

# Nerve blocks and arthrocentesis on the Equine limbs

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Images: Adams and Stashak's Lameness in Horses (Gary M. Baxter)

# Shoulder joint

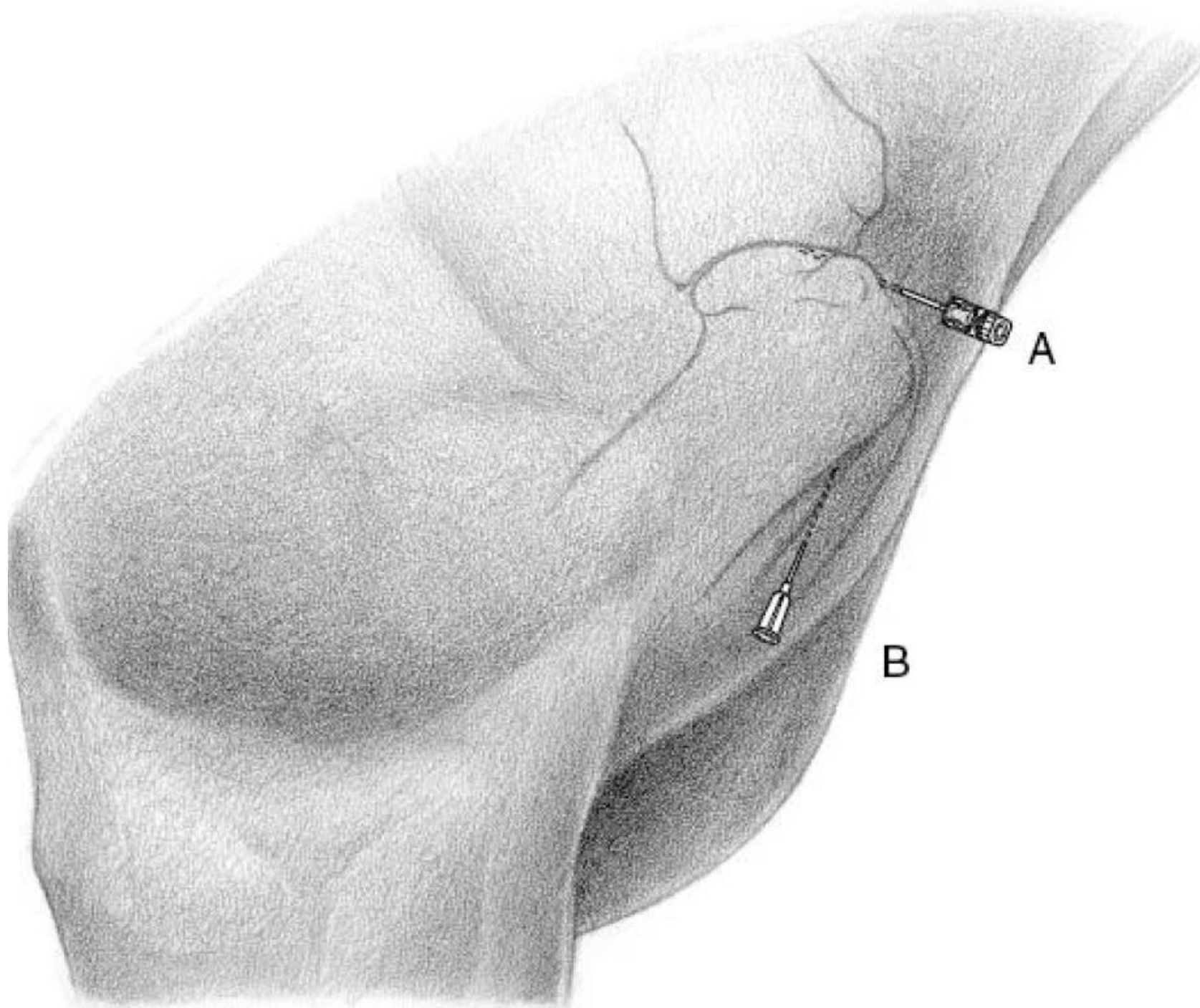
- Deep, difficult to reach
- May communicate with bicipital bursa
- Injecting anesthetics may result in suprascapular nerve block
- Between cranial\* and caudal parts of major tubercle
  - Standing position
  - Caudomedial direction
  - Horizontal needle
  - 5-8 cm deep
- Finding the infraspinatus tendon is also possible, but difficult
  - Caudal from the tendon

*\*palpable*

# Bicipital bursa

- Deep, very difficult to reach
- cc 6 cm distal from cranial\* part of major tubercle
- Cc 7 cm cranial from deltoid\* tuberosity
  - Standing position
  - Proximomedial direction
  - Aiming at *sulcus intertubercularis*

*\*palpable*



A

B

*A: shoulder joint*  
*B: bicipital bursa*

# Elbow joint

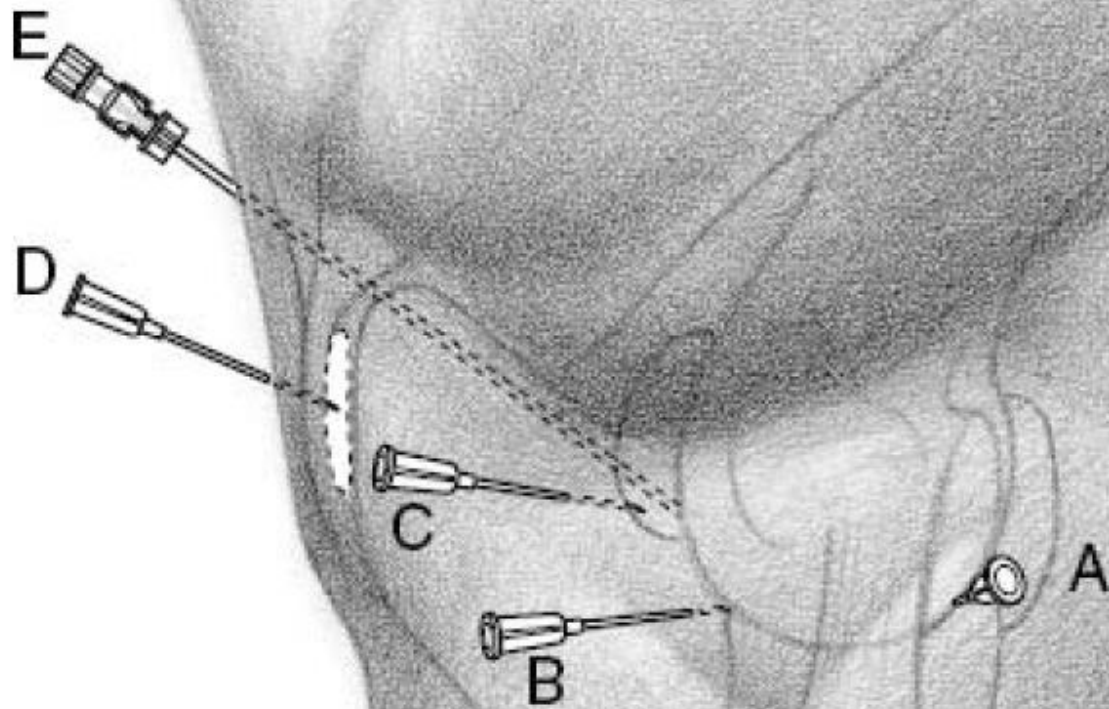
- Radiohumeral and humeroulnar joints are not separated
- May communicate with bursa of the m. ext. carpi lat.
- Joint capsule is narrow
  - But has a significant caudal pouch
- Lateral approach
  - Standing or flexed joint
  - Cranial / caudal from the collateral lat. ligament
    - From lateral epicondyle of humerus\*
    - To lateral bulb\* on caput radii for the ligament (no anatomical name)
  - Perpendicular to the skin
  - 3-4 cm deep
  - Cranially the radial nerve is close!

