# Spinal Cord Diseases

## Relevant Examination Techniques

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## Functions of the Spinal Cord

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CNS Anatomy

Spinal cord Anatomy

Modified from: Mayhew IG. Large Animal Neurology. A handbook for veterinary clinicians. 1989
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- Transmission of sensory information about the position and movement of muscles, tendons, and joints
  - Cerebellum
  - Forebrain
- Lack of awareness of the position of the neck, trunk, and limbs in space


Ataxia
Neuroanatomic Localization

Signs of Ataxia

- Abnormal limb positions
- Abnormal stride from the side
- Abnormal movements pelvis/ pelvic limbs from behind
- Circling errors
- Pacing
- Lead change errors
Abnormal Limb Positions

3-yo TB filly
West Nile encephalomyelitis

2-yo TB colt
Wobbler

Abnormal Stride

Asymmetric stride length

Hypometria/floating

22-yo Morgan stallion
EPM

2-yo Thoroughbred colt
Wobbler
Pelvis/Pelvic Limb Movements

3-yo QH filly
West Nile encephalomyelitis

2-yo TB colt
Wobbler

Pelvic Movements

• Yaw
• Swivel
• Sway
Pelvis/Pelvic Limb Movements

3-yo QH filly
West Nile encephalomyelitis

2-yo TB colt
Wobbler

Circling Errors

Circumduction

Interference/pivotting

2-yo Thoroughbred colt
Wobbler
2-Beat ("Pacing") Gait at Walk

5-yo Paso Fino stallion
Equine degenerative myeloencephalopathy

1-yo Tennessee Walking Horse filly
C7-T1 facet fracture

Lead-Change errors

Respository videos
Barrett’s sale, California
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- Maintenance of muscle tone and posture; initiation of voluntary activity
  - UMN entirely within CNS
- Spastic paresis
  - Contrast with flaccid paralysis - LMN
  - No muscle atrophy
Upper Motor Neuron Paresis

Tail-pull

At rest
At the walk

3-yr QH filly
West Nile encephalomyelitis

26-yr QH gelding
EPM
**Neuroanatomic Localization**

*Tailpull Interpretation*

- Cr-S2 walking tail-pull
- L3-S2 standing tail-pull

**Hopping Responses**

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<th>Abnormal</th>
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13-yr QH gelding  
Normal

15-yr QH gelding  
EPM
Neuroanatomic localization

Hopping responses

Quadriparesis & Ataxia in all 4 Limbs

Focal Lesion

1-yo Thoroughbred colt

Wobbler
C1-T2 Quadriparesis & Ataxia in all 4 Limbs

8-mo Andalusian gelding
Equine degenerative myeloencephalopathy
EDM Lesions

Dorsal root ganglion

Lower motor neuron

Paraparesis

Focal

Multifocal

4-mo AMH filly
Epidural mass T9

7-yo TB mare
West Nile encephalomyelitis
Neuroanatomic Localization
Paraparesis

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Long Spinal Reflexes

- Cervicofacial
- Laryngeal adductor “slap” test
- Cutaneous trunci
- Dorsal reflexes

Cervicofacial Reflex

8 yo TD gelding  
EPM

1 yo TD filly  
EDM
Laryngeal Adductor “Slap” Test

Laryngeal adductor “slap” test
Cutaneous Trunci Reflex

2-yr TB colt
EPM

Dorsal Reflexes

Normal
13 yr QH gelding
Normal

Abnormal
15 yr QH gelding
EPM
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### Thoracic Limb Weakness/Atrophy

- 4-yo Paint gelding *EPM*
- 4-yo TB colt *West Nile encephalomyelitis*
Neuroanatomic Localization
Thoracic Limb Weakness/Atrophy

Pelvic limb Atrophy/Weakness
Pelvic limb Atrophy/Weakness

- 5-yo QH filly
  - West Nile encephalomyelitis
- 6-wo TB filly
  - T12,L3 fractures

Equine Motor Neuron Disease

- 13-yo Quarter Horse
  - Equine motor neuron disease
Flexor Reflexes

Thoracic

Pelvic

8 mo Paso Fino filly
Spinal cord trauma

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Deep Pain Sensation

- Bilateral polysynaptic tracts (redundant)
- Distinguish from withdrawal (unconscious sensation)
- Must see behavioral response to assess
- Indicates catastrophic injury

Loss of Deep Pain Sensation

1-mo Paint colt
Vertebral osteomyelitis
Cauda equina syndrome

- A group of neurologic clinical signs referable to dysfunction of the cauda equina
- S2-S5 and caudal (coccygeal) segments and nerve roots
- S1-S5 segments within L6-S1 vertebrae
**CES signs**

- Motor and sensory
- Mild hindlimb signs (rare)
- Urinary and fecal incontinence
- Anesthesia of caudal structures
  - Penis, not prepuce
  - Breeding issues
- Tail, anal, rectal, penile paralysis
- Tail atrophy

**CES of foals**

- 5 week old TD filly, R equi osteomyelitis
- Paint and TD foals, Myelodysplasia

Chaffin MK et al. JAVMA 1995;206:215
CES - NCE/PNE

- 20-yo Welsh cross gelding
  Neuritis of the cauda equina
- 5-yo mixed breed mare
  Polyneuritis equi

CES - Equine herpesvirus-1
Myeloencephalopathy

- 5-yo Thoroughbred mare
- 8-yo Thoroughbred mare
CES – Traumatic/Toxic Injury

3-yo Quarter Horse mare
Alcohol tail block

8-yo Thoroughbred mare
Sacral fracture
CES - Mild

Third presentation for small colon impaction

Failure to ejaculate
C1-C2 injury
C7 osteomyelitis

Neuroanatomic localization
Postural responses
Neuroanatomic localization

Hopping responses

- Thoracic limb weakness/atrophy
  - L3-S2 gray matter

- Pelvic limb weakness
  - Lq-Su gray matter, pelvic limb weakness
Equine Motor Neuron Disease

- world-wide, mostly NY state
- risk factors
  - dirt lots
  - lack of green forage
- adult horses
- single cases
- associated with low serum vitamin E
- possible link to high Cu in feed?

Diagnostic Keys

- limb, neck weakness
- normal head
- elevated tail
- retinal pigment
- dental tartar
- increased serum CK
- coccygeal muscle biopsy
Treatment

- good-quality forage
- vitamin E
- stabilize
- usually remain exercise intolerant