Common Lameness in Dressage Horses, Risk Factors and Treatment Options

Dr Danica Olenick, DVM
Swiftsure Equine Veterinary Services
October 17, 2017

Lameness Prevalence in Dressage

- Research Questionnaire of 2000 Dressage horses in the UK *
  - Involved 80% non-elite, 11% elite and 9% unknown level horses
  - 33% had been lame at some point in their career
  - 24% had been lame within the previous 2 years
  - Highest proportion of lame horses were at the elite levels
    - 50% Grand Prix horses
    - 33% Intermediare horses
    - 20% lower level horses
  - Average time off of riding was 3 months, and away from competition was 5 months
  - Elite horses were off for longer than non-elite horses

Lameness Locations

- Over 31% of reported lameness originated in the hoof
- 25% involved the back
- 13% involved the suspensory ligament
- 11% involved the hocks
- Most common was forelimb lameness
- 23% left front, 20% right front, 12% bilateral
- 12% left hind, 11% right hind, 6% bilateral
- 9% had 3 limbs affected and 1% had all four limbs affected

General Concepts

- Multiple injuries often present simultaneously
- Horses alter their gait to compensate for one injury, leading to additional stress elsewhere
- The horse’s back is commonly the site of compensatory stress and pain
- Riders may become aware of back pain (secondary) before a lameness (primary)
- Different levels of training predispose a horse to different injuries
- More collected gaits, weighting the hind end results in increased frequency of hind end injuries
- Larger heavier horses are more likely to injure limbs as the longer limbs have to handle more pressure and power

The Biomechanics

- Training/Lower levels emphasize balance and freedom of movement
  - Younger horses, with immature musculoskeletal systems
  - Lack of strength, coordination and balance
  - Metabolizable levels emphasize more lateral movements and some collection
  - Changes in distribution of weight medio-laterally
  - Twisting of joints, bending of vertebrae
- Advanced levels require maximum collection, impulsion and suspension
  - Older horses, most time for wear and tear on joints
  - Allow stress to be placed on the hind quarters, back and pelvis
  - Maximum range of motion (flexion and extension) of all joints

Common Lameness in Dressage Horses
OA of Coffin Joints (Low Ringbone)
- Common lameness in all performance horses
- Clinical signs (C/S) are a shortened stride
- Most commonly bilateral in MDTM, distal joints
- Predisposing factors:
  - Weight of the horse, hoof conformation, medial and lateral imbalances
  - Diagnosed (DX) by nerve blocks and x-rays
  - MRI very useful to diagnose other conditions of the hoof
  - Treatment (TX) intra-articular (IA) injections, IRAP, corrective shoeing
- Good prognosis

Back Pain
- Three main sites: Thoracolumbar (T/L), Lumbar sacral (L/S) and Sacroiliac (SI)
- C/S: Poor performance, unwillingness to perform certain movements, lack of impulsion, stiffness
- DX: Nuclear scintigraphy (bone scan), ultrasound, x-rays
- TX: Steroid or anti-inflammatory injections, bisphosphonates, modification of exercise program, complimentary therapies
- Prognosis: Fair to good, recurrence is likely
- In the study, back pain was the lameness that least likely to be examined by a veterinarian

Proximal Suspensory Desmitis (PSD)
- Hindlimb PSD most common in more advanced level horses
- Bilateral cases are difficult to diagnose as no overt lameness, just reduced performance, stiffness or resistance to movements. Difficulties with pesades and flying changes
- Common Cause: Increased loading in collected trot, piaffe and passage movements when distal joints are in increased extension and hock joints are in increased flexion
- DX: Nerve blocks, US, MRI
- TX: Rest, R & R, ESWT, PRP, Stem cells, Surgery
- Good to excellent prognosis

Forelimb PSD
- Forelimb PSD most common in young horses
- Usually unilateral
- Common Cause: Extravagant movement with insufficient muscle strength and coordination to prevent hyperextension of carpus and metacarpophalangeal joints
- DX: Nerve blocks, US
- TX: R & R, ESWT, PRP, Stem cell
- Good prognosis
- Chronic cases prone to reoccurrence