*\*palpable*

# Elbow joint

- Caudal approach
  - Standing or flexed joint
  - 1/3 of the distance between
    - Proximal tip of olecranon\*
    - Epicondylus lateralis\*
  - 45°
  - Distomedially
  - Through triceps tendon
  - Towards *fossa olecrani*

*\*palpable*



*A&B: cranial approach  
C: modified cranial  
D: bursa olecrani  
E: caudal approach*

# Ulnar nerve block

- Appr. 10 cm. proximal to *os carpi accessorium*
- On the caudal aspect
- Between
  - *M. flexor carpi radialis*
  - *M. extensor carpi lateralis [m. ulnaris lateralis]*
- Superficial (under the skin)
- Desensitizes:
  - Skin of the forearm on the lateral side, until fetlock
  - Carpal canal (partially)
  - Superficial digital flexor (partially)
  - *M. interosseus medius* (partially)

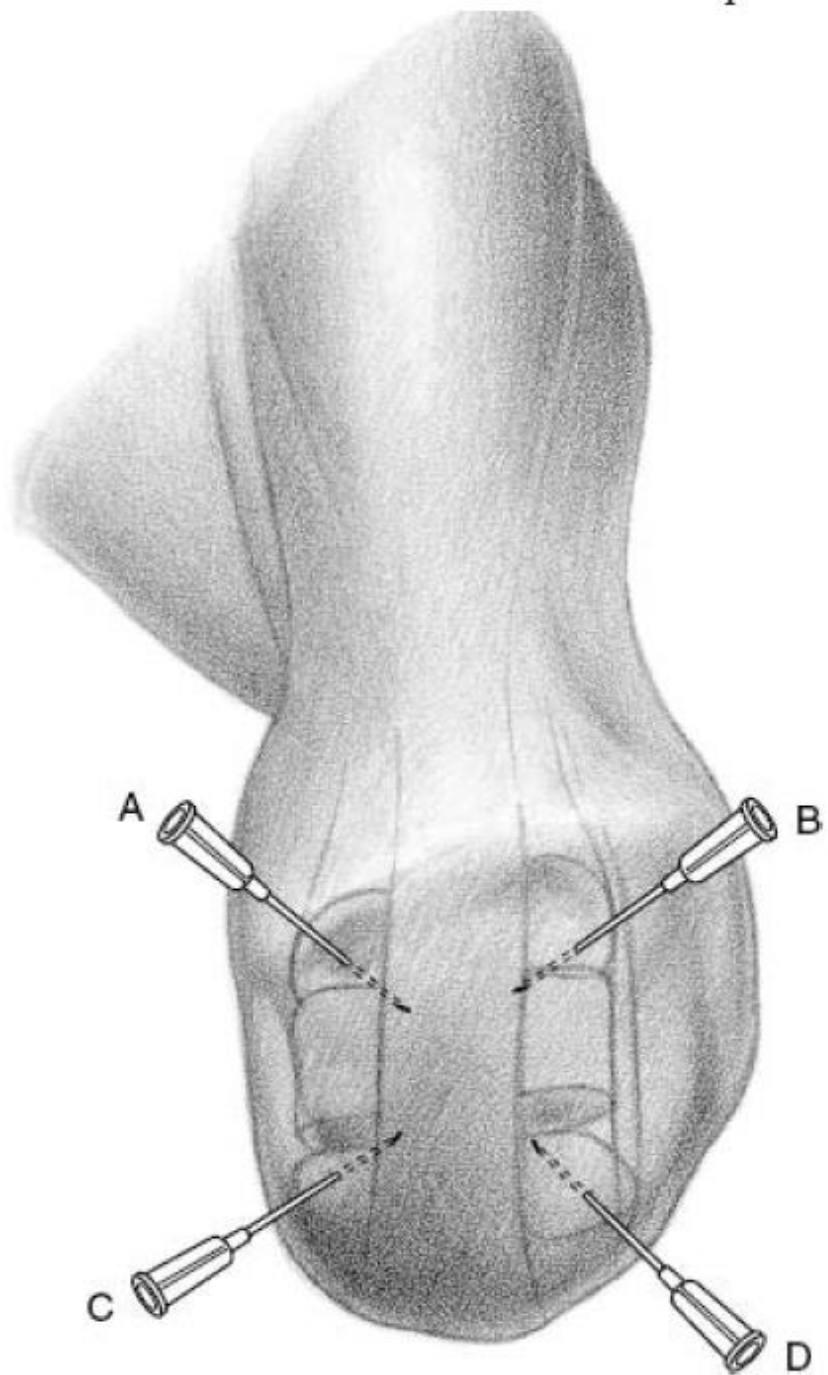


# Median nerve block

- Radius, caudomedial aspect
- Cranial to the origin of *m. flexor carpi radialis*
- Below the elbow joint
- At the insertion on the *radius* of the *m. pectoralis superficialis*
- 3-5. cm deep
- ! It is next to the median artery and vein !

# Carpal joint

- Three joint cavities
  - The most proximal cavity (*art. antebrachiocarpea*) is wide
  - The distal two (*art. mediocarpea* [between proximal & distal rows]; *art. carpometacarpea* [between distal row & metacarpus]) are narrow
  - The distal two communicate
    - Between C3-C4
- Dorsal approach
  - Flexed limb
  - Lateral/medial from the common digital extensor
  - Palpable depressions between the bone rows
- Palmar approach is possible but not common



*A&B: antebrachio-carpal joint*

*C&D:*

*D: mediocarpal & carpometacarpal joints*

# Vagina synovialis communis mm. flexorium proximalis - proximal digital flexor tendon sheath [carpal flexor sheath]

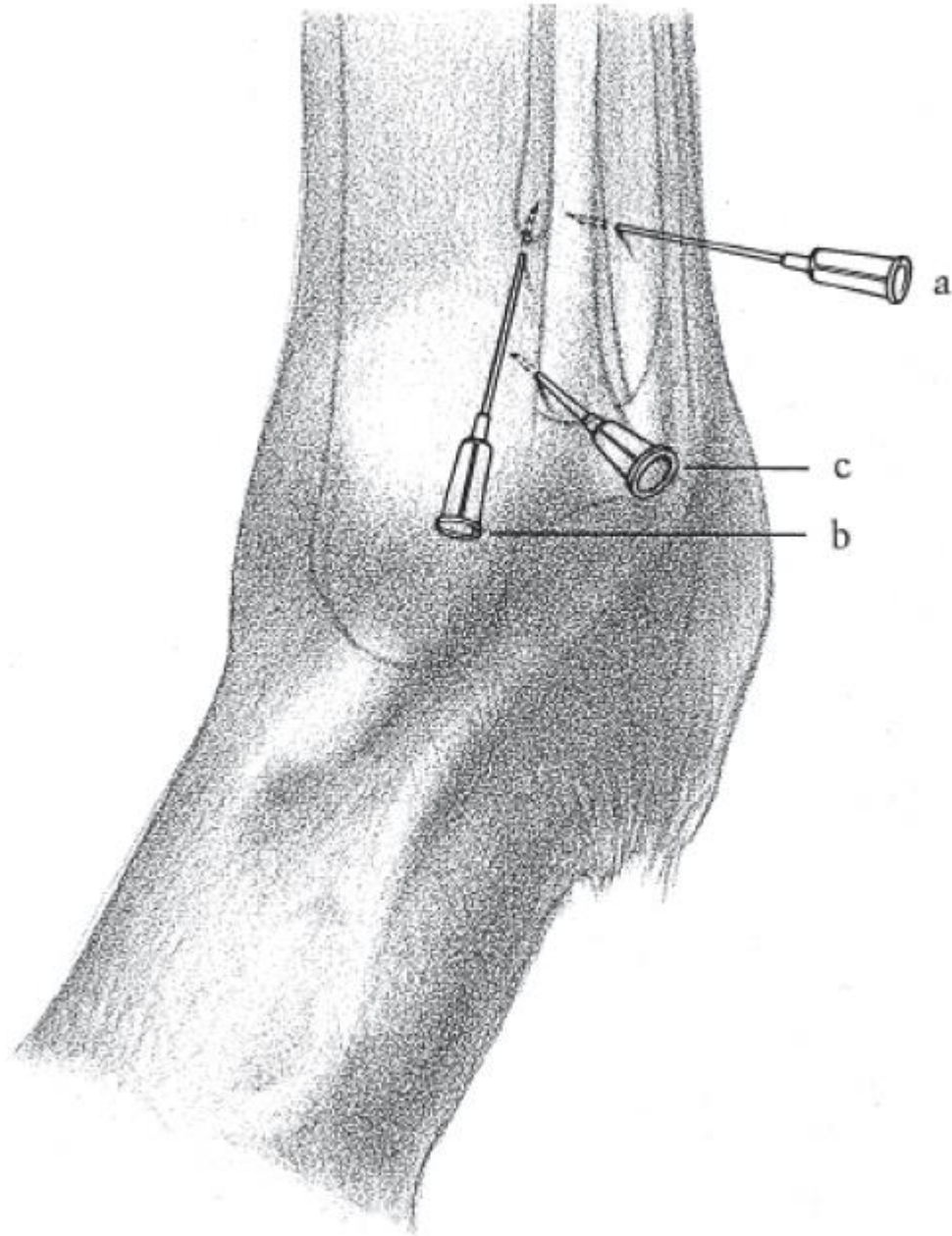
- Close to the antebrachiocarpal joint
- Easy to see during effusion
- Proximal approach
  - 5 cm. proximal to *os carpi accessorium*
  - Between
    - *M. extensor dig. lateralis*
    - *M. extensor carpi ulnaris* [*m. ulnaris lateralis*]

