

The Down Dog: So You're Telling Me There's a (Good) Chance?

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About Myself

- Vet School – University of Wisconsin
- Internship – VCA ASG Los Angeles
- Neurology Internship – MedVet Columbus
- Neurology Residency – MedVet Columbus
- Started the MedVet Pittsburgh Neurology Department in August 2021

My favorite thing about practicing veterinary neurology is helping animals return to being able to walk and have a functional, happy life.



A note on cats

- This lecture focuses primarily on dogs with intervertebral disc herniation as it is the most common cause of acute nonambulatory presentation.
- The topics discussed in this lecture are often applicable to cats as well, these problems are just less commonly seen.

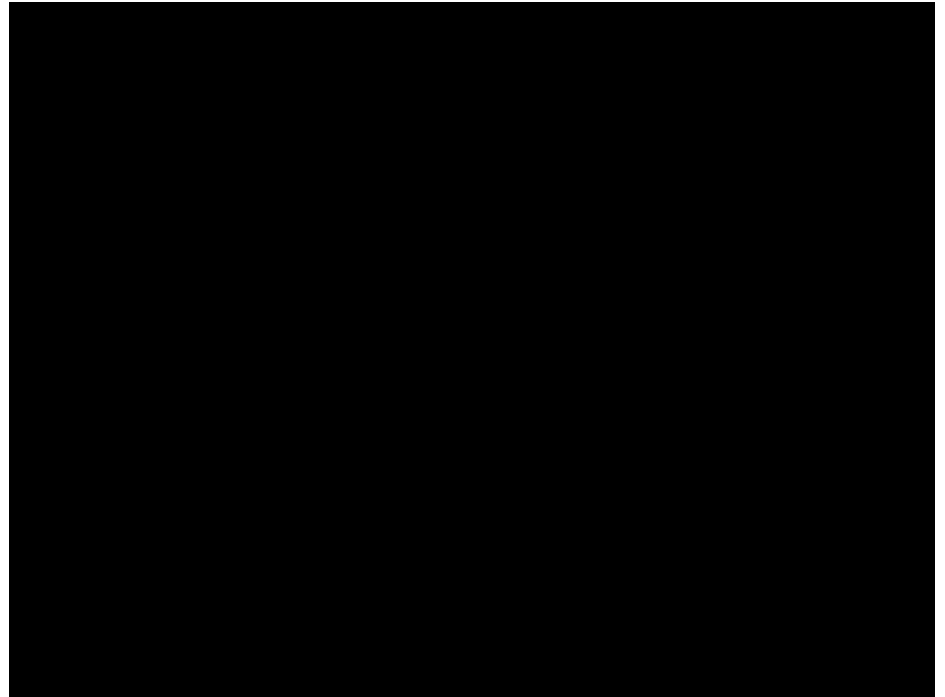
What causes a dog to go down?

- Intervertebral disc herniation (IVDH)
- Fibrocartilagenous embolism (FCE)
- Acute noncompressive nucleous pulposous extrusion (ANNPE)
- Meningomyelitis
- Spinal Neoplasia
- Diskospondylitis
- Neuromuscular disease
 - Myasthenia Gravis
 - Tick paralysis
 - Botulism
 - Polyradiculoneutritis (Coonhound paralysis)
 - Polymyositis



Not all dogs presenting down are neurologic

- Polyarthritis
- Bilateral cruciate tears
- Saddle thrombus
- Hypotension
- Hypoglycemia
- Hypovolemia
- Severe abdominal pain
- Severe electrolyte abnormalities

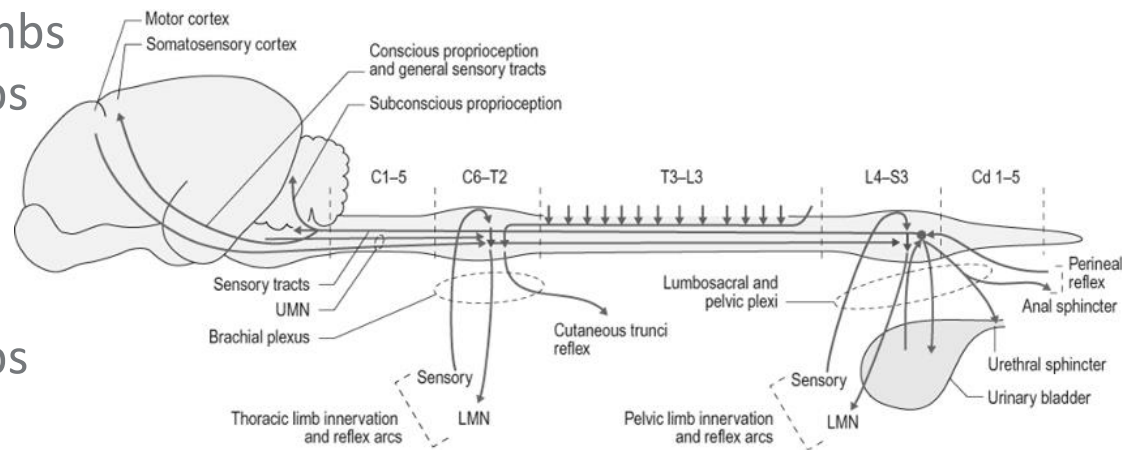


Is there a typical neurologic down dog presentation?

- Acute
- Acute on chronic
- Chronic
- Young
- Old
- Small
- Large
- Paretic
- Ataxic
- Pelvic limb
- All limbs
- Single limb
- Painful
- Nonpainful

