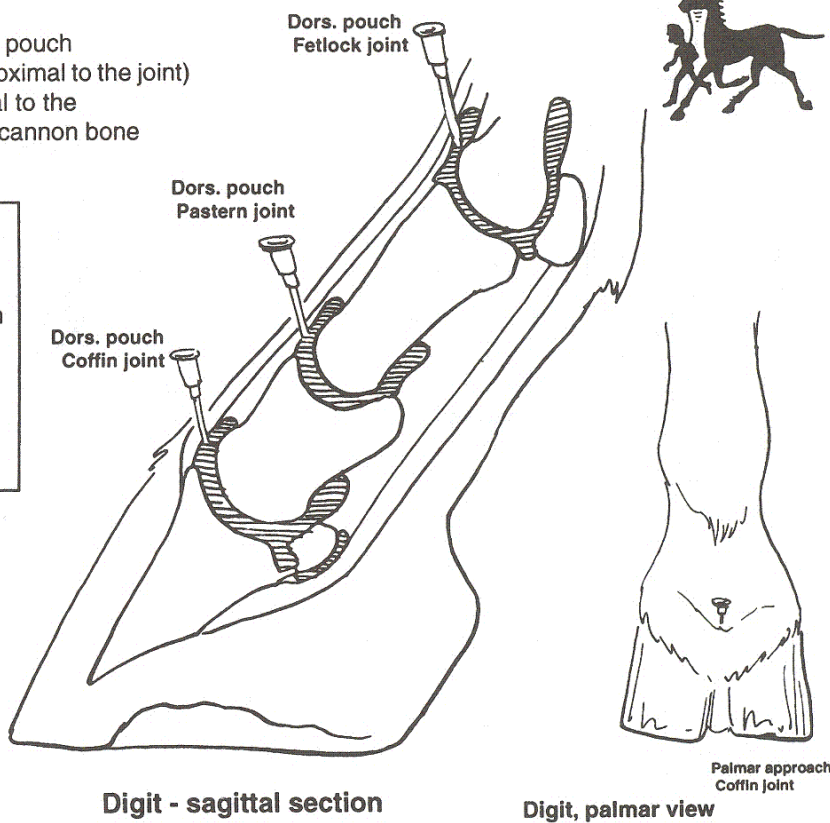
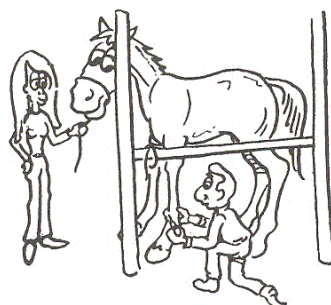
Digit - lat. view

### Palmar approach to the fetlock:

- An easier alternative to the dorsal approach
- **Procedure:**
  - Flex the fetlock
  - Palpate the boundaries of the palmar pouch (suspensory lig & cannon bone just proximal to the joint)
  - Insert the needle (1" 18-gauge) dorsal to the suspensory ligament & palmar to the cannon bone
  - Inject 5 ml of local anesthetic

### Boundaries:

- Dorsal pouches
  - Proximal to the joint
  - Obliquely under the extensor tendon
- Palmar pouch of fetlock
  - Proximal - button of splint bone
  - Dorsal - cannon bone
  - Distal - proximal sesamoid bone
  - Palmar - suspensory ligament



Digit - sagittal section

Digit, palmar view