# Vagina synovialis communis mm. flexorium proximalis - proximal digital flexor tendon sheath [carpal flexor sheath]

- Distal approach
  - Distal to the *retinaculum flexorium*
  - Between
    - *Mc. IV*
    - *M. flexor digitalis profundus*
  - Proximally directed needle

# Distal metacarpal block (low palmar block)

- Blocking the medial and/or the lateral palmar nerves
- Between
  - *M. interosseos medius*
  - Deep digital flexor
- 1 cm. proximal to the head of Mc. II/IV.
- 1,5-2 cm. deep
- Close to the tendon sheet!



*a&b: distal nerve blocks  
c: fetlock joint injection*

# Fetlock joint [art. metacarpophalangea]

- Same on forelimb and hindlimb
- Pouches dorsally and palmarly/plantarly [recessus dorsales et palmares/plantares]
- Collateral sesamoidean approach
  - Limb must be held in order to increase space
  - Depression between
    - Head of Mc/Mt 3\*
    - Lateral proximal sesamoid bone
  - Through *lig. sesamoidea collaterale lat.*
    - May be partially ossified!
  - Best way to draw blood-free sample

*\*palpable*



# Fetlock joint [art. metacarpophalangea]

- Proximal palmar/plantar approach
  - Weight bearing or held
  - Between
    - *M. interosseus medius*\* (palmar/plantar border\*\*)
    - 3rd. metacarpal/metatarsal\* bone (dorsal border)
    - Lateral proximal sesamoid bone\* (distal border)
    - Heads of Mc/Mt 4\* [lateral splint bone] (proximal border)
    - Appears as a depression
    - Needle directed perpendicular to the limb
    - May be contaminated with blood because of the vascularized synovial layer

*\*palpable*

*\*\*if behind, needle reaches common digital flexor tendon sheet!*

# Fetlock joint [art. metacarpophalangea]

- Distal palmar/plantar approach
  - Weight bearing
  - Between
    - Distal aspect of lateral proximal sesamoid bone\* (palmar/plantar border)
    - Basis of Ph1\* (dorsal border)
    - Dorsal from *a. digitalis [palmaris propria III] lateralis\*\**
    - Dorsoproximal needle direction

*\*palpable*

*\*\*if behind, needle reach common  
digital flexor tendon sheet!*

# Fetlock joint [art. metacarpophalangea]

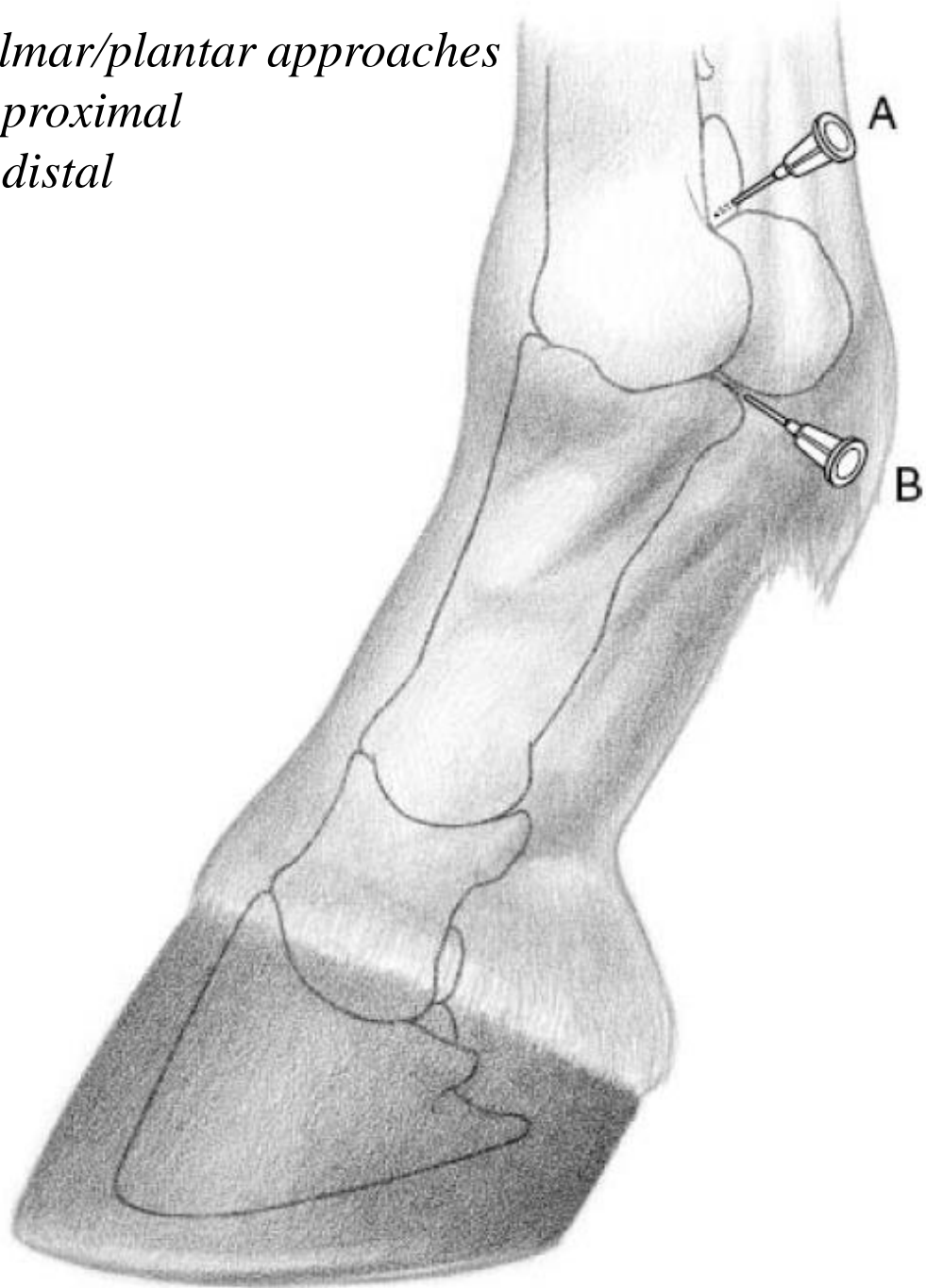
- Dorsal approach
  - Weight bearing (!)
  - Over the basis of Ph1\* (dorsal border)
  - Lateral/medial to the common/long digital extensor tendon\*
  - More painful for the animal than the other approaches