OA of Distal Hock Joints (Bone Spavin)
- Common lameness in all performance horses
- Most commonly bilateral in DITM, TMT joints and fetlock (1st) joints
- C/S: Reduced expression at trot, difficulties in canter, collected and collected gaits, difficulties with pesades and flying changes, toe dragging, shortened stride
- Common Cause: Circledping and other specific movements, increased loading and compression of tarsal joints
- Other associated with back pain
- DX: Nerve blocks, x-rays
- TX: IA injections, IRAP, other therapies
- Good to excellent prognosis

Risk Factors
Risk factors

- Age: 33% increase risk in horses above 12 yrs old compared to under 7 years old.
- Height: 15% increase risk in horses above 17.0 HH (170cm) than horses below 16.0 HH (163cm).
- Previous Careers: Previous racehorses has almost 2 times more likely to be lame.
- Concurrent health problems:
  - Horses with respiratory disease are more than 4 times more likely to be lame.
  - Horses with history of back pain are 3 times more likely to be lame.

Exercise regimes

- Walk warmup – slight increase in lameness.
  - May be inadequate way to warm up a horse.
- Lunging – slight decrease in lameness.
  - May be because horses that are lunged are fitter.
  - May be because lunging warms up a horse more than walking alone.
  - May be the horse has improved coordination and adaptation of the musculoskeletal system.
- Horses that are jumped or turned out on pasture for prolonged periods are less likely to be lame.
  - Improved flexibility, core muscle strength, fitness.
  - May also be the horse has improved coordination and adaptation of the musculoskeletal system.
  - *Bones, tendons and ligaments strengthen and adapt to different surfaces and stressors over time.

Arena surfaces

- Surfaces likely to become deeper when wet:
  - Grass, woodchips – Increased likelihood of lameness.
  - Woodchips most likely to cause slipping injuries, sand tripping injuries.
  - Woodchips and sand with rubber less likely than sand alone, sand with woodchips or grass.
  - Indoor arenas more likely to cause lameness.
  - Smaller size
  - Maintained arenas less likely (privately owned arenas less likely).
- Sand arena more likely to cause lameness, but then becomes less likely the more days per week the horse is ridden in it.
- Due to muscle, tendon and ligament adaption, cardiorespiratory fitness
- Musculoskeletal systems become less prone to injury the more frequently the horses are worked on a surface, even if that surface is initially more prone to causing injury than other.

Take Home Messages

- Changes in surfaces helps to strengthen bones, tendons and ligaments.
- If a horse is only worked on one type of surface, they are more likely to become injured when they are worked on a different surface.
- Gradual introduction to working on other surfaces may have beneficial effects in improved fitness and musculoskeletal adaptation.
- Lunging and jumping help to strengthen core muscles, protecting against injury.
- Training needs to focus on endurance and strength just as much as skill.
- Regular and long turnout in the field is protective against lameness.
- Horses should be ridden in large, well maintained, rings that are not prone to becoming deep or boggy when wet.
- Early identification and treatment of respiratory disease and back pain are important.

Regenerative Therapies

IRAP Therapy

- IRAP = Interleukin-1 Receptor Antagonist Protein.
- Used for the treatment of Osteoarthritis (OA).
- Derived from the horse’s own blood.

- How it works:
  - Trauma to joint surface leads to production of inflammatory proteins, including Interleukin-1.
  - These proteins cause cartilage degradation and potentiate further inflammation, inflammatory joint instability and joint damage (degenerative cycle).
  - IRAP blocks the action of IL-1, reducing inflammation and cartilage damage.
IRAP Production

- How it’s made:
  - 50-60ml of blood is collected from horse
  - Blood is incubated for 21-24 hrs in a special syringe
  - Syringe is designed to stimulate the production of IRAP
  - After incubation the plasma (blood minus RBCs) is separated into several individual doses
  - Doses are frozen and stored

- Treatment Protocol:
  - IRAP doses are thawed and sterilely injected into affected joints
  - Protocol is typically once every 7-10 days for 3 treatments per joint
  - Additional doses can be saved for future use over a 2 year period

