‘Art & Science’ of the Equine Lameness Examination
- a practical approach to improving the evaluation and interpretation of clinical signs

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History of Equine Lameness

‘If your horse is lame in his shoulder, take off his shoes…Young and inexperienced practitioners are quite too apt to commit the error of overlooking the examination of the foot, looking upon it as a matter of secondary importance and attending to it as a routine and formal affair only’

A. Liautard, 1888
‘Lameness of horses’

Assume nothing and question everything…!!!
Definition of Lameness

‘Lameness is therefore not so much an original evil, a disease per se, as it is a symptom and manifestation of some antecedent vital physical lesion, either isolated or complicated, affecting one or several parts of the locomotive apparatus’

A. Liautard, 1888
Lame - ‘crippled or physically disabled, as a person or animal…in the foot or leg so as to limp or walk with difficulty’

Lameness - ‘incapable of normal locomotion, deviation from the normal gait’

Lameness is a *clinical sign*, a manifestation of the signs of inflammation, including pain, or a mechanical defect, that results in a gait abnormality characterised by limping.

The definition is simple but *recognition, localisation, characterisation and management can be complex.*

“*You won’t know the meaning of ‘experience’ as a clinician until you have been in practice 20 years, and then you will realise you don’t have any !!*”

Rob Pilsworth, Newmarket

‘Diagnosis & Management of Lameness in the Horse’
Ross & Dyson, 2010
Clinical Anatomy of the Stifle

- Complex
- 3D appreciation and visualisation
- 7 centres of ossification
- Stay Apparatus
- Influence of the Reciprocal Apparatus
‘New’ ways of thinking about clinical stifle anatomy - through comparative imaging and computer mapping

- Cauvin et al (1996)
- Denoix (2004)
- Dyson (2002)

Fig 1. Lateromedial radiographic map of ligaments and tendons attachments of the stifle. The structures attaching within the intercondylar area of the tibia and the femur are marked with dotted lines.

Fig 2. Cadocranial radiographic map for ligaments and tendons attachments of the stifle. The structures that are associated with the caudal half of the femur or tibia are noted by dotted lines.

Images courtesy of B. Maulet, 2005
More Common Conditions in the Adult Horse Stifle

- **Femoropatellar location**
  - Articular cartilage trauma/Osteoarthritis
  - Patellar ligament injuries
  - Patella fragmentation (post MPL desmotomy)
  - Intermittent upward fixation of the patella following trauma/enforced rest

- Haematomas
- Fractures eg. patella, femoral trochlear ridges ('Old OCDs')
- Sepsis
More Common Conditions of the Adult Horse Stifle

- **Femorotibial location**
  - Articular cartilage trauma/Osteoarthritis
  - Meniscal and meniscal ligament injuries
  - Cranial and caudal ligament injuries
  - Collateral ligament injuries
  - Subchondral cystic lesions
  - Fractures eg. intercondylar eminence, tibial tuberosity, femoral condyles
  - Sepsis
Aims of the Examination

- Is the horse actually lame?
- Which limb or limbs are affected?
- Which part of the limb is involved?
- Is there pathology/ an accurate diagnosis to explain the lameness?
- What is the significance of the pathology/ an accurate diagnosis in relation to treatment options and prognosis?
The History...

- Careful history taking and interpretation of the ‘story’
- Establish trends
- *Keep an open mind!*
Questions ???

- BIOP
- Signalment - Age/(Sex)/Breed+Use
- Previous lameness/back problems/other
- Current lameness problem including:
  - Trauma/Duration/Recent management changes eg. shoeing, diet
- Previous/current management/medication and response
Establish the **baseline**

- **FULL** clinical examination
  - **VISUAL**
  - **PALPATION**

- **CHARACTERISATION** of the lameness
  - Straight line *walk & trot*
  - /Lunge **soft** v hard
  - /Ridden
  - Limb/Limbs/Weightbearing lameness
  - /Swinging limb lameness
  - /Lameness score/Flexion and/or extension test responses
  - /Consistent/Intermittent/Improving or worsening with work
Lameness examination 1

- AT REST
- Visual
  LOOK !!!
- Palpation
  FEEL !!!
Appreciation of what is a normal horse.....?!

Relationship of lameness and conformation

Subjective v Objective.....

- Poor performance
- Gait deficits not caused by lameness
- Unexplained lameness
Visual & Movement

eg. stifle lameness

- Are there stance characteristics suggestive of a stifle lameness?
  Limb rotation/resting towards the midline...