*\*palpable*

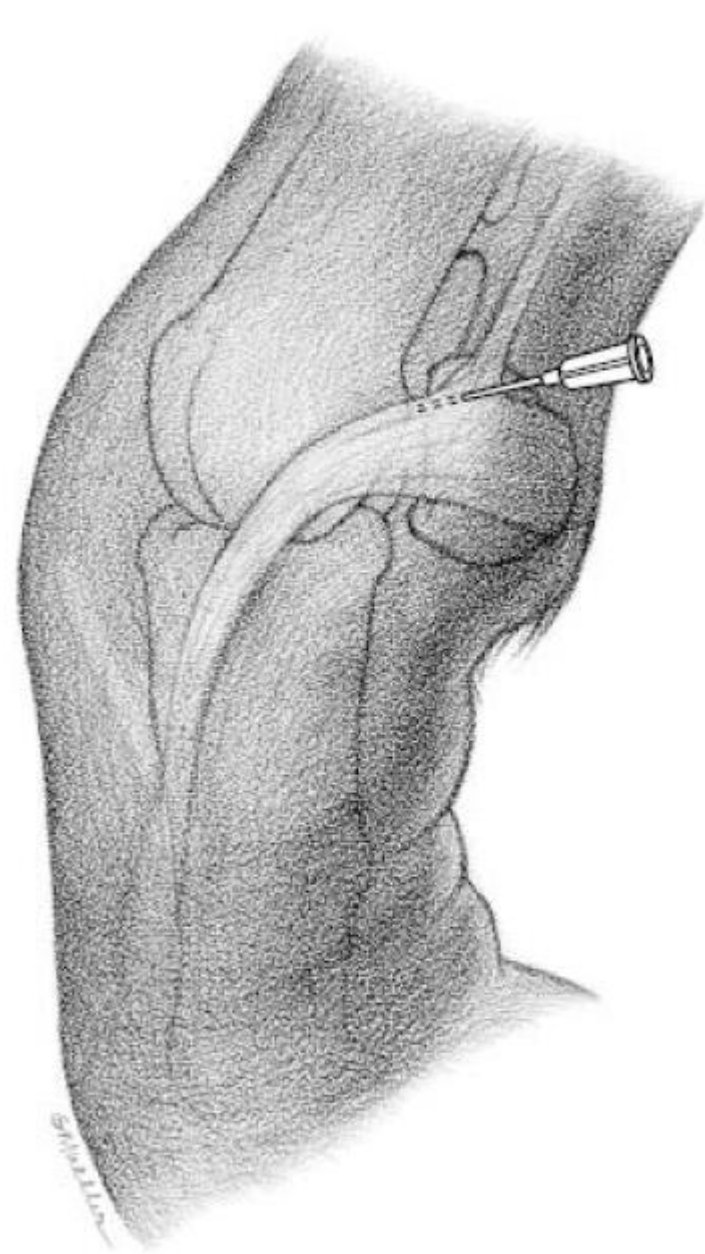
*Palmar/plantar approaches*

*A: proximal*

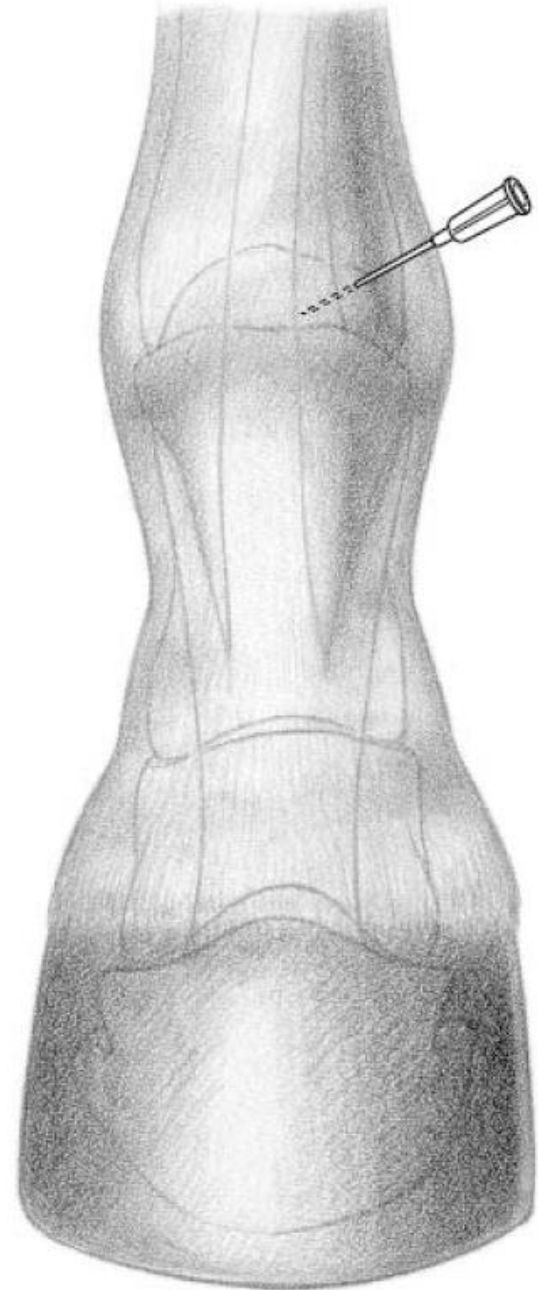
*B: distal*



*Through Collateral sesamoid ligament*



*Dorsal approach*



# Vagina synovialis communis mm. flexorium distalis [vag. syn. tendineum digitorum manus/pedis] – distal digital flexor tendon sheet

- Same on forelimb and hind limb
- Easy to see during effusion
- Proximal approach
  - Weight bearing or held
  - Palmar/plantar to *m. interosseus medius*\*,\*\*
  - Just proximal to annular ligament/proximal sesamoid bone
  - Needle directed perpendicular to the limb

*\*palpable*

*\*\*if cranial, needle reaches fetlock joint*

# Vagina synovialis communis mm. flexorium distalis [vag. syn. tendineum digitorum manus/pedis] – distal digital flexor tendon sheet

- Same on forelimb and hind limb
- Easy to see during effusion
- Distal approach
  - Weight bearing or held
  - Between the diverging cruses of *m. flexor digitorum superficiale*
  - Just under the skin

