Rehabilitation in Hindlimb Conditions

Ronald Koh, DVM, MS, CVA, CCIR, CVCH, CVFT
rkoh@lsu.edu
Assistant Professor, Integrative Medicine
School of Veterinary Medicine
Louisiana State University

Overview

1. Introduction to Rehabilitation
2. Goals for Hindlimb Rehab
3. Rehab Exam in Hindlimb
4. Objective Outcome Measurements
5. Rehab Plan:
   - CHD, iliopsoas, CCLR, IVDD

Rehabilitation

- Growing specialty in vet med
- "Physical Therapy" and "Physiotherapy" are protected terms
- DVM/ VMD / VT / PT / PTA / OT / OTA
- Canine Rehabilitation Institute (CCRT or CCRA)
- University of Tennessee (CCRP)
- Am Col of Veterinary Sports Medicine and Rehabilitation
- DACVS/MR, Approved by ABVS in 2010
- All rehab patients need to be evaluated by a veterinarian

Rehabilitation in Hindlimb

- CHD, CCL, MPL, OA, tendinopathy, IVDD, DM
- Pain relieve and maximize function
- Rehab techniques address the following conditions:
  - Pain and inflammation
  - Hypomobility or hypermobility
  - Flexibility
  - Weakness
  - Muscle atrophy

What is involved?

- Assessment of the patient
- Physical exam
- Orthopedic exam
- Neurologic exam
- Rehabilitation exam
- Diagnostic imaging

DIAGNOSIS!!

Ortho Exam Tips – DO

- Put on your detective hat
- Ask clients to provide video
- Take rectal temp after exam
- Use treats
- Evaluate functional mobility and transitions
- Do exam on good grip floor
- Leave the “limb of interest” for last
- Leave the feet for last but DON’T forget
Ortho Exam Tips – DON’T

- Do exam on a stainless-steel table
- Forget the soft tissues
- Forget front limbs and neck
- Forget that neuro disease
- Assume the only indication of pain is crying out, turning, or pulling back
- Pin the scared animal to the ground and expect to feel cranial drawer or other subtle signs of discomfort

Rehabilitation Exam

- Soft tissue palpation
- Goniometer
  - Measures joint angles
  - Compare both sides
- Gulick:
  - Specialized tape (4oz tension)
  - Measures muscle girth
  - High up in the thigh, cross tape at greater trochanter
  - Compare both sides

Rehabilitation Exam

- Gait Analysis
  - Stance
  - Gait
    - Walk, Trot, Pace, Gallop

Gait analysis tools

- Stance analyzer
- Kinematic analysis system
- Temporal analysis system

Formulate a Treatment Plan

- Set goals
- Pain management
- Rehab Plan
- Patient compliance
- Owner compliance and finances
- Owner expectations

Hip Dysplasia or OA

Common findings:

- Tenderness or pain
- Decreased ROM
- Atrophy
- Slow rise, hip sway, “bunny” hop
- “tight skirt” syndrome
- Overactive or decreased flexibility of pectineus and iliopsoas m
- Using the forelimbs to pull themselves into the standing position
**Hip Dysplasia or OA**

**Treatment goals**
- Decrease pain
- Maintain/improve ROM
- Increase muscle mass and strength
- Decrease hypertonicity of pectineus and iliopsoas
- Increase flexibility of iliopsoas and pectineus
- Improve core stabilization
- Manage weight

**Hip Dysplasia Treatment Plan**

- **Pain management**
  - NSAIDs, Gabapentin, Tramadol, etc
  - Acupuncture, Laser, US, Adequan
- **Massage**:
  - Adductors, iliopsoas, lumbar spine, shoulders
- **Ice**:
  - Acute injury, post-op, after exercise
- **Heat**:
  - Chronic injury, before exercise
- **Stretching**:
  - Hip, pectineus, iliopsoas, quads
- **Joint Mobilization**:
  - Traction, compression, gliding
- **OFA**, glucosamine, chondroitin, MSM, HA, GLM, protandim

**Non-slip Floor**

- **Ground**
- **Grass**
- **Carpet**
- **Sand**
- **Mat**

**IMPORTANT!!**

We should first realize the larger picture. Dogs walk on their toes like a horse, not on their pads or the "soles" of their feet like a human. So this puts weight dispersion and balance of the dog's entire mass on a very small center of impact absorption (especially if they are also overweight). If they feel pain in a toe or a nail, they will then have to rock back on their heels and extend the ligaments of their larger pad and the back of their ankles to try to ease the pain in their toes. This puts them at a tremendous risk of injuring their ankles, elbows, hocks, shoulder and hips, as well as their connective tissues such as ACLs. Everything in one's musculoskeletal system is connected with every other part of the body. Overgrown nails are also one of the leading causes of obesity.

**Harness**

- Comfortable
- Sturdy
- Good ROM
- Easy to put on

- **Premier Sure Fit Harness**
- **Four Paws Safety Seat Harness**

**Hip Dysplasia or OA**

**Physical Therapy**
- Sit-to-stands
- Cavaletti rails / weave poles
- Balancing board
- UWTM vs. swimming
- Gl. trochanter or stifle level
- Steps/stairs, walking up hill
**Hip Dysplasia or OA**

**Home Exercises:**
- Ice or Heat
- Slow walking
- Stretching:
  - Flexion, extension, abduction
  - Cookie stretch
- Swinging/Shifting
- Stepping
- Sit-to-Stand
- Swimming?

**The Forgotten – Iliopsoas Muscle**

- Often under-diagnosed
- Origin at L2-L7, insert at lesser trochanter
- Primary or Secondary
- Signs similar to hip problems
- No pain on hip joint palpation (X-ray normal)
- Hip become painful when extend the hip
- Dx: Iliopsoas Exam, US or MRI
- If hip pain not better on NSAID, think ILIOP!