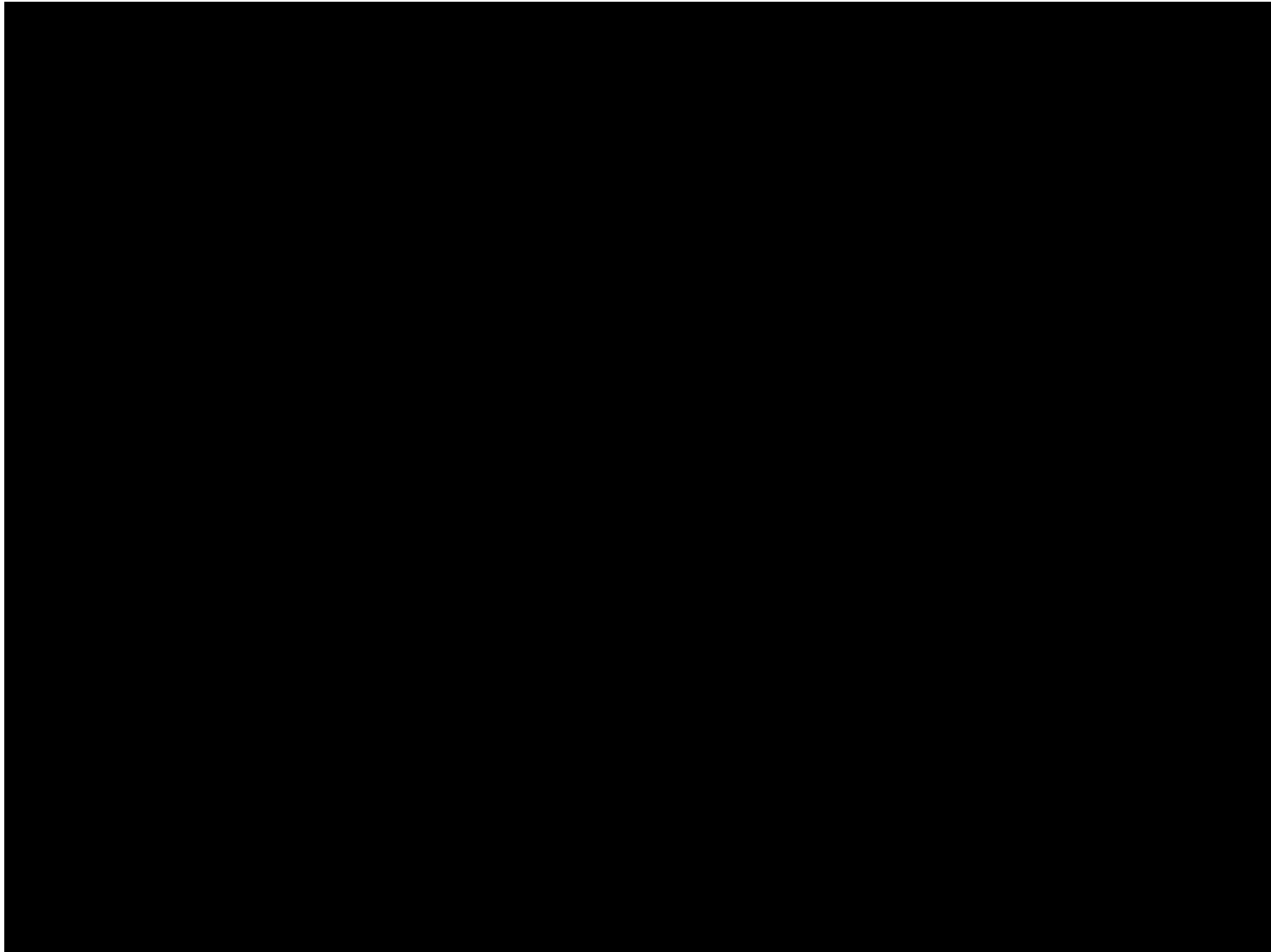
Neurolocalization

- C1-C5
 - UMN signs to all 4 limbs
- C6-T2
 - LMN signs to thoracic limbs
 - UMN signs to pelvic limbs
 - Ataxia over paresis
- T3-L3
 - Normal thoracic limbs
 - UMN signs to pelvic limbs
- L4-S3
 - Normal thoracic limbs
 - LMN signs to pelvic limbs
 - Paresis over ataxia

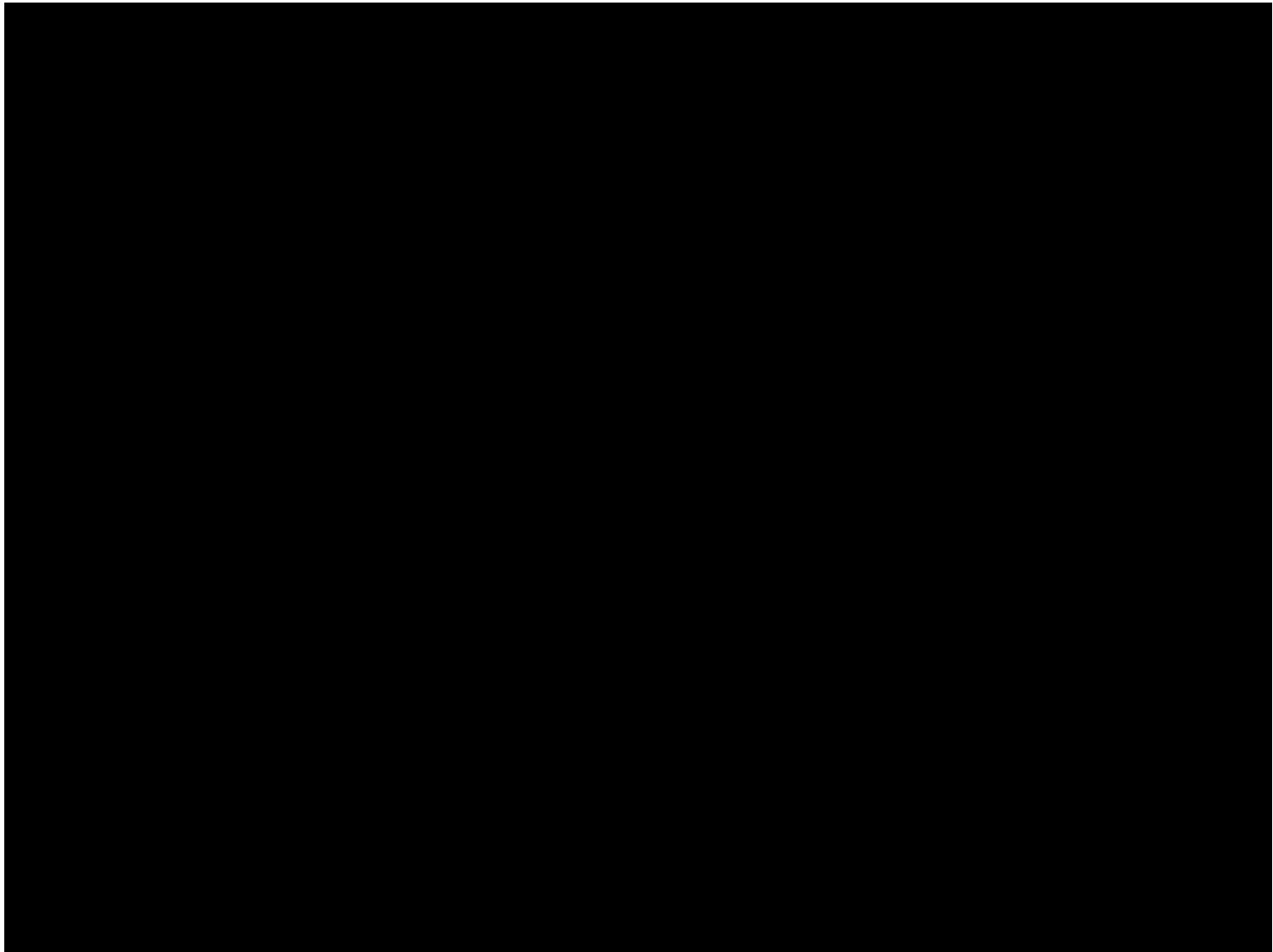


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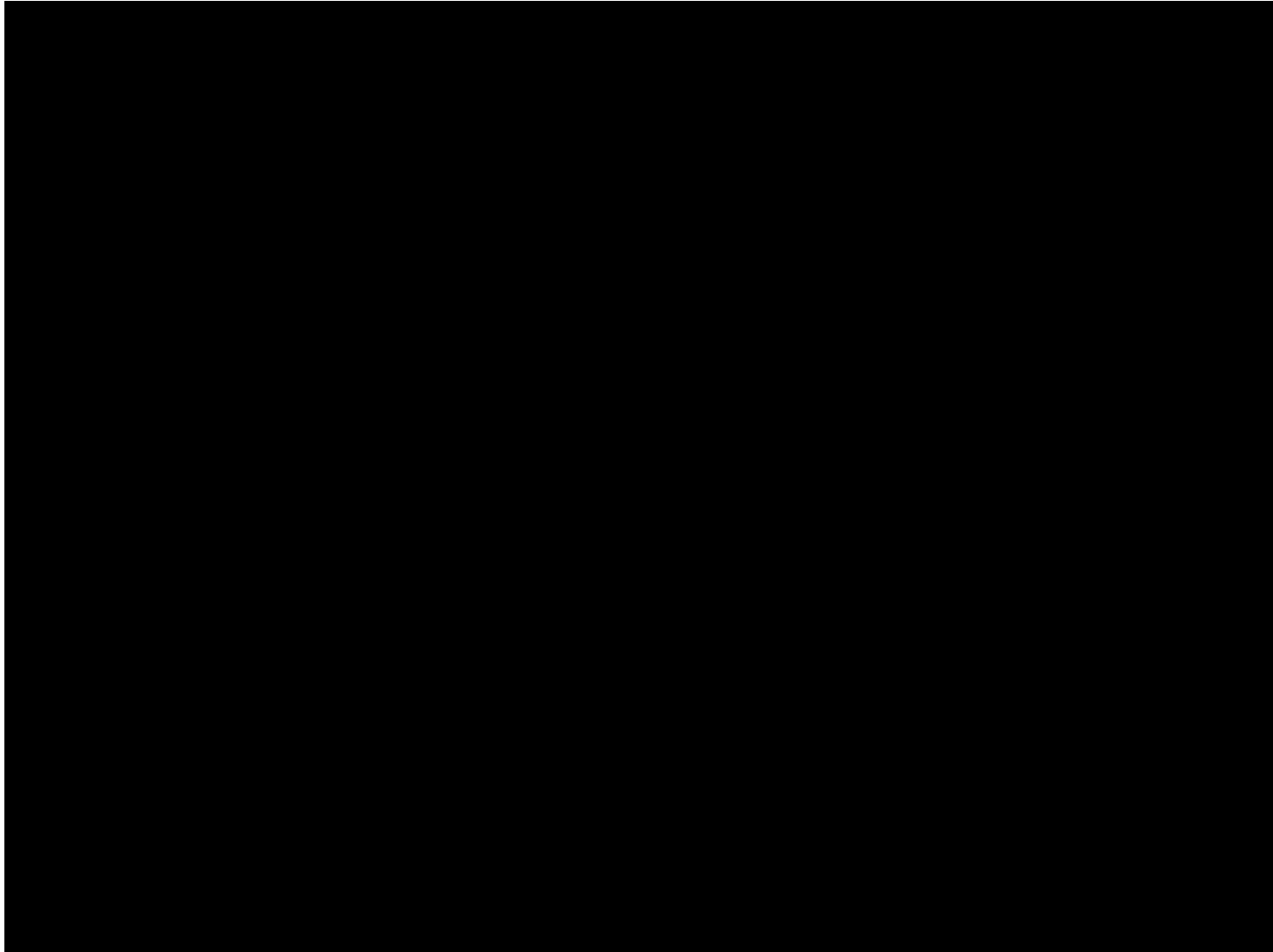
Gait analysis – Upper Motor Neuron