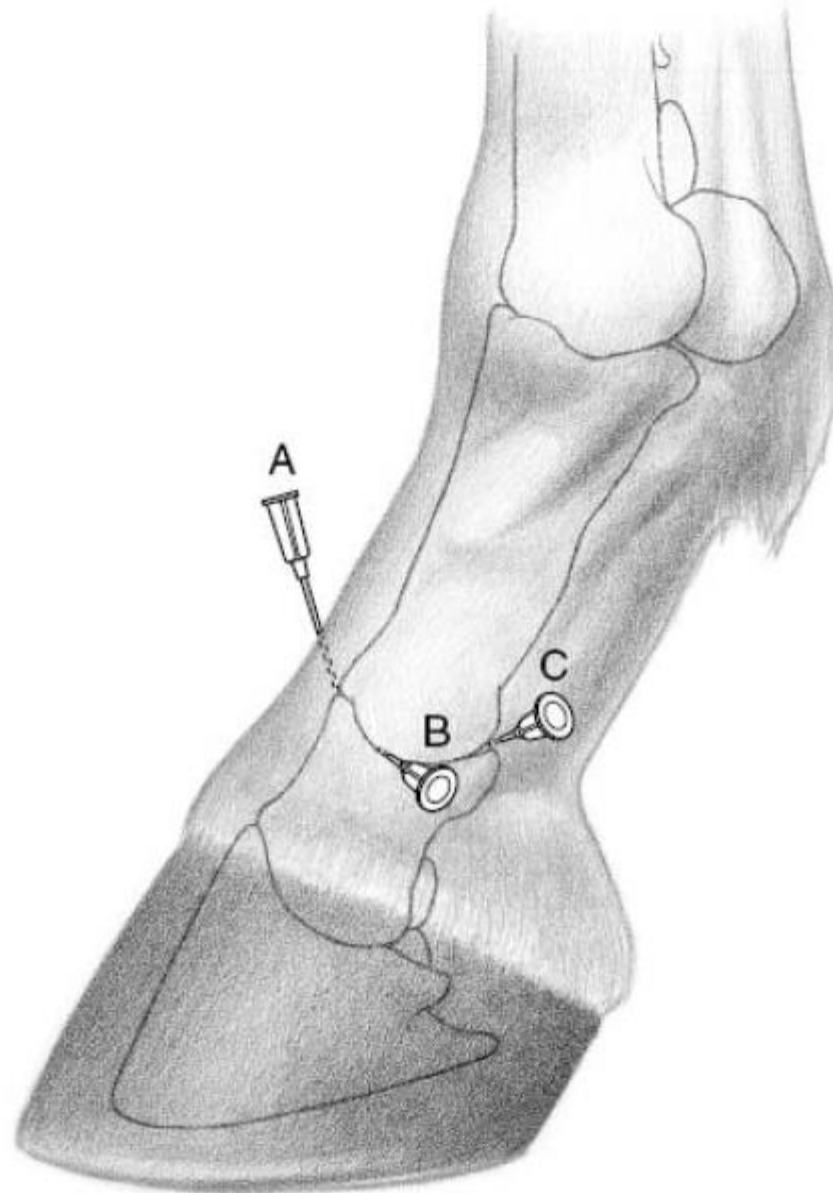
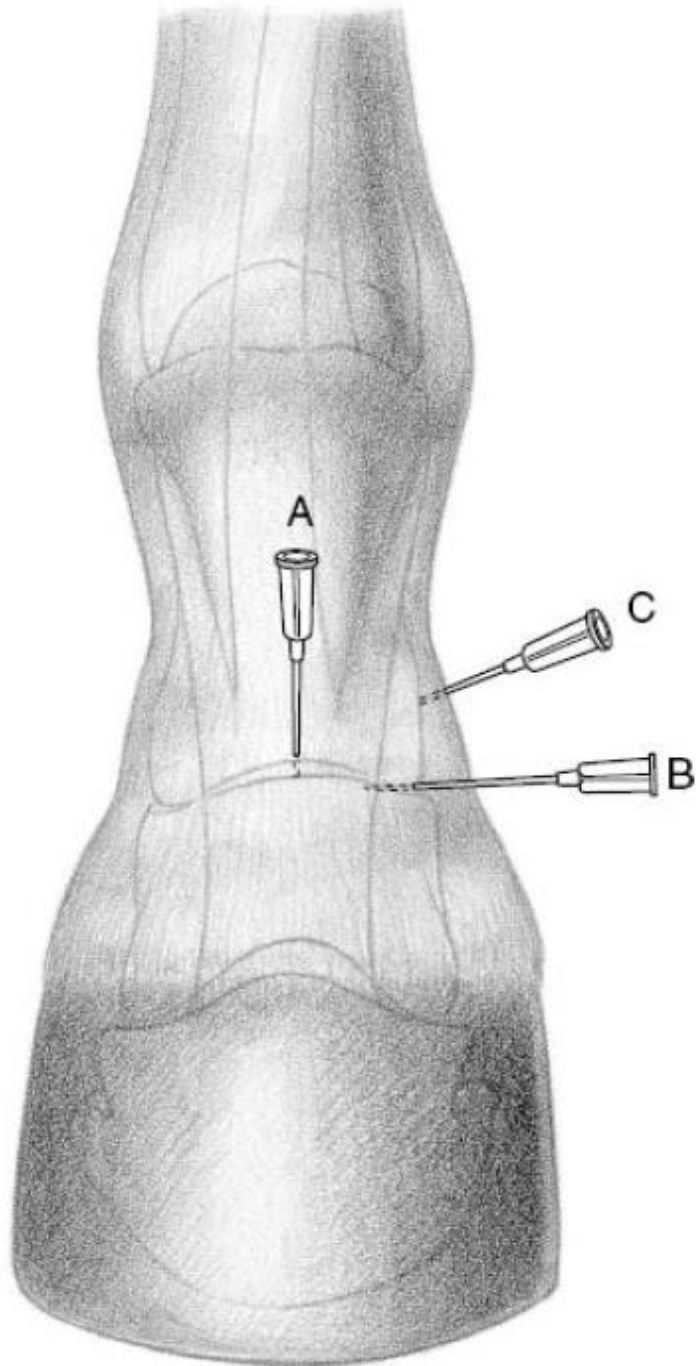
# Pastern joint [art. interphalangea proximalis]

- Same on forelimb and hind limb
- Pouches dorsally and palmarly/plantarly [*recessus dorsales et palmares/plantares*]
- Dorsal approach
  - Weight bearing limb, or limb extended while being held
  - Midline
- Dorsolateral approach
  - Weight bearing limb, or limb extended while being held
  - Slightly dorsal from the *lig. collaterale lat.*
    - The corresponding eminences on P1/P2 are palpable
  - Needle to be directed latero-medially, under the extensor tendon

# Pastern joint [art. interphalangea proximalis]

- Palmar/plantar approach
  - Flexed distal limb
  - A „V” shaped depression on the palmar/plantar aspect
  - Between:
    - Distal tip of *trigonum phalangis proximalis* (proximal border)
    - Diverging lateral crus of the superficial digital tendon (palmar/plantar border)
    - *Tuberositas flexoria* of Ph2
  - Not exactly perpendicular, but slightly dorsal needle direction





*A: Dorsal approach*  
*B: Dorsolateral approach*  
*C: Palmar/plantar approach*

# Coffin joint [art. interphalangea distalis]

- Same on forelimb and hind limb
- Pouches dorsally and palmarly/plantarly [*recessus dorsales et palmares/plantares*]
- Also has small pouches on the medial & lateral aspects
- Dorsolateral approach
  - Weight bearing limb
  - 1-2 cm lateral from the midline
  - 0.5-1 cm above the coronary band (*margo coronalis*)
    - Technically on the lateral side of *proc. extensorius*
  - Vertical needle, then directed toward the center of the hoof at appr 45°

# Coffin joint [art. interphalangea distalis]

- Dorsal approach
  - Weight bearing limb
  - In the midline
  - Just over the tip of the *proc. extensorius*
  - May be performed
    - Parallel to the ground („dorsal parallel approach”)
    - Perpendicular to the skin („dorsal perpendicular approach”)
- Lateral approach
  - Weight bearing limb
  - Proximal to *cartilago unguaris*
  - Caudal to the collateral ligament
  - Barely used