**Iliopsoas Exam**

- Abduct, internal rotate, extend the hip
- Palpate it’s origin (L2-L7) and insertion (lesser trochanter)
- Compare both sides

**Iliopsoas Muscle Strain**

- **Treatment**
  - Conservative!
  - Pain meds not always helping
  - Add muscle relaxant
  - Rehab is similar to CHD
  - Lots of acupuncture + US + stretch
  - Take longer time to recover (>8wks)
  - May consider tenectomy

**Cranial Cruciate Ligament Rupture**

- **Common findings:**
  - Grade I-II sprain (partial tear) vs. Grade III (complete tear)
  - NWB-PWB gait
  - Abnormal sitting posture
  - Swelling in stifle
  - + cranial drawer ± cranial tibial thrust test
  - Painful at end range stifle flexion and extension
  - Meniscal “click”
  - Muscle atrophy in affected disuse limb

**Cranial Cruciate Ligament Rupture**

- **Treatment goals:**
  - Decrease pain and swelling
  - Normalize ROM
  - Normalize flexibility
  - Achieve FWB gait
  - Strengthen quadriceps, hamstrings, gluteals
  - Promote core stabilization
CCLR Treatment Plan

**Grade I or II sprains:**
- Pain management
  - NSAIDs, Tramadol, Gabapentin
  - Acupuncture, Laser, US, Adequan
  - Rest and No running, jumping, or quick side turns
- Ice or Heat
- PROM: until WB
- Massage and Stretching: quads, hamstrings, sartorius
- Joint Mobilization: traction, compression, gliding
- Start physical exercises once pain and inflammation are relieved

**Grade III sprains:**
- Post-Op pain management
  - NSAIDs, Tramadol, Gabapentin
  - Acupuncture, Laser, US, Adequan
  - Rest and No running, jumping, or quick side turns
- Ice or Heat
- PROM: until WB
- Massage and Stretching: quads, hamstrings, sartorius
- Joint Mobilization: traction, compression, gliding
- Start physical exercises once pain and inflammation are relieved

---

**CCLR Treatment Plan**

**Physical Exercises (non-surgical and 2-4 weeks postop)**
- Balancing board
- Cavaletti rails / weave poles
- Sit-to-stands
- UWTM (stifle level) – Postop: not until suture removed
- 3 legged standing (PWB or FWB)
- Steps/stairs, walking up hill (>4 week)
- Brace? Orthopet, Animorthocare

**Home Exercises:**
- Ice or Heat
- Slow walking (2-3 months)
- Stretching:
  - Flexion, extension, abduction
  - Cookie stretch at shoulder, hip, toe
- Swaying/Shifting
- Stepping
- Sit-to-Stand

---

**Common Neurological Conditions Affect Hindlimb**
- Spondylosis, IVDD, trauma, cancer, DM, FCE, Wobbler's
- Pain
- Slow or unable to rise
- Using the forelimbs to pull themselves up
- Delayed or absent CP
- Muscle atrophy
- Pressure sores
- Incontinences
- UTI
- Loss deep pain

**Neurological Disorders**

**Treatment goals:**
- Decrease pain
- Improve nerve function
- Maintain/improve joint health
- Prevent muscle loss
- Improve muscle tone & strength
- Increase proprioception
- Treat anxiety!
### Pain Management
- Steroids/NSAIDs, tramadol, gabapentin, etc
- Acupuncture – relieve pain, regenerate nerves
- Laser – relieve pain, reduce swollen, wound healing
- Cage rest (6-8 weeks)
- No running or jumping
- Cold or Heat
- NMES – prevent muscle atrophy

### Acupuncture
- Relieve pain, regenerate nerves

### Laser
- Relieve pain, reduce swollen, wound healing

### Cage Rest
- 6-8 weeks
- No running or jumping

### Heat or Cold

### NMES
- Prevent muscle atrophy

### IVDD Treatment Plan

#### Home Exercises:
- PROM & Massage
- Slow walking
- Stretching:
  - Cookie stretch to shoulder, hip and toe
- Swaying/Shifting
- Stepping
- Sit-to-Stand

#### Assist Exercise
- Physical Exercises
  - Massage – paraspinal muscles and limbs
  - PROM and toe pinches
  - Ear scratches
  - Joint compressions – improve proprioception
  - Assisted standing
  - Assisted sit to stand
  - UWMT: 2 weeks after injury/postop

### Assisted Standing
- After injury or postop
- Sling is good, BUT…

### Underwater Treadmill
- Great for non-ambulatory paraparesis or paralysis
- G. Trochanter level, then stifle level
- Helps with gait re-training and proprioception

### Toe Up Sling
- Dorsiflexion assist
- Felicitate cranial swing
- Proprioceptive input/stimulation
- IVDD, Spondylosis, FCE, DM

### Orthopet
Wheelchairs
- Ideal for certain patients…maybe not large dogs
- Most dogs that end up in cart are “end-stage” CAREFUL!
- MUCH more work than you expect…
- Measurements and fitting are important!
- Can get into trouble loose in a cart!!

Active Therapeutic Exercises
- No one exercise fits all!
- Exercise should be PAIN FREE
- Good TRACTION floor!
- Choose only 2-4 exercises per session, BID-TID
- Doing all exercises may result in lameness and pain
- Rate of progression is based on response and progress

Summary
- Growing specialty
- Benefit any MSK or neurological in hindlimb
- Goals:
  + Pain relief
  + Minimize disuse changes
  + Return to normal activity
- Multi-modalities
- Individualized treatment - No one size fits all
- 5’s’ home exercises
- Should see improvements every week

Question?
rkoh@lsu.edu