Study the Strut: Gait Changes in Dogs: Cased Based Analysis
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ANIMAL SURGICAL CLINIC
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Types of Gait Analysis

Subjective analysis
  - Visual observation
  - No special equipment
  - Multi-observer variability

<table>
<thead>
<tr>
<th>LAMENESS GRADE</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>Grade 1</td>
<td>Sound at the walk, but weight shifting and mild lameness noted at trot</td>
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<tr>
<td>Grade 2</td>
<td>Mild weight-bearing lameness noted with the trained eye</td>
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<tr>
<td>Grade 3</td>
<td>Weight-bearing lameness, typically with distinct “head bob”</td>
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<tr>
<td>Grade 4</td>
<td>Significant weight-bearing lameness</td>
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<td>Grade 5</td>
<td>Toe-touching lameness</td>
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<tr>
<td>Grade 6</td>
<td>Non-weight-bearing lameness</td>
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*Note: Grades 2 through 6 lameness can be observed at the walk or trot.*
Types of Gait Analysis

Objective analysis

- Specialized equipment
- Kinematic analysis
- Force plate analysis
- Pressure sensing walkways
Before analysis

- Detailed history
  - Limbs with lameness
  - Onset and timeframe
  - Exacerbation
  - Previous surgeries
  - Medical response

- Static/standing exam

- Complete physical exam
Subjective Gait Analysis

Gait evaluation

- Symmetrical – walk and trot (best to use)
- Asymmetrical – canter and gallop

Observation factors

- Controlled flat environment with good traction
- View the gait at multiple angles
- Evaluate for subtle neurologic changes
Case 1

Signalment
- 5 year old, F/S, German Shepherd

History
- 1 ½ to 2 year progressive right hind limb gait change
- NSAID’s lead to no improvement
- The owner does not perceive her as painful
Gait Analysis
Questions to ask yourself

- Neurologic vs orthopedic?
- Which limb or limbs?
- Does activity or speed of gait exacerbate the changes?
- What does it look like from the side?
Case 1

Physical exam findings
  o Spinal reflexes and proprioception – WNL
  o No perceivable discomfort
  o Tight muscle/fibrous band palpated over the caudal medial thigh
Gracilis Muscle Contracture

- Most commonly seen in German Shepherds 3-7 years of age
- Often associated in combination with the semitendinosus muscle
- Progressive weight-bearing abnormality that is non-painful
- Jerking type of gait with hyperflexion of the tarsus and internal rotation of the metatarsus
- Repeated strain?
Gracilis Muscle Contracture

Normal anatomy
- Origin – pelvic symphysis
- Insertion – cranial border of the tibia and tuber calcanei

Contracture anatomy
- Cranial limb advancement
- Tibia internally rotates
Surgery
  o No long-term benefit?

Conservative management
  o Non-painful
  o Reaches a static state
  o No medications have been beneficial
  o Stem cells/platelet-rich plasma – give me some PROOF
Case 2

Signalment
  o 9 year old, M/C, Beagle

History
  o Waxing waning gait change over 3-4 weeks
  o NSAID’s and tramadol use lead to mild improvement
  o The owner perceives him as painful and stiff
  o No other concurrent medical conditions
Case 2
Physical exam findings

- Extreme neck stiffness
- Delayed proprioception in all limbs
- Neurologic reflex abnormalities
  - Patellar reflex – hyperreflexia
  - Forelimb withdrawal – incomplete

Caudal cervical localization (C₆-T₂)
Differential Diagnosis - \((C_6-T_2)\)

- Wobbler syndrome (cervical spondylopathy)
- Inflammatory/infectious
  - Granulomatous Meningoencephalitis (GME) – most common spinal region
  - Meningitis
  - Discospondylitis
- Fibrocartilaginous emboli (FCE)
- Neoplasia
- Intervertebral disc disease
- Trauma - fractures
Caudal Cervical Lesion

Front limbs
  • Lower motor neuron
    • Decreased muscle tone
    • Hyporeflexia
    • Rapid muscle atrophy

Hind limbs
  • Upper motor neuron
    • Maintained muscle tone
    • Hyperreflexia
    • Slow muscle atrophy
Imaging Results

C₇-T₁ disc extrusion
Caudal Cervical Disc Extrusion

Treatment
Caudal Cervical Lesion
Case #3

Signalment:
- 8 year old
- F/S
- Brittany Spaniel

History:
- Acutely lame on the left front limb three months ago but it mostly resolved within a few days. The last two months noticed a abnormal gait with no response to NSAID’s.
Case #3