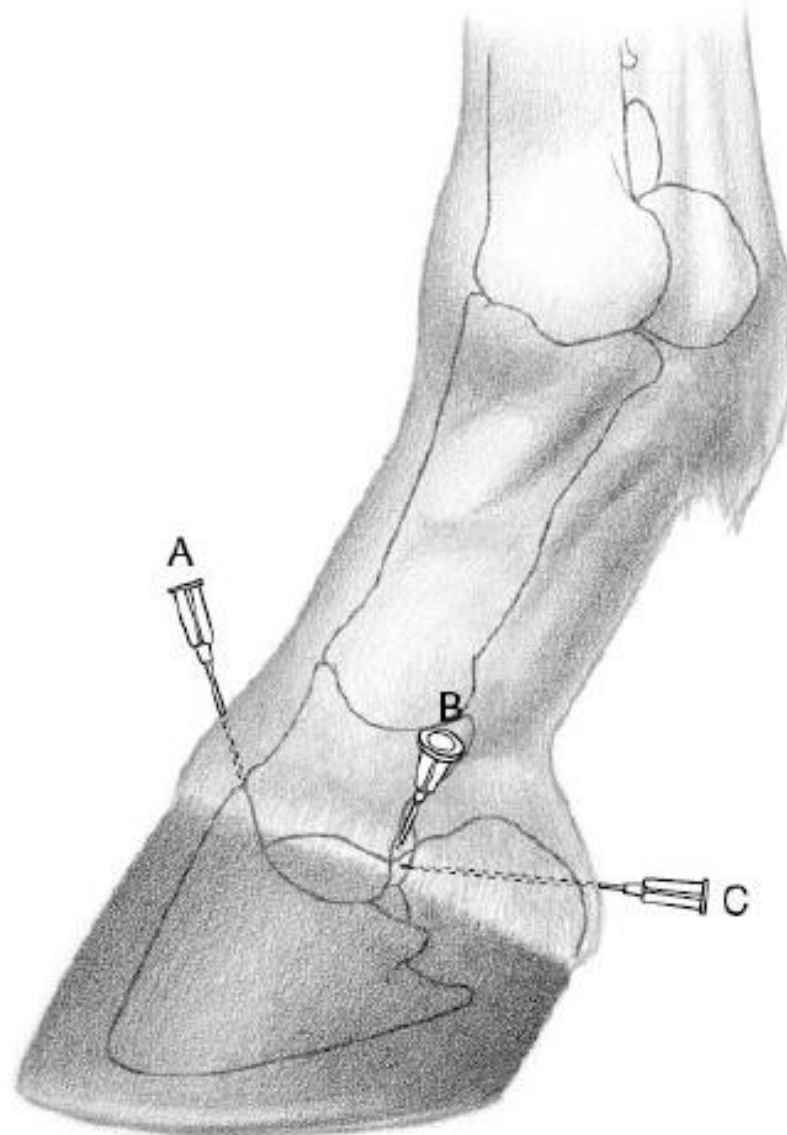
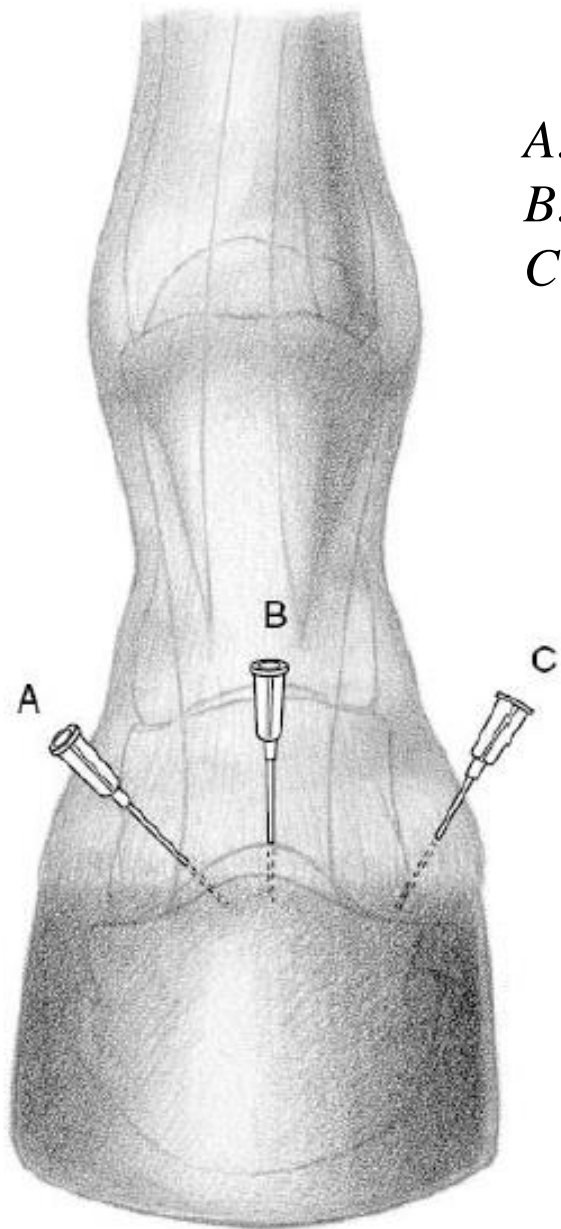
# Navicular bursa [bursa podotrochlearis]

- Same on forelimb and hind limb
- Palmar/plantar approach
  - Weight bearing limb
  - Between the hoof bulbs (*pulvinus toricus*)
  - Just above the coronary band (*margo coronalis*)
  - Driven distally, slightly under the band until navicular bone is touched
  - May hurt deep digital flexor
  - May result in accessing coffin joint or tendon sheath

# Navicular bursa [bursa podotrochlearis]

- Lateral/Medial approach
  - Between
    - Ph2
    - Deep digital flexor
  - Thus, it does not penetrate the deep digital tendon

- A: Dorsal lateral approach*  
*B: Dorsal perpendicular approach*  
*C: Lateral approach*

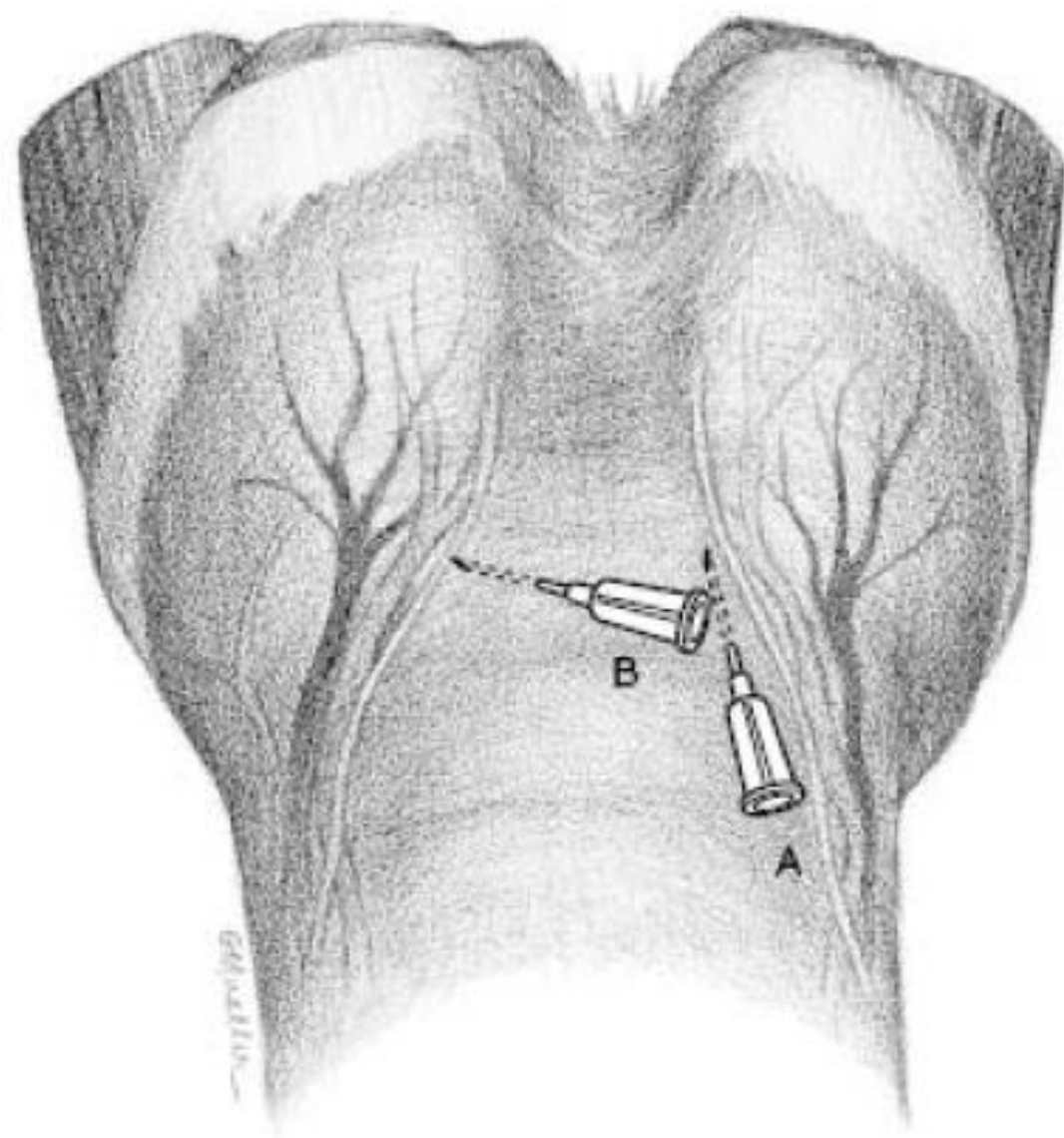


- A: Dorsal approach*  
*B: Lateral approach for navicular bursa*  
*C: Palmar/plantar approach for navicular bursa*

# N. digitalis palmaris block (PD block)

- Proximal to the pastern joint:
  - At the dorsal border of the superficial digital flexor
- Distal to the pastern joint:
  - At the dorsal border of the deep digital flexor
- Block:
  - Limb held
  - At the proximal borders of the *cartilago unguularis med./lat.*
  - Subcutaneously
- Desensitizes:
  - Skin at the coronary band (*margo coronalis*)
  - Deep sensation in the heel bulbs (*pulvinus toricus*)
  - *If both blocked:*
    - *Entire sole, navicular apparatus, coffin joint, deep digital flexor attaching portion, distal sesamoid ligaments (partially)*