- Are there movement characteristics suggestive of a stifle lameness?
  Slight abduction...
  Changes seen in other hindlimb lamenesses…
Visual 2
Visual 4
Palpation – ‘heat, swelling, pain & hoof testers!’
‘Greatest range of movement’ in back is at lumbosacral joint (large joint space and disc).....
Lameness examination 2

- AT EXERCISE
  - Walk
  - Trot (0-5/0-10)
  - Lunge (hard v soft)
- (Inclines)
- (Ridden)

- (Video/Motion Analysis)
- Manipulative tests
  - Flexion/Extension/Direct digital pressure/
  - Hoof tester/Wedge test/Stress tests - care in interpretation…..
Lameness examination 3

- **DIAGNOSTIC ANALGESIA**
- Perineural
  Intra-synovial
  Area of interest
  (local infiltration)
- **SEQUENTIAL**
  and/or **TARGETED**
- **INTERPRETATION !!!**
- Loss of flexion response ?
- Synovial fluid collection/analysis
  (Cytology/Total Protein/other)
Review of Technique

- Patient restraint - physical v chemical
- Patient preparation
  Perineural *(NB Inadvertant synovial penetration)*
  Intrasyovial
- Injection techniques
  Needles/Volume/Walk out or not/Initial re-evaluation
  10 mins
- Re-evaluate lameness *at best baseline*
  *(Care if ridden - use your common sense !)*
Palmar Digital Nerve Block

- Inject 1.5 cc at level of cartilage of the foot.
- More proximal injection or larger volume may result in desensitisation of the PIP joint.

Schumacher, 2004
Palmar Digital Nerve Block
Deep branches of the PD nerves (3 & 5) to the PIP joint, arise at the level of the joint (Sack 1975)
DIP Joint Analgesia

- Dorsal approach parallel with the solar surface
DIP Joint Analgesia
Mechanism of DIP Joint Analgesia

Direct contact
DIP Joint Analgesia

Heel branches
Navicular Bursa Analgesia
Mechanism of Navicular Bursa Analgesia (2)
Navicular Bursa Analgesia
Diagnostic Analgesia of the Stifle

- Consideration of joint communication ???
- FP ➞ MFT : 60-65%  MFT ➞ FP : 80%
- FP ➞ LFT : 3-18%
  (Reeves et al, 1991; Vacek, 1992)
- Local diffusion occurs between all compartments 75%
  (Gough, 2002)
- Block all 3 joints
- Sites of injection ? Volume ?
- Aspiration if possible ?

(Cf TMT & DIT)
Common Sites of Inadvertant Synovial Penetration with perineural blocks

- Low 4-point and fetlock joint
- High 4-point and carpometacarpal joint (17-67% 2.5cm distal to joint level)
- Lateral palmar and carpal sheath
- High 4/6-point and tarsometatarsal joint
Synovial analgesia and nearby structures

- Middle carpal joint and proximal palmar metacarpal region
  Palmar metatarsal nerves and suspensory branches from lateral palmar nerve closely associated with distopalmar outpouchings of carpometacarpal joint

- Tarsometatarsal joint and proximal plantar metatarsal joint
  Plantar metatarsal nerves and suspensory branches from lateral plantar nerve closely associated with distoplantar outpouchings of tarsometatarsal joint
Interpretation

- Testing efficacy with perineural blocks
- 100% improvement from baseline lameness
- 70-80% positive response more common but *any improvement in reality - positive or negative*
- ‘Switching lameness’
- Worsening lameness !!
False-negative responses

- Inaccurate injection eg. navicular bursa
- Inadequate time for local to be effective
- Failure to appreciate improvement
- Very severe pain
- Failure to alleviate subchondral bone pain after intra-articular injection
- Extra-articular pain
- Aberrant nerve supply
- Failure, in an unshod horse, to appreciate foot soreness contributing to lameness
- Failure to appreciate the degree of lameness fluctuation within an examination period
Common false negative interpretation scenarios:

- Interpretation of negative tarsometatarsal and distal intertarsal intra-articular analgesia
- Interpretation of partial improvement of fibular+tibial perineural analgesia of moderate to severe OA of small hock joints
- Laminitis/P3 fracture/Sub-solar abscess
  Desensitisation not as expected with severe foot pain with palmar digital +/- abaxial sesamoid
- Inadvertant intrasynovial injection eg. accidental tarsal sheath injection when blocking the plantar metatarsal nerves
- Failure to allow sufficient time eg. femorotibial joints and extra-synovial location of cruciate ligaments
But.....

- Failure to allow sufficient time can sometimes lead to false positive responses!
  eg. interpretation of a negative response to fibular/tibial at 30 mins rather than 60 mins then getting a positive result after blocking the all 3 compartments of the stifle joints infers maybe incorrectly a stifle problem because it could still be the hock

- Blocking each compartment of the stifle may not result in significant improvement compared to blocking all 3 compartments in combination if there is stifle pain
Never forget…..

- The importance of your clinical examination
- **Repeated** observations
- ‘Trusting your nerve blocks’ for efficacy
- Experience of interpretation of movement changes (slow-motion video recordings may be useful)
Other considerations:

- Failure to perform appropriate nerve blocks in a logical and complete sequence esp. hindlimb
- Blocking the wrong limb - a head nod can occur with marked ipsilateral hindlimb lameness and therefore are not always an indicator of forelimb lameness
- Unblockable sources of pain eg. stress fractures above the carpus/tarsus in young horses/deltoid fracture/proximal tibia (extra-articular) or fibular fracture/3rd trochanter of femur fracture/tuber ischii fracture etc
- Muscle injuries eg. pectorals etc
Confusing responses…..