Physical exam findings
Anatomy

- **Origin**
  - Caudolateral scapula

- **Insertion**
  - Lateral greater tubercle of the humerus

- **Action**
  - Abduct the shoulder
  - Lateral rotation
Infraspinatus Muscle Contracture

- Usually occurs in adult, sporting breed dogs
- Not reported in cats
- Usually associated with an acute event
- Radiographs help rule out other disorders
- Medical management is not effective
- Surgical treatment is releasing the infraspinatus tendon
- Excellent prognosis
Infraspinatus Muscle Contracture
Case #4

Signalment

- 2 year old, F/S, German Shepherd

History

- Acute left hind limb changes
- NSAID’s use lead to no improvement
- The owner perceives her as more dysfunctional than painful
Physical exam

- Spinal reflexes within normal limits
- Hyperflexion of the tarsus with the stifle in extension
- Swelling over the common calcaneal tendon
Calcaneal Tendon Avulsion
Calcaneal Tendon Anatomy

Common calcaneal tendon
- Biceps femoris
- Gracilis
- Semitendinosus
- Gastrocnemius
- Superficial digital flexure
Calcaneal Tendon Avulsion

Treatment

- Surgical repair only proven therapy
- Prolonged splinting/bracing postoperative
- 70-90% success
Partial Calcaneal Tendon Avulsion
“Look a likes” of a Calcaneal Tendon Avulsion
“Look a likes” of a Calcaneal Tendon Avulsion
“Look a likes” of a Calcaneal Tendon Avulsion
Plantar Tarsal Instability

Plantar Tarsal Instability

Treatment

- Partial tarsal arthrodesis
- Very good to excellent surgical outcome
Case #5

Signalment
  o Tippy, 10 year old, F/S, DSH

History
  o 4-5 week history of not wanting to use her hind limbs “properly”.
  o They had recently moved to a new house without carpets.
  o She seemed much worse after the vacuum scared her and she slipped on the wood floors.
Case #5

Previous diagnostics

– Thoracolumbar radiographs
Case #5

Previous therapies

- Onsior (Robenacoxib) – 6mg PO q24hr for 3 days
- Tramadol – 12.5mg PO q8-12hr
- She showed no improvement on either therapy
Case #5
Case #5

Physical exam
  o T/P/R – within normal limits
  o BCS 7/9 – 5.4kg
  o Pulses and thoracic auscultation – within normal limits

Neurologic exam
  o Spinal reflexes – within normal limits
  o No conscious proprioception deficits
  o Cranial nerves - within normal limits
Differentials

Neurogenic
- Inflammatory - most common
  - FIP (51%)
  - Bacterial myelitis (16%)
  - Cryptococcosis (9%)
  - Unknown (8%)
  - Toxoplasmosis (6%)
  - Eosinophilic meningomyelitis (5%)
  - Idiopathic poliomyelitis (5%)
- Neoplastic
- Intervertebral disc disease
- Ischemic myelopathy

Differentials

Neurogenic

Orthopedic

- Bilateral stifle disease
  - Cranial cruciate ligament disease
  - Patellar luxation
- Bilateral hip disease
  - Capital physeal dysplasia/fractures

Vascular

- Saddle thrombus

Metabolic

- Diabetic neuropathy
Case #5

Orthopedic exam - Bilateral grade II/IV medial patellar luxations
Patellar luxations in cats

- Medial is most common
- I-IV grades
- Surgical correction based off
  - Severity of signs
  - Grade of luxation
- The main stay of surgery is bony corrections
  - Tibial tuberosity transpositions
  - Trochlear recession
Case #5

8 weeks postoperative
Nocita ™ Aratana

- Bupivacaine liposome injectable suspension
- Released from the multivesicular liposomes over a period of time (72 hours)
- Labeled for postoperative cranial cruciate ligament surgery pain management
- Labeled for use in dogs only.
Clinical use instructions

- Maximum dose 0.3mg/kg (0.4ml/kg)
- Can be diluted 1:1 ratio 0.9% NaCl
- Soft tissue injection only

Other potential uses?
Advantages
  - Another modality of pain management
  - Minimal to no side effects
  - It clinically works

Disadvantage
  - Cost
Questions???
THANK YOU!

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