Medial



Lateral



# Stifle joint

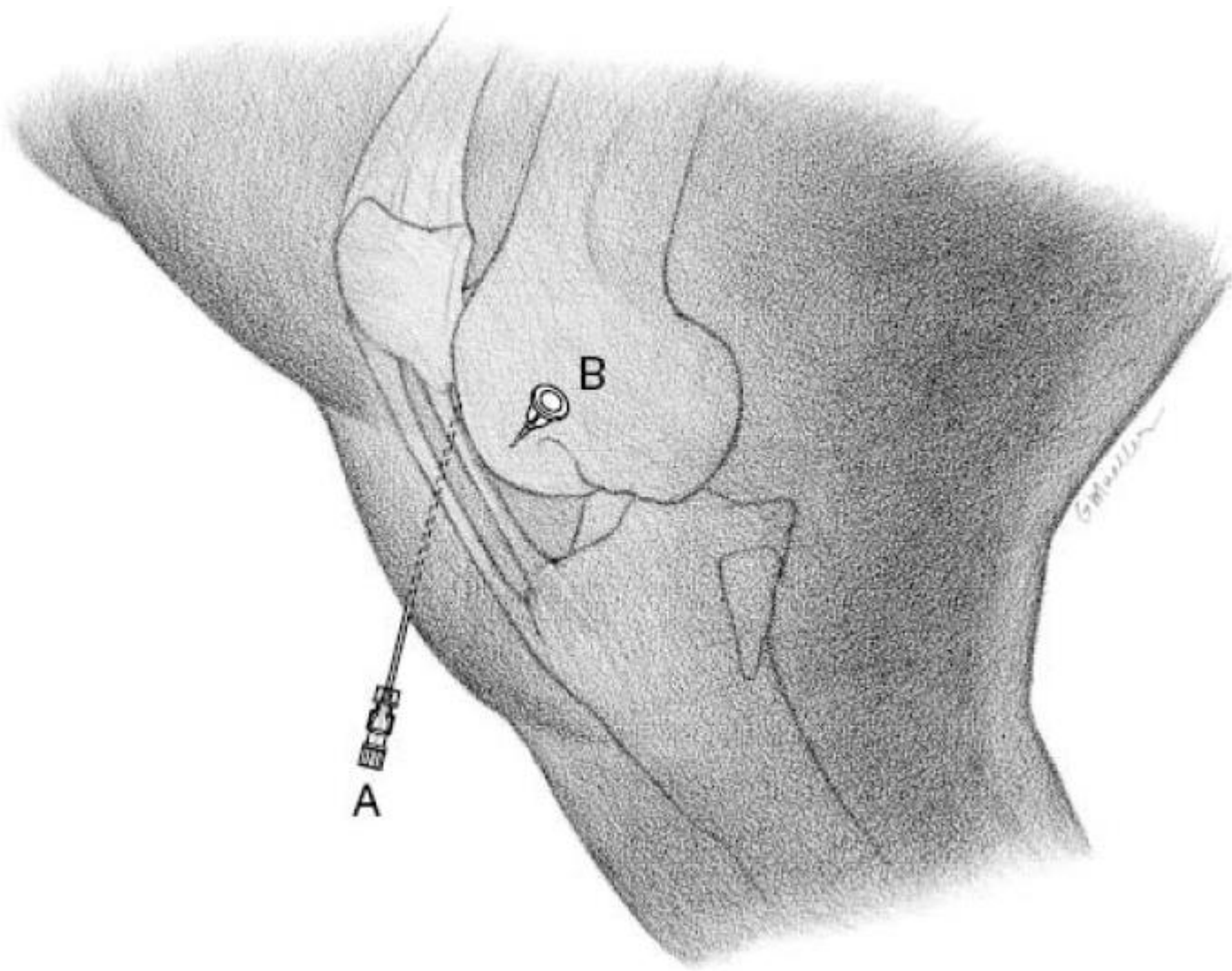
- Art. femoropatellaris
  - Communicates with *art. femorotibialis medialis* – usually
  - Lateral approach
    - Slightly flexed position (partially weight bearing)
    - Between
      - *Lig. patellae intermedium*
      - *Lig. patellae lat/med*
    - 4-5 cm. above *tuberositas tibiae*
    - From lateral/medial direction
    - Needle directed horizontally
  - Cranial approach
    - Slightly flexed position (partially weight bearing)
    - From cranial direction
    - Next to *lig. patellae intermedium*
    - Needle directed horizontally

# Stifle joint

- *Art. femorotibialis*
  - Medial and lateral synovial cavities=>
    - *Art. femorotibiale lat et med.*
  - Each has a proximal and a distal recess
  - The proximal and distal recesses **of the same side** communicate with each other (on the medial side of the corresponding meniscus)
  - The medial and lateral cavities NEVER communicate
    - Under healthy conditions
  - The *art. femorotibiale med.* usually communicates with *art. femoropatellaris*

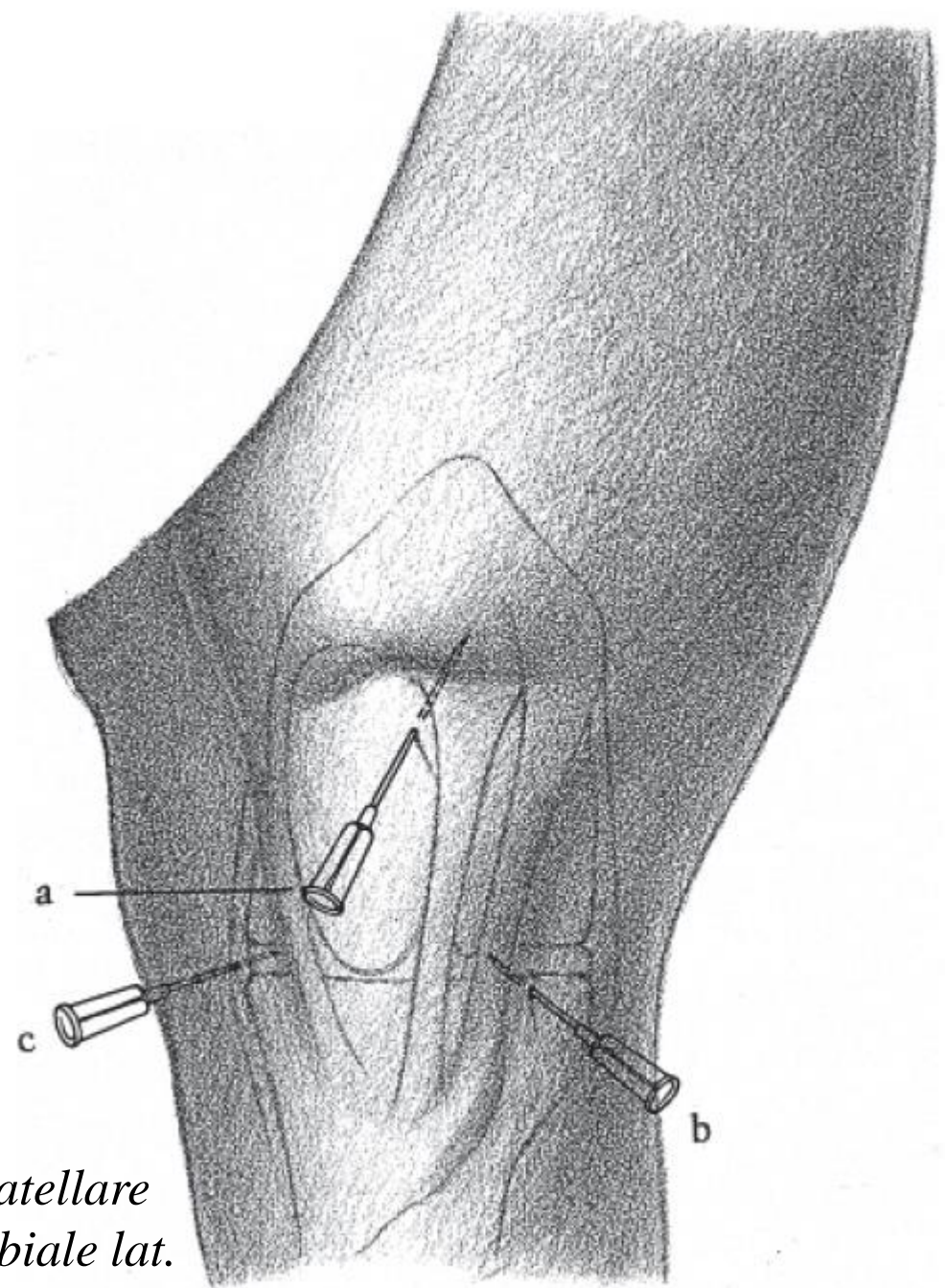
# Stifle joint

- *Art. femorotibiale mediale*
  - Weight bearing limb
  - Between
    - *Lig. collaterale med.*
    - *Lig. patellae med.*
  - 1 cm. proximal to the tibia
  - Perpendicular to the limb
- *Art. femorotibiale laterale*
  - Weight bearing limb
  - Caudal to the *lig. patellae lat.*
  - Just above the *tibia*



