**MRI SEQUENCES**

**T1:**
Provides good anatomical detail
Fat = white
Fluid = black

**T2:**
Emphasises the presence of fluid
Fluid = white
Fat = White (less than in T1)

**MRI SEQUENCES**

**STIR:**
Suppresses the fat signal
Very sensitive to detect bone abnormalities.
FAT = BLACK

**PDW:**
(proton density weighted): good detail and emphasises the distribution of fluid.
Greater GREY SCALE

**MRI**

General considerations:
- Signal: noise ratio
- Field strength
- Coil technology
- Sequences and parameters

**MRI**

Magnetic Resonance Imaging:
- Advanced medical imaging technology.
- The physics of MRI make this modality a very sensitive tool for detecting soft tissue and bone pathology.
  
  MRI relies on the behaviour of protons (H) within the body when within a magnetic field

**EQUINE APPLICATIONS**

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**Why MRI?**

- Magnetic Resonance Imaging is a cross sectional imaging modality
- Excellent contrast between soft tissue and bone
- Very sensitive to bony changes
- Allows cartilage assessment
- Combination of sequences allows further characterisation of the type of injury
**MRI SEQUENCES USED IN MUSCULO-SKELETAL IMAGING**

- **T1**
- **T2**
- **STIR**
- **PDW**

**NAVICULAR FRACTURE**
- 4 year old WB gelding
- History: Positive to palmar digital (p.d.) block
- No radiological abnormalities were visualised
- Worse after intraarticular treatment

**NAVICULAR DISEASE**
- 8 year old warmblood
- History: RF intermittent lameness
- Palmar digital block positive
- Radiographs: medial vascular channel abnormally shaped

**MRI EQUIPMENT AT THE UVTHC**
- 0.3 Tesla (low field magnet)
- Open magnet

**LOW FIELD MRI**
- Advantages:
  - No general anaesthesia is required
  - Less susceptible to artifacts
  - Less susceptible to accidents
  - Provides excellent contrast
NAVICULAR DISEASE
- 9 year old dressage stallion
- History: intermittent lameness in both front feet.
- Lameness improved after short period of rest
- Positive response to p.d. block
- Radiographs: mild enthesiophytes proximal navicular bone

9 year old dressage mare
- History: intermittent 3/5 lameness in both front feet
- Positive response to p.d. block
- Radiographs: no abnormalities were visualised

7 year old TBX gelding
- History: 3/5 lameness after show jumping
- Positive response to p.d. block
- Radiographs and ultrasound did not reveal any abnormalities

SUBCHONDRAL CYST
- 2 year old SB gelding
- History: Recurrent 3/5 lameness when training for 12 months.
- 90% Positive response to abaxial block
- Radiographs: equivocal changes, possible cyst P2

SUBCHONDRAL CYST
- 4 year old quarter horse stallion
- History: 12 month RH 3/5 lameness associated with training
- Tarso-metatarsal joint joint block slight improvement.
- Tibial/peroneal block improved 80%.
5 year old TB gelding.

HISTORY: 3/5 lame after fast work. Positive response to flexion of the distal limb. 90% improvement with p.d. block.

RADIOGRAPHS: no abnormalities were seen in pastern or fetlock.

ULTRASOUND: hypoechoic area on the distal aspect of the SSL and mild irregularity of the palmar eminence of P2.

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7 year old WB gelding showjumper.

HISTORY: mild 3/5 lameness 8 months duration.

Improved 60% with p.d. block. Improvement with intra-articular medication. Improved 100% with abaxial block.

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2 Year old TB gelding.

HISTORY: 3/5 lame for the past 8 months.

50% improvement with p.d. block. 80% improvement with abaxial block.

RADIOGRAPHS: NO abnormalities detected.

DDFT TEAR

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4 year old SB gelding.


RADIOGRAPHS: mild remodeling of the navicular bone.

DEEP DIGITAL FLEXOR TENDON TEAR

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3 year old SB filly.

History: Sudden onset of lameness after 3 month spell.

RADIOGRAPHS: Mild periosteal reaction associated with dorsal P2.

P2 FRACTURE

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3 year old TB gelding.

HISTORY: 3/5 lame after fast work. Positive response to flexion of the distal limb. 90% improvement with p.d. block.

RADIOGRAPHS: no abnormalities were seen in pastern or fetlock.

ULTRASOUND: hypoechoic area on the distal aspect of the SSL and mild irregularity of the palmar eminence of P2.

STRAIGHT SESAMOIDEAN LIGAMENT TEAR

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Pedal Bone Subchondral Cyst

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P3 Subchondral Cyst

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3 Year old SB filly
History: intermittent lameness for 12 months. Mild swelling over the pastern.
RADIOGRAPHS: Mild periosteal reaction on the dorsal aspect of P2

2 Year old WB show jumper
4/5 lame after competition. 80% abaxial block
RADIOGRAPHS: NO abnormalities
NUCLEAR MEDICINE: Moderate increase uptake P1

3 year old TB gelding
History: LF lameness after fast work. Positive response to low four point block.
RADIOGRAPHS: No significant findings

5 year old TB gelding
History: No response to intra-articular medication in the fetlock joint.
RADIOGRAPHS: mild osteoarthrosis. Poor correlation with clinical signs.

4 year old TB gelding
HISTORY: Poor performance in the last two races. Positive to carpal flexion.
3/5 lame. NO response to high 4 point block
RADIOGRAPHS: No abnormalities were found in the distal limb.
Nuclear Medicine: equivocal

4 year old TB gelding
3/5 lame. NO response to high 4 point block
RADIOGRAPHS: No abnormalities were found in the distal limb.
Nuclear Medicine: equivocal

8 year old WB gelding
History: 3/5 lame for the past 6 months
1 year ago 4/5 lame
Intra-articular DIPJ medication mild improvement lameness

3 year old TB gelding
History: LF lameness after fast work.
Positive response to low four point block.
RADIOGRAPHS: No significant findings
P2 REMODELLING and COFFIN JOINT ABNORMALITIES

Improvement with intra-articular medication of the coffin joint.

P3 STRESS FRACTURE

- 5 Year old SB
- History: In hospital. Put in the yard for 3hrs.
- 4/5 lame, increased digital pulse, hoof tester positive
- RADIOGRAPHS: NO abnormalities

ANNULAR LIGAMENT ENLARGEMENT

- 7 year old quarter horse
- History: Unable to extend the RH digit
- 4 weeks ago was cast in the box
- No apparent pain on manipulation of the limb
- No response to nerve blocks

P2 SUBCHONDRAL BONE CYST

- 3 year old thoroughbred gelding
- History: 3/5 in the past 3 months
- 100% improvement abaxial block
- Mild improvement with intra-articular anaesthesia

SUMMARY

1. Applications of low field MRI.
2. Navicular pathologies
3. Straight sesamoidean ligament
4. Subchondral cysts
5. Tendinous pathologies
6. Annular ligament
7. Traumatic and developmental pathologies

HOOF INFECTION

- 5 Year old TB gelding.
- HISTORY: 4/5 lame for two months.
- RADIOGRAPHS: semicircular radiolucent indentation dorsal P3
Questions?