The use of nerve and joint blocks in practice

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Diagnostic Anesthesia
When to use it

- Lameness work-up
  - Identify site of pain
  - Guide further diagnostics
  - Guide therapy
- Surgical procedures
  - Lacerations
  - Joint lavage
- Radiographs
Perineural anesthesia

• Nerve block
  – Anesthetic injected directly over nerve
  – Anesthetizes at and distal to site of block
  – start distally and work proximally
  – Always check block (test skin sensation)

• Common sites:
  – Palmar/Plantar digital nerve block
  – Abaxial sesamoid block
  – Low 4-point
Intrasynovial anesthesia

• **Principles**
  – Anesthetic injected directly into the joint/bursa/tendon sheath
  – more specific → Anesthetic effect localized to particular synovial structure (?)
    • Subchondral bone pain not always blocked
  – Must be sterile

• **Joint blocks: common sites**
  – Distal interphalangeal (coffin) joint
  – Fetlock joint
  – Distal tarsal joints

• **Bursal blocks: common sites**
  – Navicular bursa
  – Bicipital bursa

• **Thecal blocks: common sites**
  – Digital flexor tendon sheath
Diagnostic Anesthesia Equipment

• Sterile disposable needles
  – Smallest gauge possible
  – Big enough for synovial fluid
  – Big enough not to break
• Sterile non-luer lock syringes
• Local anesthetics
• Gloves
  – Exam
  – Sterile
• Scrub
  – Betadine
  – Chlorhexidine
  – Alcohol
## Local anesthetic agents

<table>
<thead>
<tr>
<th></th>
<th>Lidocaine</th>
<th>Mepivicaine</th>
<th>Bupivicaine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset of action</td>
<td>&lt; 4 min</td>
<td>&lt; 4 min</td>
<td>&lt; 10 min</td>
</tr>
<tr>
<td>Duration of action</td>
<td>0.5 – 1.5 h</td>
<td>2 – 4 h</td>
<td>6 – 10 h</td>
</tr>
<tr>
<td>Max. recom. Dose mg/kg</td>
<td>5</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Concentration</td>
<td>2%</td>
<td>2%</td>
<td>0.5 – 0.75%</td>
</tr>
</tbody>
</table>

- **Mepivicaine**: longer duration than lidocaine, less edema, less vasodilation
- **Adrenaline additive**
  - **Plus**
    - increased duration of Anaesthesia
    - decreased local anesthetic plasma concentration
  - **Minus**
    - Tissue ischemia and necrosis
    - White hair formation
    - Dehiscence
Diagnostic Anesthesia
Safety

• Horse handler
  – Responsible
  – Experienced
  – On same side
• Patient demeanor
• Workable space
• Restraint
  – Twitch
  – Nose chain
  – +/- sedation?
Diagnostic Anesthesia
Potential Side Effects

• Tissue damage (rare)
• Soft tissue swelling
  – Needle trauma
  – Hematoma
  – Cellulitis
• Synovitis
  – Nonseptic “flare”
  – Septic
• Toxicity
  – Lidocaine: 10 – 12 mg/kg
  – Maximum dose in 500 kg horse
    = 250 mls of 2% lidocaine
Nerve Blocks
Nerve Blocks

• Start distally → work proximally
• Considerations:
  – Spread of local anaesthetic
  – Drug testing
  – fracture
Nerve blocks

• Palmar Digital Nerve Block
• Basisesamoid/Abaxial Sesamoid Nerve Block
• Low 4-point (low volar) Nerve Block
• High Metacarpal Anaesthesia
  – Infiltration of Suspensory Ligament
  – High 4-point (high volar)
  – Wheat block (Lateral palmar nerve block below the accessory carpal bone)
  – Lateral palmar nerve block at the level of the accessory carpal bone
• High Metatarsal Anaesthesia
  – Infiltration of Suspensory Ligament
  – High 6-point
  – Deep branch of the lateral plantar nerve
• Median/Ulnar Nerve Block
• Peronial/Tibial Nerve Block
Palmar Digital Nerve Block

- **Position**
  - Standing or foot elevated
  - Facing back, 1 hand holding limb
  - Facing forward with foot between your knees
- **Nerves blocked**
  - Medial Palmar/plantar digital nerve
  - Lateral Palmar/plantar digital nerve
- **Landmarks**
  - Palmaromedial and lateral pastern region, just above collateral cartilage
  - Palpate VAN
  - Nerve axial to vein and artery

Picture from: “Diagnosis and Management of Lameness in the Horse” by M. Ross and S. Dyson, Elsevier Science 2003
Palmar Digital Nerve Block

- Needle
  - 25 ga
- Amount of anesthetic:
  - 1 – 2cc/each nerve
- Time:
  - 5-10 mins
- Testing block:
  - Skin sensation in heel, just above coronary band
  - Hoof testers