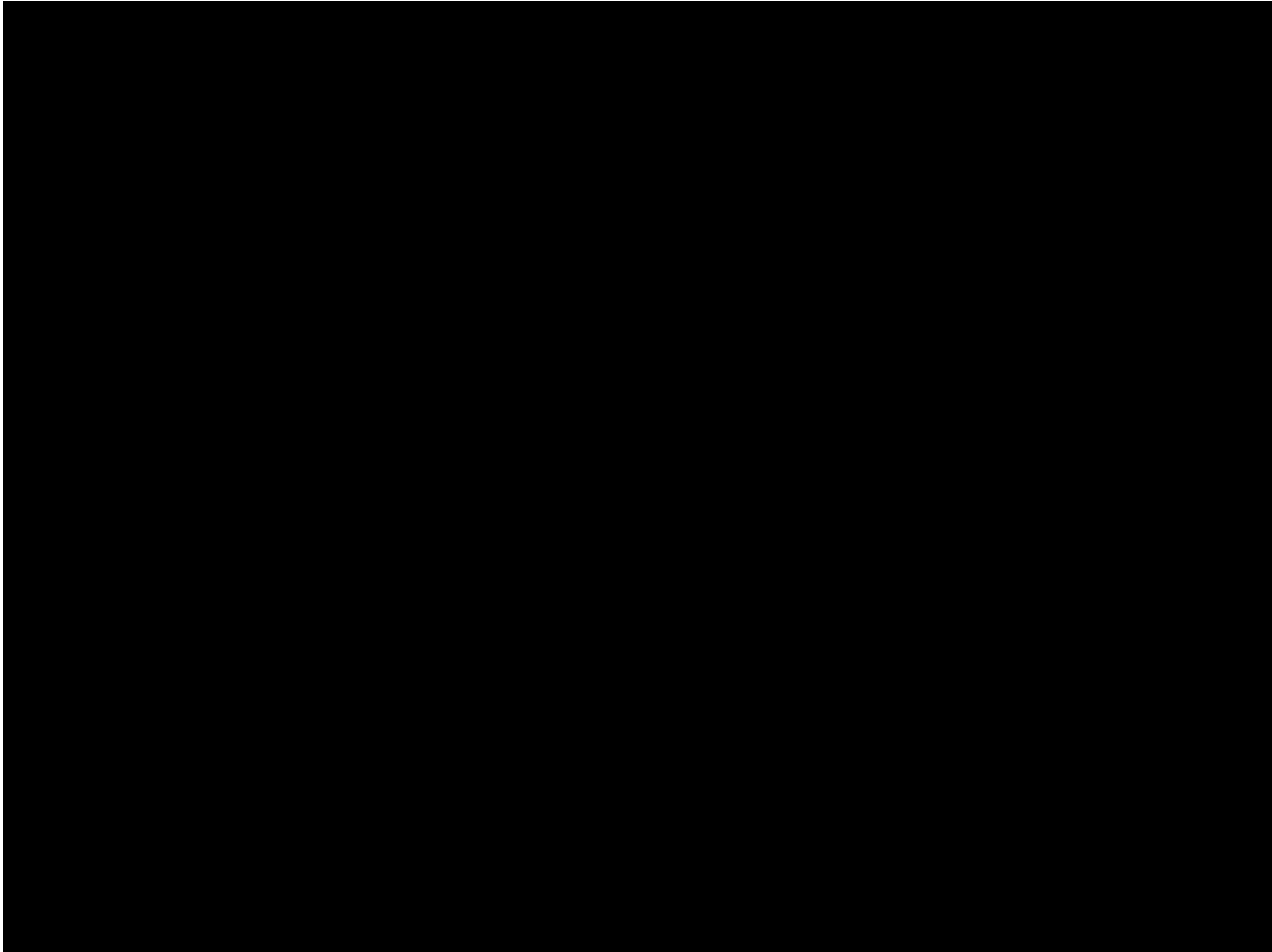
Gait analysis – Upper Motor Neuron



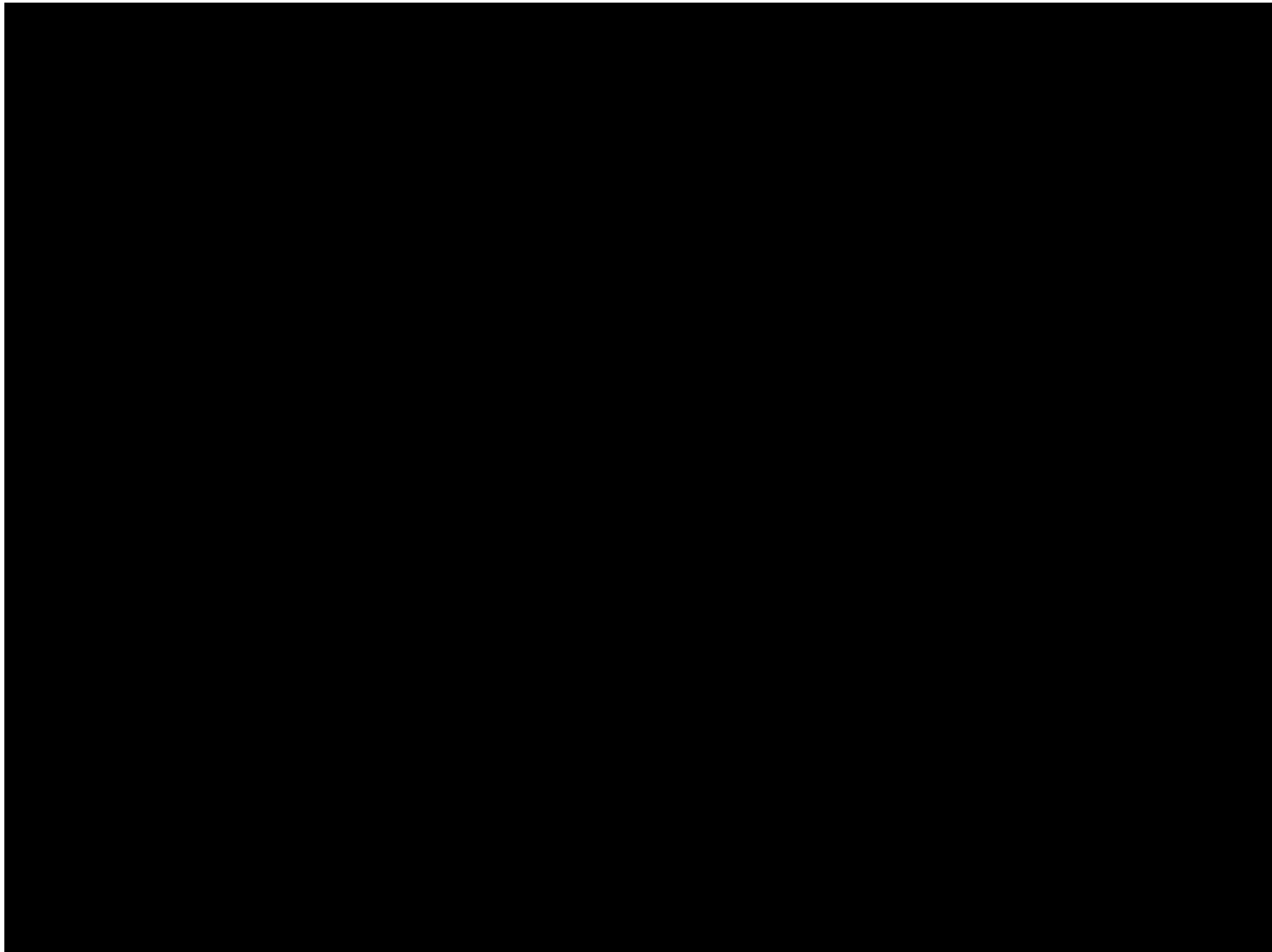
Gait analysis – Lower Motor Neuron Thoracic Limbs