- Partial improvement following perineural analgesia
  Either failure to completely alleviate pain from single location or due to additional sources of pain
- Sequential improvement following perineural analgesia
- Subchondral bone pain - need scintigraphy+/-MRI
- Soft tissue pathology of the foot - MRI
- False positives if horse mildly lame at examination but more obvious before - may not be true reflection of original cause
Multiple sources of pain and lameness in more than one limb

- Start with lamest limb first
- If ipsilateral forelimb and hindlimb start with the hindlimb first since some of the head nod will be from the hindlimb lameness
More confusing responses.....

- Lameness induced on small circles on a hard surface may not reflect primary cause of lameness since it is such a severe test.

- Lameness induced by flexion - blocking this response *does not necessarily* identify the cause of lameness.
Tips with.....

- Subtle lameness - work to accentuate...care esp with a ‘fracture’ history !!
- Intermittent or sporadic severe lameness...again, care...
- Attention to history eg, fluctuaut swellings
- Scintigraphy - when to use ?!
- Haemarthrosis - re-create circumstances and arthrocentesis at acute episode ?
Lameness that varies within and between examinations

- eg. subchondral bone cysts - ‘spontaneous improvements’
- Combination of results of repeated clinical observations, blocks if possible, scintigraphy then radiography
The Dangerous Horse!

- Xylazine/(ACP)/(Butorphanol) for each block but interpretation becomes more difficult and less accurate

- Scintigraphy (bone scan)
Other things to consider.....

- Neck lesions and forelimb lameness
- Concept of ‘referred pain’
- Soft tissue injuries unrecognised proximal to the carpus/tarsus
- Misinterpretation of imaging in horses where results of diagnostic analgesia equivocal/negative
- Ridden lamenesses
- Multiple lesions in one location - attributing significance.....
Other causes of lameness/’lame movement’ :

- Lacerations/Occult spiral longbone fractures - acute onset moderate to severe = radiograph+- scintigraphy rather than use diagnostic analgesia !!!
- Rib/sternal lesions
- Withers region fractures
- (TMJ pain)
- Neurological deficits eg. cervical compressive lesions, EPM, radial neuropathy etc.
- Lyme disease, EPSM, immune mediated polysynovitis, tack induced, rider induced, reproductive
Visual & Palpation...Again ?!!
Diagnostic Imaging 1

- **RADIOGRAPHY**
- Multiple Views/Positioning
- Exposures
- Normal v Normal Variants
- Significant v Insignificant Findings
- Contrast studies
- Conventional v Digital
Radiography/Radiology 2
Radiography/Radiology 3
Radiography/Radiology 4
Diagnostic Imaging 2

- ULTRASOUND
- Technique.....!
- Normal
- Abnormal
- Artefacts - care !!!
- Interpretation…
Diagnostic Imaging 3

- **NUCLEAR IMAGING**

- ‘Bone scanning’ /Scintigraphy
- Te99-MDP
- Active bone turnover
- Normal uptake patterns
- Sensitivity v Specificity
Diagnostic Imaging 4

- **MAGNETIC RESONANCE IMAGING (MRI)**
  - Static magnetic field
  - Tesla (field strength)
  - T1(fat)/T2(water) weighting/STIR
MRI of the RH stifle under GA
Diagnostic Imaging 6

- Diagnostic & Surgical Arthroscopy / Tenoscopy / Bursoscopy
QuickTime™ and a H.264 decompressor are needed to see this picture.
Other Ancilliary Tests

- Lab Tests
  (CPK/AST/LDH/Fibrinogen/SAA)
- Electromyography
- Thermography
- (Faradic stimulation)
- (Myelography)
- ‘PBZ test’
- Gait analysis systems eg. Equinalysis, Lameness Locater etc.
What next ?!!

- Accurate Diagnosis
- Prognosis - Good/Fair/Guarded/Poor/Hopeless…..
- Treatment Options : Conservative versus Surgical
- Responses to Treatment
Conclusions

- A veterinarian requires both ‘Art & Science’ in equal amounts to be successful in the diagnosis and treatment of equine lameness.

- These are gradually acquired from the day we first look at a pony, when we start our riding lessons as a child to our first steps into veterinary school and then into veterinary practice until we ‘retire’….. hopefully (dis !) gracefully…..

and then realise we will never stop learning !!!
Acknowledgements

- Graham Munroe, DipECVS
  Flanders Equine Referrals, UK
- Michael Schramme, DipECVS
  North Carolina State University, USA
- Alex Font, DVM
  Bearl Farm Equine Clinic, UK
- Eddy Cauvin, DipECVS
  IMV, France
- Referral colleagues, UK & France