Picture from: “Diagnosis and Management of Lameness in the Horse” by M. Ross and S. Dyson, Elsevier Science 2003
Palmar Digital Nerve Block

• Regions blocked
  – Heel region
  – Palmar skin
  – Navicular bursa
  – Distal DDFT
  – Palmar coffin joint
  – Wings of the coffin bone
  – Collateral cartilage
  – Bars, frog, sole
  – Laminar corium
  – Digital cushion

• May also desensitize
  – Toe
  – Coffin joint
  – Pastern region
  – Pastern joint
Abaxial Nerve Block

• Position
  – Standing or foot elevated
  – Facing back, 1 hand holding limb
  – Facing forward with foot between your knees

• Nerves blocked
  – Medial Palmar/plantar digital nerve
  – Lateral Palmar/plantar digital nerve

• Landmarks
  – Distal border of proximal sesamoid bones
  – Palpate VAN
  – Nerve axial to vein and artery
Abaxial Nerve Block

- Needle
  - 25 ga
- Amount of anesthetic:
  - 1.5 – 2cc/each nerve
- Time:
  - 5-10 mins
- Testing block:
  - Skin sensation to heel, palmar pastern
  - May still have dorsal skin sensation at dorsal coronary band

Picture from: “Diagnosis and Management of Lameness in the Horse” by M. Ross and S. Dyson, Elsevier Science 2003
Abaxial Nerve Block

• Regions blocked
  – Foot
  – P1, P2, P3
  – Coffin joint
  – Pastern joint
  – Part of DDFT and dig flexor tendon sheath
  – Distal sesamoidean ligaments
  – Extensor branch of the suspensory ligament
  – Extensor tendon insertion

• May also block
  – Proximal Sesamoid Bones
  – Fetlock joint
  – Digital flexor tendon sheath
Low 4-/6-point Nerve Block

• Position
  – Standing

• Nerves blocked
  – Lateral Palmar/Plantar metacarpal nerve
  – Medial Palmar/Plantar metacarpal nerve
  – Lateral Palmar/Plantar nerve
  – Medial Palmar/Plantar nerve
  – Lateral and Medial dorsal metatarsal nerve in HL

Picture from: “Diagnosis and Management of Lameness in the Horse” by M. Ross and S. Dyson, Elsevier Science 2003
Low 4-/6-point Nerve Block

• Location
  – Palmar/plantar metacarpal/metatarsal nerves
    • just distal/axial to button of splint bone, adjacent to MCIII/MTIII
    • Caution!! Very close to palmar fetlock joint pouch
  – Palmar/plantar nerves
    • between DDFT and suspensory lig., 3-5cm proximal to button of splint
    • Caution!! Very close to flexor tendon sheath
  – Dorsal metatarsal nerves
    • Either side of extensor tendon
    • s.c. dorsal ring at level of plantar metatarsal nerves

Picture from: “Diagnosis and Management of Lameness in the Horse” by M. Ross and S. Dyson, Elsevier Science 2003
Low 4-/6-point Nerve Block

• Needle:
  – 25g /22g needle

• Amount of anesthetic:
  – 2 – 5 cc / each nerve

• Time:
  – 10 mins

• Testing block:
  – Dorsal and palmar/plantar Fetlock area
Low 4-/6-point Nerve Block

• Regions blocked
  – Fetlock joint
  – Proximal sesamoid bones
  – Flexor tendons distal to block
  – Digital Flexor tendon sheath
  – Entire distal limb
High Metacarpal Anaesthesia

- Infiltration of local anaesthetic solution at the suspensory origin
- High 4-point nerve block
  - Lateral/medial palmar nerve
  - Lateral/medial palmar metacarpal nerve
- Wheat block
  - Lateral palmar nerve
  - Medial palmar nerve
- Lateral palmar nerve block at the level of the accessory carpal bone

Picture from: “Diagnosis and Management of Lameness in the Horse” by M. Ross and S. Dyson, Elsevier Science 2003
High Metacarpal Anaesthesia
Wheat Block

• **Lateral Palmar Nerve**
  – Position
    • Standing, carpus slightly flexed
  – Landmarks
    • Groove distal to accessory carpal bone
    • Ca 1.5 cm deep
  – Needle: 25 ga
  – Amount of anesthetic: 5 ml

• **Medial Palmar Nerve**
  – Position
    • Standing
  – Landmarks
    • Axial to MCII (medial splint)
    • Adjacent to MCIII
  – Needle: 25 ga
  – Amount of anesthetic: 2-5 ml

• Time: 20 min
• Testing block
  – Skin sensation palmar metacarpus

Picture from: “Diagnosis and Management of Lameness in the Horse” by M. Ross and S. Dyson, Elsevier Science 2003
High Metatarsal Anaesthesia

