Navicular Syndrome/Heel Pain
Clinical signs:
- Forelimb lameness, intermittent, progressive and insidious onset, usually bilateral.
- Stumbling
- Pointing toes to relieve pressure on DDFT
- Packing shavings under front feet
- Decreased performance/stopping
- Short, stiff gait
- Chronic sequela-contracted heels, increased concavity of sole, toe bruising, may have enlarged digital vessels and increased digital pulses.
Anatomy of the Navicular Apparatus

Associated structures:
- Navicular/distal sesamoid bone
  - 30% of distal articular surface, acts as a fulcrum with DDFT
- Navicular bursa
- Deep digital flexor tendon (DDFT)
- Coffin joint
- Collateral (suspenory) ligament of navicular bone
- Distal sesamoidean impar ligament
The Equine Hoof

- Impar ligament
- Coffin joint
- Navicular bursa
Predisposing factors

- Conformation:
  - Low/under run heels
  - Small feet
  - Long toes

- Improper shoeing

- Hard work on concussive surfaces

- Nutrition imbalances during younger years
Pathophysiology – why does it happen?
3 main theories - Contentious!

1. Concussion leading to bursitis
   - Alters the flexor surface of the bone
   - Villous hypertrophy, hyperplasia of synovial lining cells, venous congestion

2. Remodeling of bone due to increased pressure of deep digital flexor tendon (DDFT)

3. Vascular
   - Arterial occlusion in foot, thrombosis and ischemic necrosis of navicular bone
Pathophysiology continued

- Syndrome most likely a mixed etiology:
  - Age related changes-degenerative change in fibrocartilage on flexor surface of bone
  - Adaptive remodeling of bone due to tendon stresses-cortical thickening
  - Edema, congestion and fibrosis of marrow-cyst like-lesions
  - Loss of proteoglycans in articular cartilage
  - Bursitis
  - Adhesions between DDFT and navicular bone
Differential diagnoses for navicular syndrome

- Puncture wounds to foot
- Fracture of navicular bone or distal phalanx
- Bruised sole
- Pedal osteitis
- Arthritis of coffin joint
- Corns

- Soft tissue injury such as lesions in the distal DDFT, impar ligament, or collateral ligaments.
Diagnosis

- Lameness exam
- Hoof testers-pain over center 1/3 of frog
- Distal limb flexion test/toe extension
- Palmar digital nerve block
- Intra-thecal analgesia of navicular bursa
- Coffin joint intra-articular analgesia
Diagnosis

- **Radiographs**
  - 5 standard views
    - most sensitive view 45° palmar proximal-palmarodistal oblique (navicular skyline view)
  - Most significant changes likely to reflect navicular disease:
    - Cyst like lesions in medulla
    - Medullary sclerosis, and reduced cortico-medullary demarcation
    - New bone growth/erosion on flexor surface
    - Mineralisation in ligaments
Radiographs
Normal
Abnormal
Abnormal
Diagnosis continued…

- **Nuclear scintigraphy**
  - Can see increased bone turnover

- **MRI/CT**
  - More sensitive than radiographs
  - Detects abnormal amount of fluid in coffin joint and navicular bursa
  - Detects changes in bone such as fluid/edema

- **Endoscopic evaluation of navicular bursa**
Treatment options—no cure, only management

Corrective trimming/shoeing
- Aim: balance the feet and straighten the pastern-hoof axis.
- Raise heels, shorten and roll toe to facilitate break-over
- Support across center 1/3 of frog
- Shoes: egg-bar, heart-bar, straight bar, natural balance
Treatment continued

- **Drugs**
  1. **Analgesia**
     1. NSAIDS-phenylbutazone, naproxen, banamine, aspirin
  2. **Vascular modifying drugs**
     1. Isoxsuprine / Pentoxyfylline-vasodilators, alter deformability of erythrocytes
     2. Dicumeral-blood thinner
  3. **Intra-thecal injection into navicular bursa**
  4. **Polysulfated glycosaminoglycans-Adequan**
  5. **Tildren-inhibits bone resorption**
Treatment continued

- Chemical “neurectomy”/cryoneurectomy-ablation of sensory fibers of palmar digital nerves
  - Sarapin
  - Clinical improvement lasts 2-3 months
  - Unreliable
Treatment continued

- Palmar digital neurectomy
  - Last choice option
  - Careful selection of case, only if peri-neural analgesia of PD nerve eliminates lameness
  - Successful in 65-70% of horses and lasts approximately 12-18 months
  - Complications:
    - Incomplete desensitization
    - Regeneration of nerves
    - Damage to DDFT
    - Neuroma formation
    - Change in hoof growth
Conclusion

- Multifactorial and controversial etiology
- No treatment is 100% successful
- Prognosis is always guarded:
  - Many horses can continue to be useful if managed well, others may need to reduce level of work or even retire