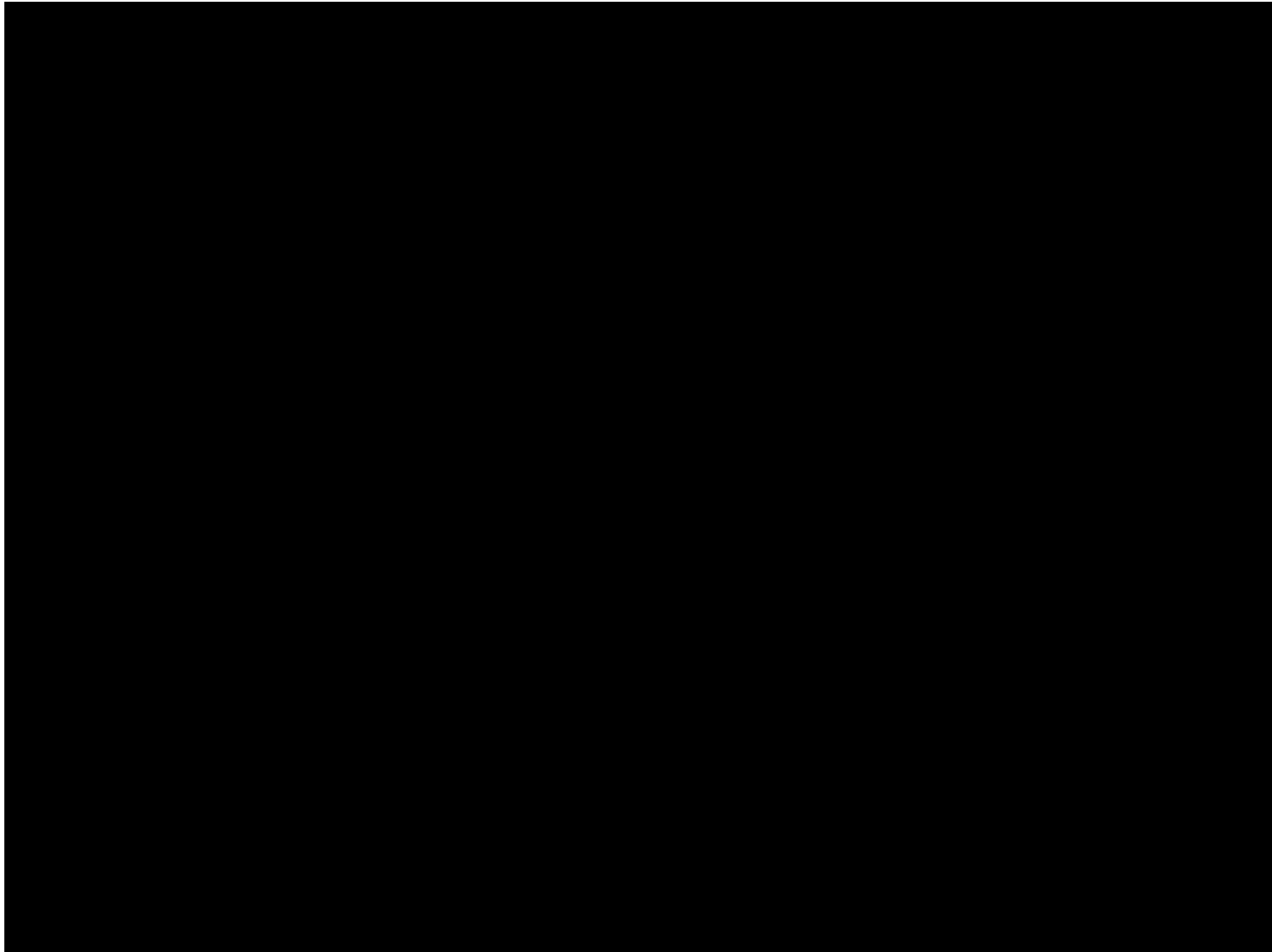
Gait analysis – Lower Motor Neuron Monoparesis



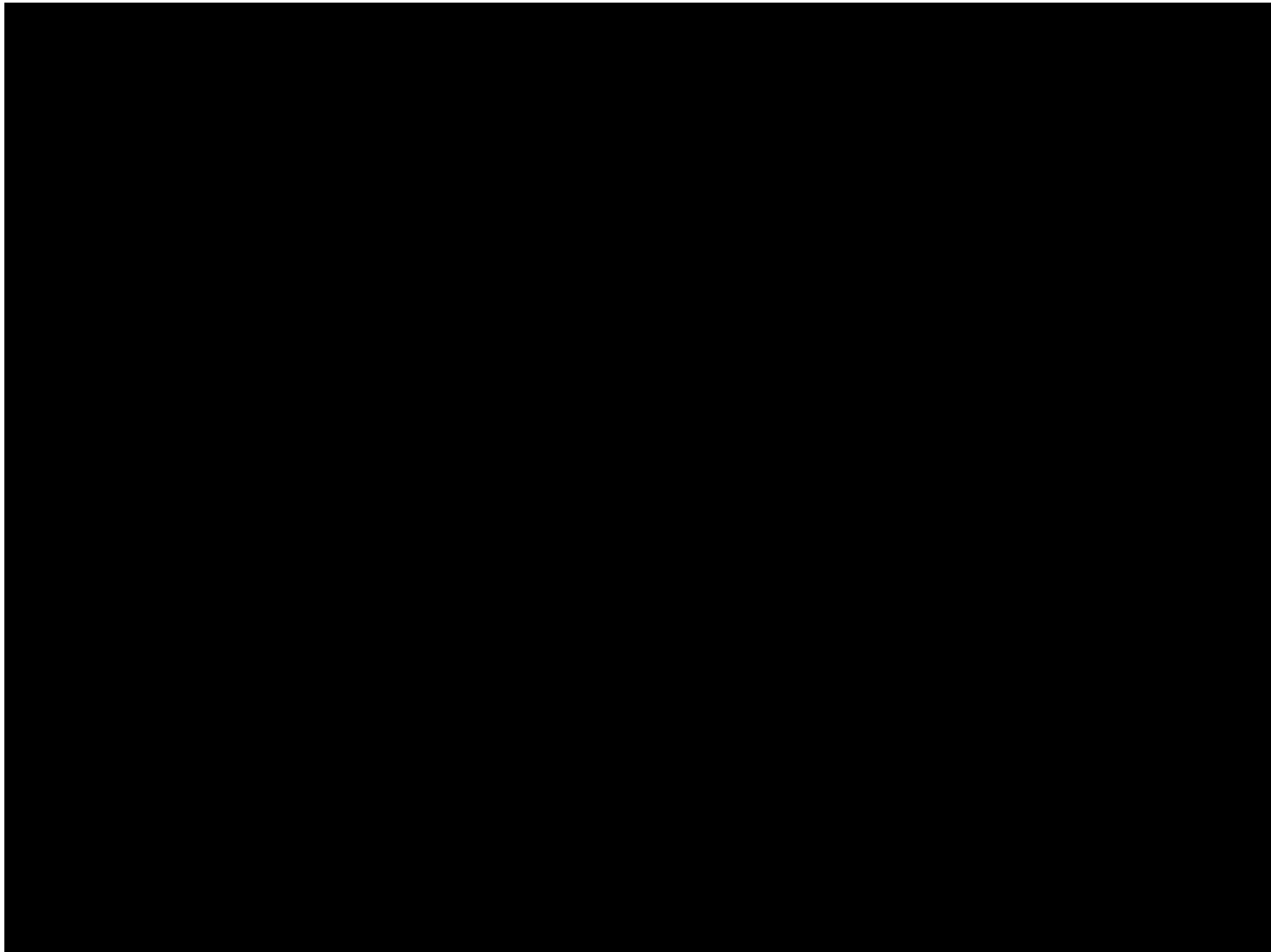
Gait analysis – Lower Motor Neuron Pelvic Limbs