- Infiltration of local anaesthetic solution at the suspensory origin
- High 4-/6-point nerve block
  - Aka subtarsal nerve block
  - Lateral/medial plantar nerve
  - Lateral/medial plantar metatarsal nerve
- Deep branch of the lateral plantar nerve block

Picture from: "Diagnosis and Management of Lameness in the Horse" by M. Ross and S. Dyson, Elsevier Science 2003
High Metatarsal Anaesthesia
Deep Branch of the Lateral Plantar Nerve Block

• Position
  – Standing or flexed

• Landmarks
  – 2 cm distal to head of MTIV (lateral splint)
  – Axial to MTIV
  – 1.5 cm deep

• Needle: 21 ga

• Amount of anesthetic: 5 ml

• Test of block
  – improvement of lameness
Joint Blocks
Joint blocks

- **Distal interphalangeal (coffin)**
- Proximal interphalangeal (Pastern)
- **Metacarpophalangeal/metatarsophalangeal (Fetlock)**
- Carpal
  - Radiocarpal
  - Middle carpal (aka intercarpal carpal)
- **Cubital (elbow)**
- Scapulohumeral (shoulder)
- Tarsal
  - Tarsocrural
  - Distal intertarsal
  - **Tarsometatarsal**
- Stifle
  - Femoropatellar
  - Lateral femorotibial
  - Medial femorotibial
- Coxofemoral (hip)
Distal Interphalangeal Joint Block

• Position
  – Standing

• Location
  – 1) Dorsal pouch: 1cm dorsal to coronary band, abaxial to extensor tendon, 45° angle
  – 2) Dorsal pouch: just above coronary band, midline, needle directed horizontally
  – 3) Palmar pouch: abaxial, just above collateral cartilage, needle directed 45° angle dorsally or axially
Distal Interphalangeal Joint Block

- **Needle**
  - 18 - 20 ga, 1.5 inch
- **Amount**
  - 5-10cc
- **Time**
  - 5 mins!!!
  - then 20 mins
- **Test of block**
  - improvement of lameness

Picture from: "Diagnosis and Management of Lameness in the Horse" by M. Ross and S. Dyson, Elsevier Science 2003
Distal Interphalangeal Joint Block

• Structures blocked:
  – Coffin joint
  – Navicular bursa: Carbocaine diffused from DIP joint to NB in 100% horses in 15 mins;

• May also block
  – Insertion of DDFT
  – Sole
Fetlock Joint Block

• Position
  – Standing or limb elevated

• Location
  – 1) Proximopalmar
    • distal to splint button
    • proximal to sesamoid
    • Dorsal to suspensory ligament
  – 2) Dorsal
    • abaxial to CDE tendon
  – 3) Distopalmar
    • depression proximal to proximal palmar process of P1
  – 4) Palmar
    • Between dorsal sesamoid and palmar distal MC3
    • flex fetlock
Fetlock Joint Block

Picture from: “Diagnosis and Management of Lameness in the Horse” by M. Ross and S. Dyson, Elsevier Science 2003
Fetlock Joint Block

• Needle
  – 20 -18 ga
• Amount
  – 10cc
• Time
  – 10 mins
• Test of block
  – improvement of lameness
Fetlock Joint Block

• Structures blocked:
  – Fetlock joint

• May also block:
  – Proximal sesamoid bones
  – Suspensory branches
  – Digital flexor tendon sheath
Tarsometatarsal Joint Block

• **Position**
  – Standing

• **Location**
  – Just proximal to lateral splint bone at level of palpable depression between head of splint and 4th tarsal bone
  – ~45° angle craniomedially and distally

*Picture from: "Diagnosis and Management of Lameness in the Horse" by M. Ross and S. Dyson, Elsevier Science 2003*
Tarsometatarsal Joint Block

- Needle
  - 20 - 22 ga
- Amount
  - 3 – 10 cc
- Time
  - 10 - 20 mins
- Test of block
  - improvement of lameness

Picture from: "Diagnosis and Management of Lameness in the Horse" by M. Ross and S. Dyson, Elsevier Science 2003
Tarsometatarsal Joint Block

• Structures blocked:
  – TMT joint

• May also block:
  – Distal Intertarsal joint in 76% cases (diffusion)
  – origin of suspensory ligament
  – proximal MT3
Tendon Sheath

&

Bursa Blocks
Digital Flexor Tendon Sheath Block

• Position
  – Standing or limb elevated

• Location
  – Proximal to proximal sesamoid bones and annular ligament
  – Palmar/plantar to suspensory ligament
  – Direct needle slightly downward

Picture from: “Diagnosis and Management of Lameness in the Horse” by M. Ross and S. Dyson, Elsevier Science 2003
Digital Flexor Tendon Sheath Block

• Needle
  – 20 -18 ga
• Amount
  – 10 – 20 ml
• Time
  – 20 mins
• Test of block
  – improvement of lameness
References

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