IRAP Benefits/Drawbacks

- Benefits (over traditional steroid/HA injections):
  - Will not trigger allergic reaction or ‘flare’
  - Will not trigger steroid-induced laminitis
  - Appropriate for metabolically challenged horses
  - One collection can yield multiple treatments

- Drawbacks:
  - Same risk of joint infection
  - More costly therapy overall, but not on a per-dose basis

PRP Therapy

- PRP = Platelet Rich Plasma
- Used for the treatment of injured tendons and ligaments
- Derived from the horse’s blood

- How it works:
  - Platelets are cells found in blood that contain growth factors
  - Growth factors are integral to tissue regeneration and the healing process
  - These proteins enhance access of desirable inflammatory cells to the area of tissue injury
  - Improves healing of notoriously difficult to heal tissues of tendons and ligaments

PRP Production

- How it’s made:
  - 50-60ml of blood is collected from horse
  - Blood is processed in a special centrifuge then
  - Platelets are concentrated into a smaller volume of plasma = PRP

- Treatment Protocol:
  - PRP is used immediately (not frozen and stored)
  - PRP is injected with ultrasound guidance into the core lesion of a tendon or ligament
  - Typically done under standing sedation and nerve block

PRP Considerations

- Not all PRP have the same concentration of platelets
- Platelets need to be activated to release their growth factors either before or during injection otherwise there will be no beneficial effects
- Platelets can trigger an inflammatory reaction or ‘flare’
- Same risk of infection
- PRP needs to be administered immediately, no storage option
- Not to be collected and administered in-hospital, or same location as processing (ie not done on farm)

Pro-Stride

- Combination of IRAP and PRP
- Beneficial when inflammation is present AND tissue healing is required
- Derived from the horse’s blood

- Blood is collected and processed ON-FARM within 21 min
- On-farm procedure, no storage option
- Most expensive on a per-dose basis
- Appropriate for metabolically challenged horses
Mesenchymal Stem Cells (MSC) are used in healing of joints, bone and tissue.

MSC integrate into the tissue themselves differentiating into specialized tissue types leading to regeneration of the tissue.

MSC also stimulate the healing process thru release of growth factors and anti-inflammatory proteins, recruitment of blood vessels and stimulation of local cells to regenerate.

Stem Cells con’t

MSC are derived from bone marrow, fat cells, umbilical tissue and umbilical blood.

In horses, MSC are typically collected from the bone marrow in the sternum.

Marrow harvested under standing sedation and local block.

MSC are cultured in a lab.

Treatment typically involves 2 or 3 repeated injections, a month apart.

Not (easily) available in Canada.

Most expensive treatment.

Noltrex & Arthramid

Polyacrylamide hydrogel.

Designed for the treatment of OA.

Synthetic, inert, biocompatible, non-soluble IA therapy.

Designed to mimic the visco-elastic and lubricating properties of synovial fluid.

Longer-acting compared to traditional steroid/HA joint injections.

Osphos & Tildren

Bisphosphonates labelled for use in Navicular Syndrome.

Inhibit bone resorption by inducing the cell death of osteoclast (bone-eating) cells.

Effect is the reduction of bone-related pain.

Has been used off-label for other types of bone pain.

Osphos is administered intra-muscularly.

Tildren is administered intra-venously.

Osphos shown to reduce lameness by one grade in 67% of horses within 1 month and 75% of horses within 2 months.

Both carry risks of colic and kidney damage.

Legend

Hyaluronic Acid (HA)

Used for the treatment of Osteoarthritis (OA).

Stimulates the production of the joint’s own HA.

Administered intra-venously (IV) or intra-articularly (IA).

Clinical improvement in 90% of horses after IV and 96% after IA administration.

Cartrophen Equine Forte

Pentosan Polysulfate

Prevention and treatment of OA.

Improves cartilage health.

Stimulates the joints to produce HA.

Administered intra-muscularly (IM).

Clinical improvement in 60% of cases.

Not currently available in Canada (but Cartrophen Vet – for dogs is available).