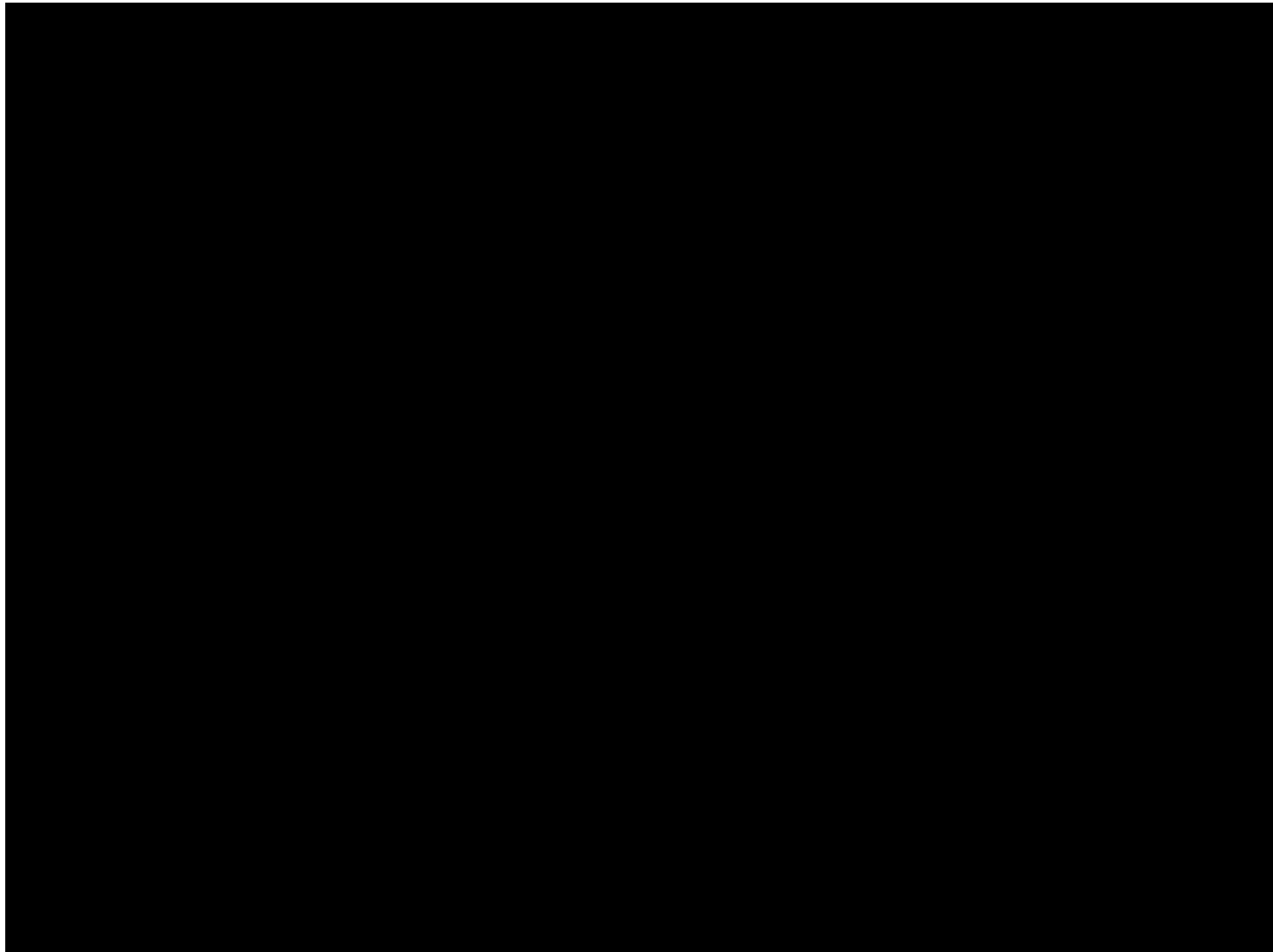
Gait analysis – Lower Motor Neuron Pelvic Limbs