*A: art. femoropatellare, cranial approach*

*B: art. femoropatellare, lateral approach*



*a: art. femoropatellare*

*b: art. femorotibiale lat.*

*c: art. femorotibiale med.*

# Tibial nerve block

- Weight bearing limb
- Appr. 10 cm. proximal to *tuber calcanei*
- On the medial aspect
- Between
  - *Tendo calcaneus communis*
  - Tendon of *m. flexor digitalis profundus med.*
- Superficial (under the skin)
- Desensitizes:
  - Plantar tarsus, metatarsus
  - *M. interosseus medius*
  - Distal portion of the *tendo calcaneus communis*
  - Most of the foot

# Fibular nerve block

- *N. fibularis communis*
  - A) at the origin of the *m. extensor digitorum longus*
  - B) at the head of the fibula
- *N. fibularis superficialis*
  - Weight bearing limb
  - Appr. 10 cm. proximal to *tuber calcanei*
  - On the lateral aspect
  - Between
    - Tendon of *m. extensor digitorum longus*
    - Tendon of *m. extensor digitorum lateralis*
  - Superficial (under the skin)
- *N. fibularis profundus*
  - Same as superficial, but 4-5 cm deep

# Hock joint (art. tarsi)

- Total of four joints
  - *Art. tarsocruralis* (between tibia and proximal row)
  - *Art. talocalcaneocentralis* (between the bones of the proximal and central rows)
  - *Art. centrodistalis* (between central and distal rows)
  - *Art. tarsometatarsae* (between tarsus and metatarsus)
- Communication is always present between
  - *Art. tarsocruralis* and *art. talocalcaneocentralis*
- Communication often occurs between
  - *Art. centrodistalis* and *art. tarsometatarsae*
- Communication may be between
  - any of the joints

# Hock joint (art. tarsi)

- *Art. tarsocruralis* (between tibia and proximal row)
  - Medial and lateral plantar pouches
  - Dorsomedial approach
    - Weight bearing limb
    - 2-3 cm distal to *malleolus medialis*
    - Cranial to *r. cranialis* of *v. saphena med.*
    - Needle directed plantarolaterally at 45°
  - Plantarolateral approach
    - Weight bearing limb
    - Between:
      - *Tuber calcanei* (plantar border)
      - *Tibia* (dorsal border)
      - *Trochlea tali* (distal border)
    - Perpendicular to the skin

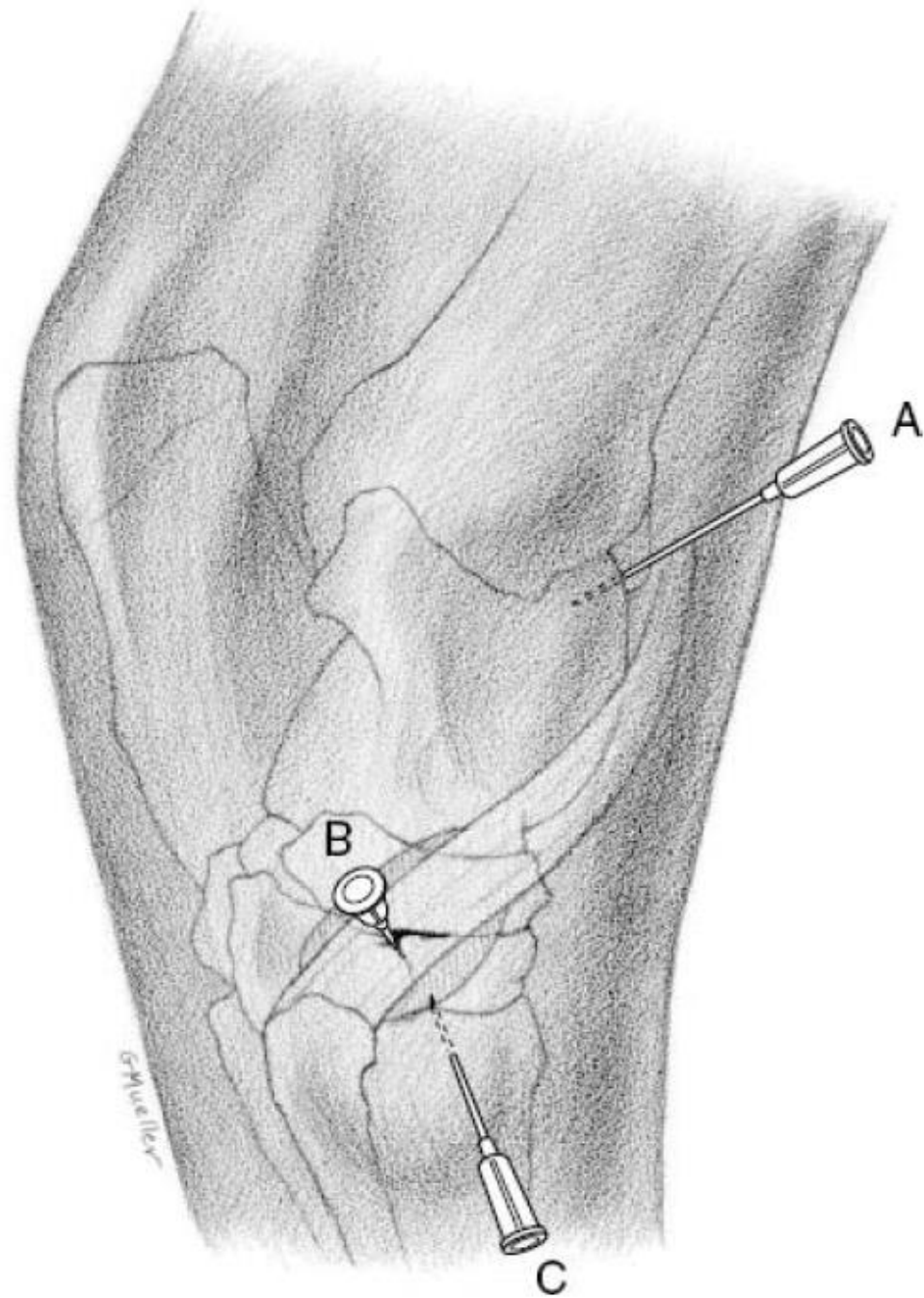


# Hock joint (art. tarsi)

- *Art. centrodistalis* (between central and distal rows)
  - Medial approach
    - Weight bearing limb
    - Small depression halfway between
      - *Tuberculum tali*
      - *Os tali centrale*
      - Technically on the *lig. collaterale tarsi mediale longum* [cunean tendon],
    - Needle directed perpendicular to the limb
    - 1-2 cm. deep

# Hock joint (art. tarsi)

- *Art. talometatarsae* (between distal rows and metatarsus)
  - Plantarolateral approach
    - Weight bearing limb
    - Close to the tendon sheath
    - Small depression between
      - 0.5-1 cm. above the *basis of Mt IV*.
      - *Lateral edge of superficial digital flexor tendon*
    - Needle directed dorsomedially, slightly distally
    - 1-2 cm. deep



*A: art. tarsosruralis*  
*B: art. centrodistalis*  
*(C: cunean bursa)*