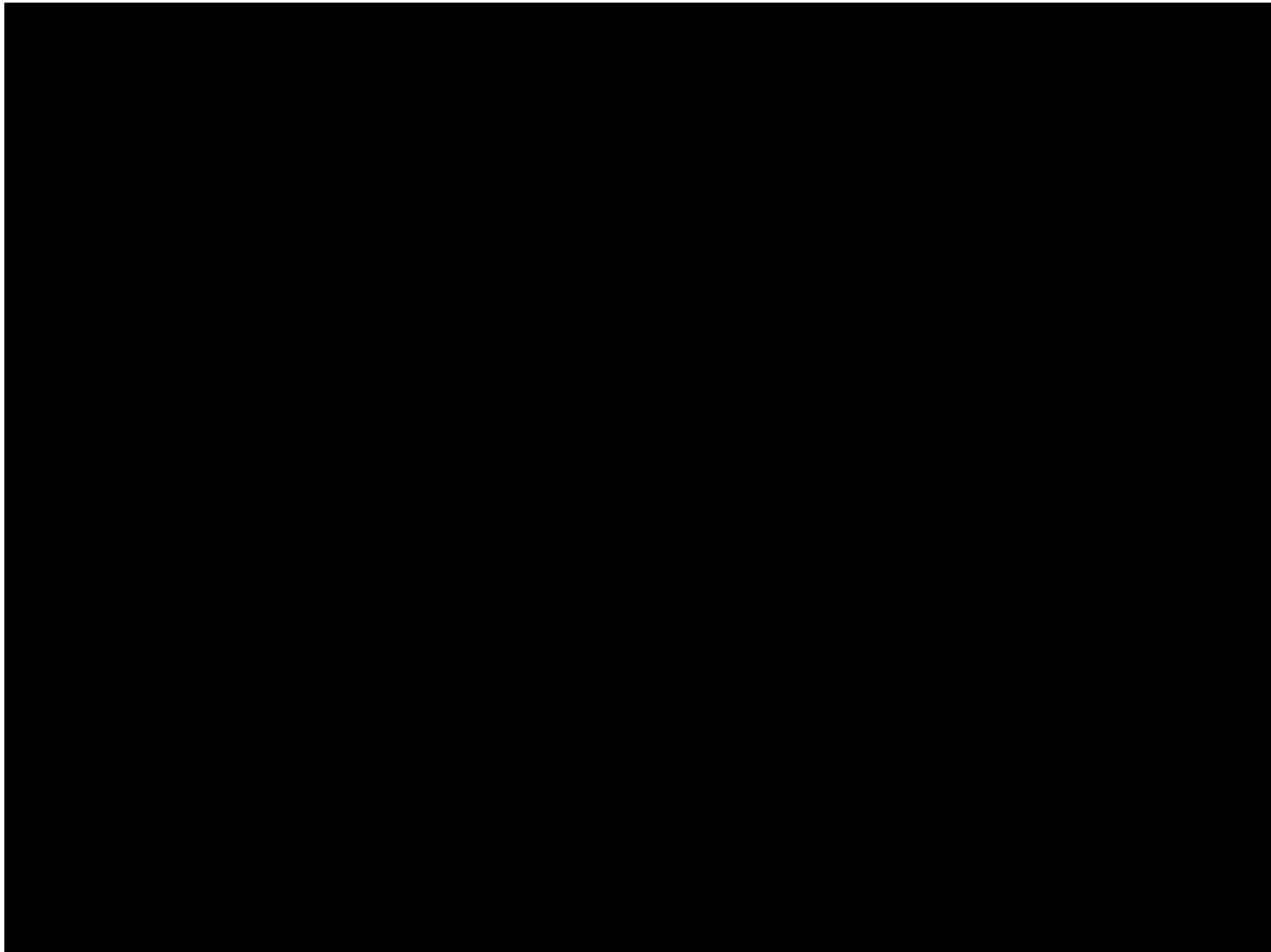
Gait analysis – Vestibular Ataxia



Gait analysis – Cerebellar Ataxia

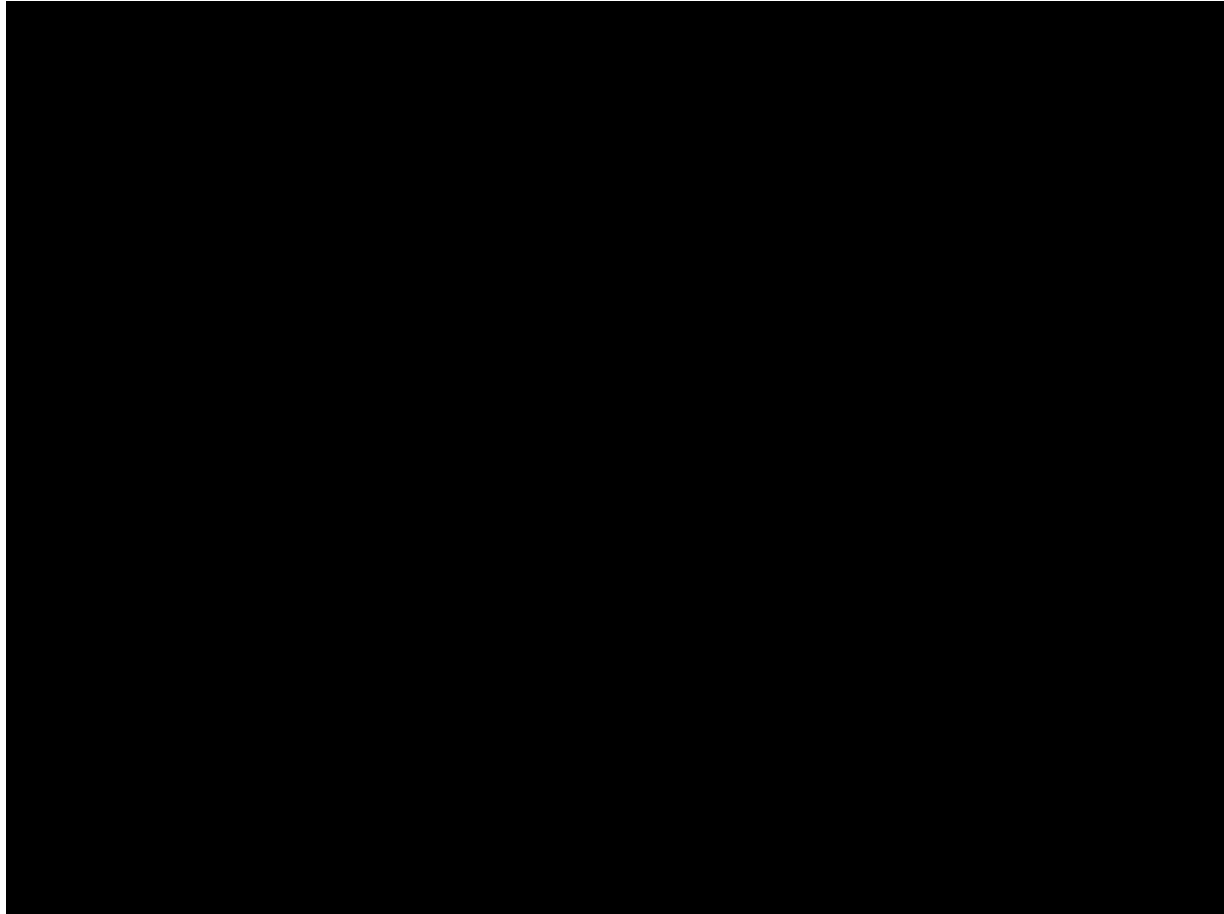


Postural reactions and reflexes



Testing nociception

- Pinch toe with a hemostat
- Look for a conscious response to pain
 - Turn of head
 - Bite
 - Vocalizing
- A withdrawal reflex is not nociception



Medical Management for IVDH

- Anti-inflammatory
 - Prednisone 0.25-0.5mg/kg PO Q12 (taper over ~3-4 weeks)
 - NSAID (clinicians choice)
- Pain Management
 - Gabapentin (5-10mg/kg PO Q8)
 - Amantadine (3-5mg/kg PO Q24)
 - Fentanyl Patch
- Bladder management
 - Prazosin (0.5-1mg PO Q8)
 - Tamsulosin (occasioanly used)
 - Diazepam (DOGS ONLY) 2-5mg PO Q8 (30minutes prior to expression)
 - Bethanechol (2.5-25mg PO Q8)
- Rest Aid
 - Trazodone

- Crate Rest



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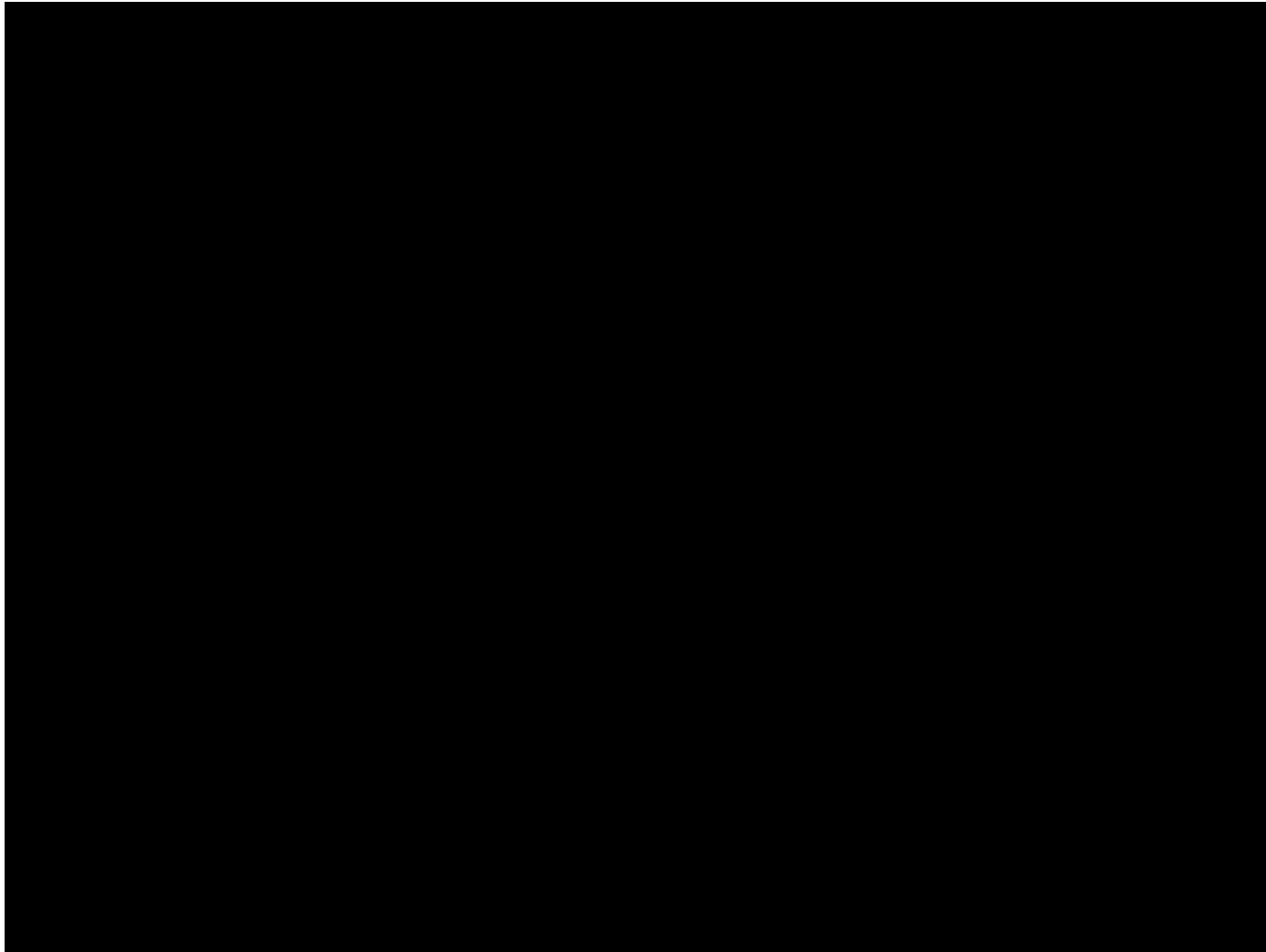
Medical Management Prognosis

- 70-80 % of paraparetic dogs will recover with conservative medical management
- 50-60% recover when presenting plegic
- ~20% recover when presenting with absent nociception

When to Refer/Consider Imaging and Surgery

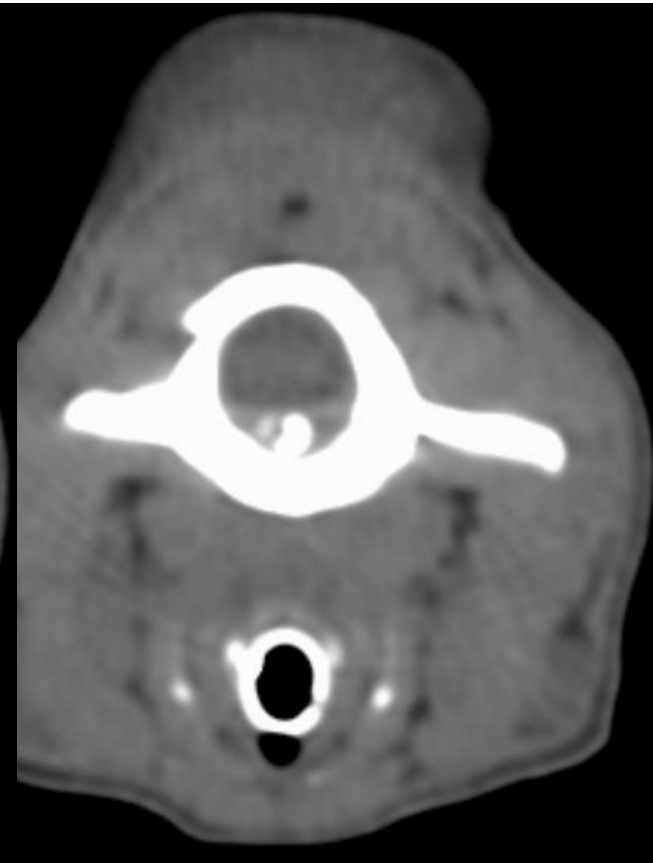
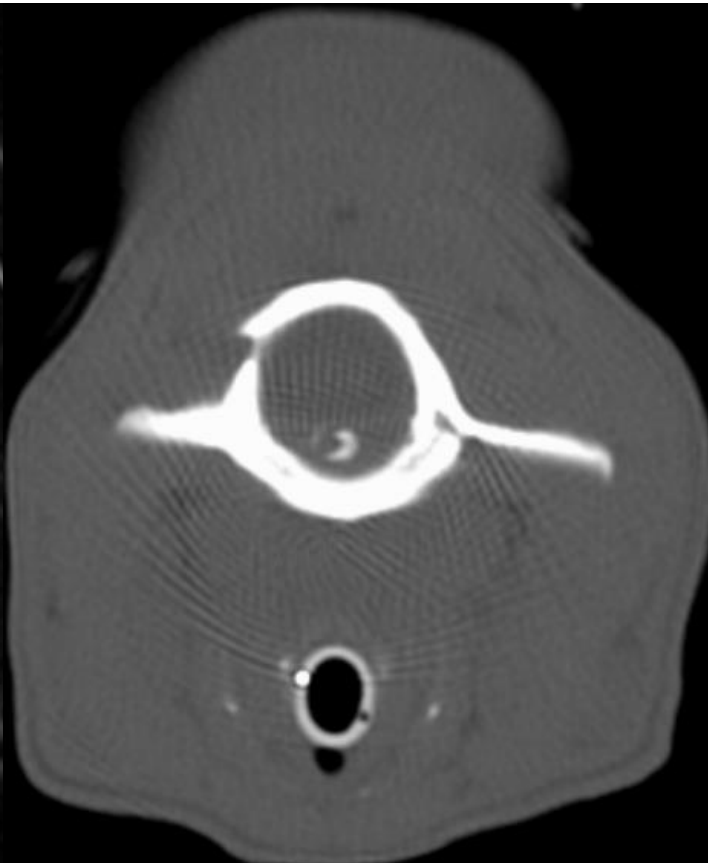
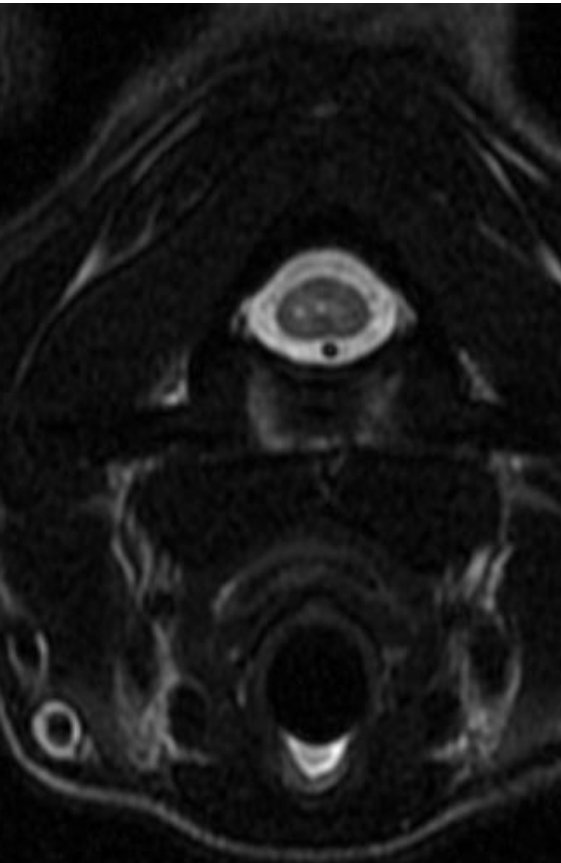
- Atypical signalment/presentation
- Failure to improve on medical management
- Unable to discontinue medications
- Intractable pain
- Progressive paresis/pain/ataxia
- Nonambulatory
- If owners wish to pursue advanced diagnostics even if medical management has not been attempted

Painful Muscle Spasms

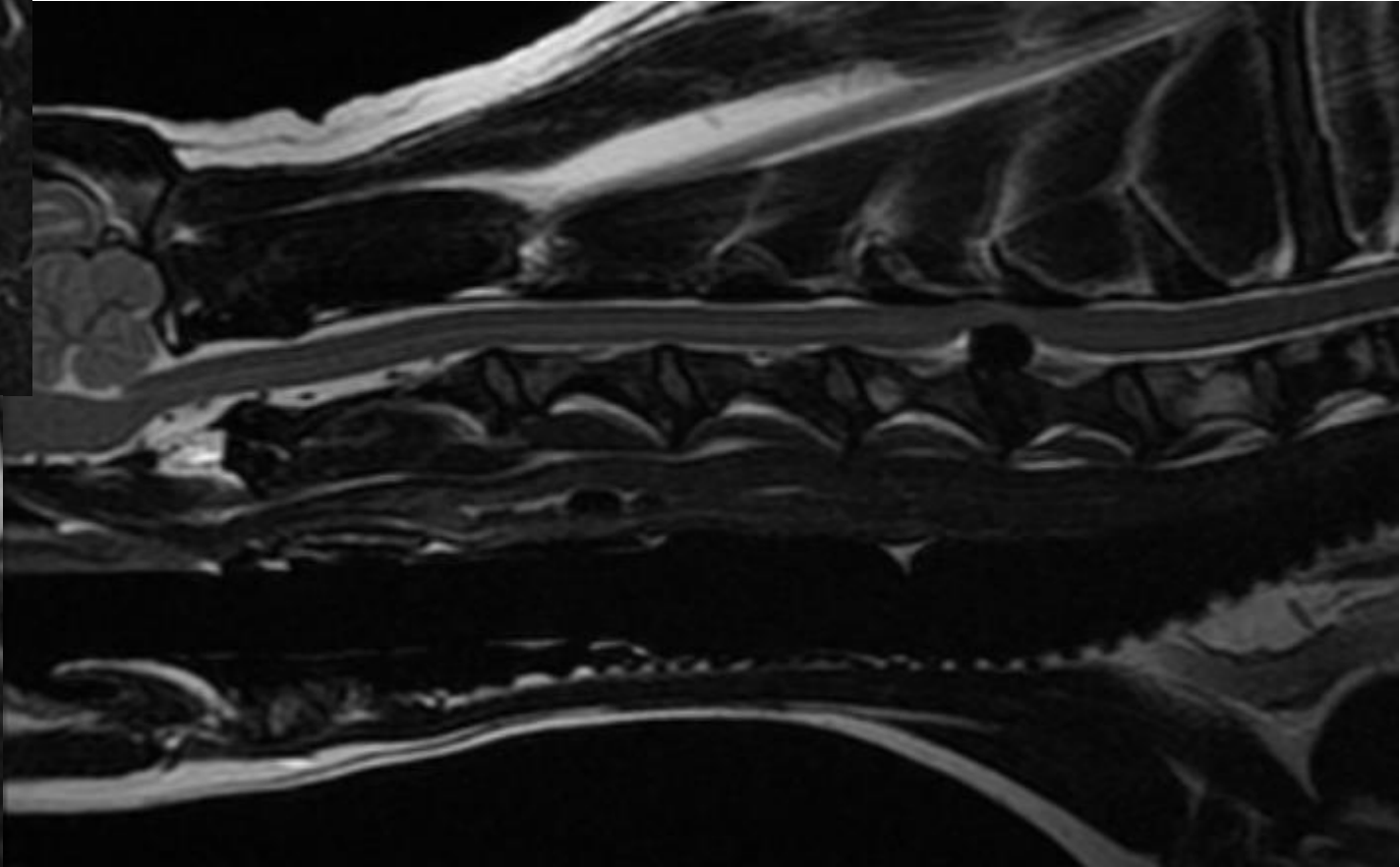
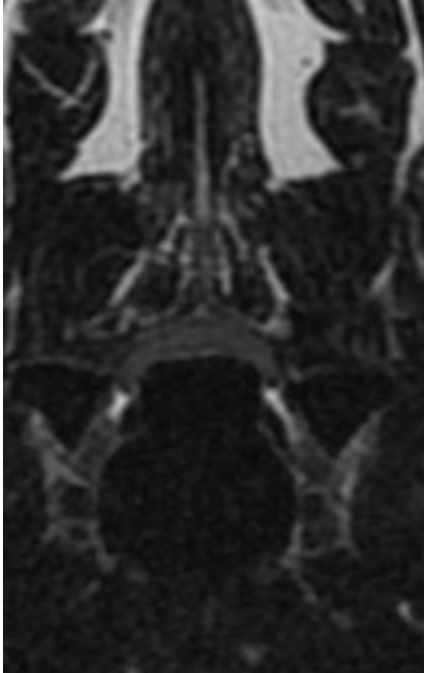
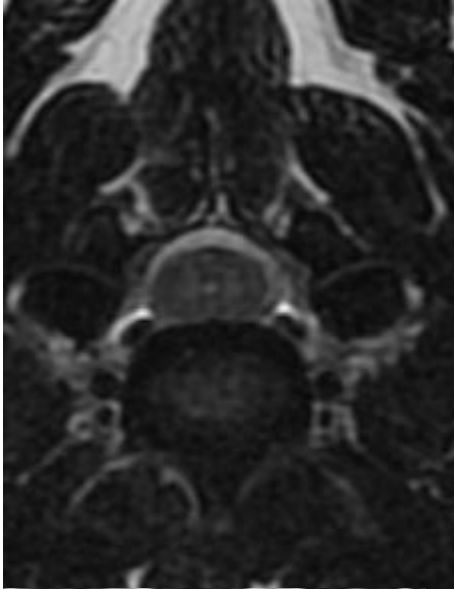


Diagnostic Imaging

- MRI provides excellent soft tissue data
- CT adequate for extradural mineralized disc herniations
 - Chondrodystrophic breeds with acute onset



A pain in the neck



Prognostic indicators

- Severity of signs at presentation is still the best prognostic indicator
- Loss of nociception is the main determinate of prognosis
- A history of progression of signs to include a high cutaneous trunci cut off , ascending lower motor neuron signs, or difficulty breathing are concerning for myelomalacia
- MRI can reveal signs suggestive of myelomalacia
- CSF and blood biomarkers are minimally helpful/experimental/and too untimely to aid in decision making.

Doc how long until my dog will walk?

- Ambulatory paraparetic – 84% at 2 weeks, 92% at 4-6 weeks
- Nonambulatory paraparetic 78% at 2 weeks, 89% at 4-6
- Paraplegic with pain 70% at 2 weeks, 78% at 4-6 weeks 83% at 3 months
- Paraplegic no pain 26% at 2 weeks, 42% at 4-6 weeks, 53% at 3 months

- Most dogs who will recover will significantly in the first 2 weeks.
- Don't give up hope if things are taking longer.

Surgical Management

- Decompressive Surgery
 - Hemilaminectomy
 - Ventral slot
 - Dorsal laminectomy
 - Foraminotomy
- Durotomy
- Disc fenestration



Does time matter?

- Historic reports suggested that time matters
- Experimental studies vs real life
- More recent studies are demonstrating this is less important
- Even with absent nociception there should be no hard cut off in prognosis based on time from loss of nociception

Post- Operative Care

- Same as medical management but better prognosis
- 4 weeks of strict rest
- Physical therapy can start right away
- Ice incision if patient will allow

Adjunctive Therapies

- Physical therapy
- Activity restriction
- Daily activity
- Joint supplementation
- Laser therapy
- Acupuncture



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Take Home Points

- The most common cause of a neurologic nonambulatory patients intervertebral disc disease
- Signalment and history can help you neurolocalize and create a differential list.
- Absence of deep pain is the main negative prognostic indicator
- Time from loss of nociception does not correlate with likelihood of recovery.
- Prognosis for recovery is acceptable with conservative management and excellent with surgical management.

References

- Olby, N. J., Tipold, A., eds. (2021). Canine Intervertebral Disc Disease: The Current State of Knowledge. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88966-740-6
- Hirano, R., Asahina, R., Hirano, T. *et al.* Outcomes of extensive hemilaminectomy with durotomy on dogs with presumptive progressive myelomalacia: a retrospective study on 34 cases. *BMC Vet Res* **16**, 476 (2020). <https://doi.org/10.1186/s12917-020-02690-z>