

Growing old is not easy, but it sure beats the alternative



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Thank you to our sponsor:



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What are we about to talk about?

- ▶ General concepts
- ▶ Diagnosing Back Pain
- ▶ Treating Back Pain
- ▶ Treating spinal dysfunction



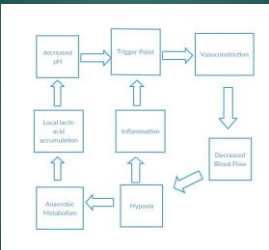
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General Concepts



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Myofascial Trigger Points



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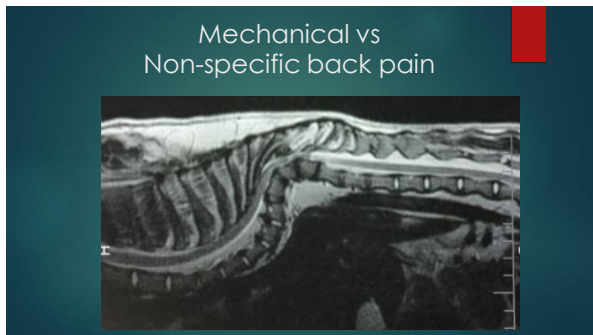
    graph TD
      Hypoxia --> AlteredMetabolism[Altered Metabolism]
      AlteredMetabolism --> LocalIrritant[Local irritant accumulation]
      LocalIrritant --> IncreasedpH[increased pH]
      IncreasedpH --> TriggerPoint[Trigger Point]
      TriggerPoint --> Vasoconstriction[Vasoconstriction]
      Vasoconstriction --> DecreasedFlow[Decreased Blood Flow]
      DecreasedFlow --> Inflammation[Inflammation]
      Inflammation --> Hypoxia
  
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Local Twitch Response (LTR)



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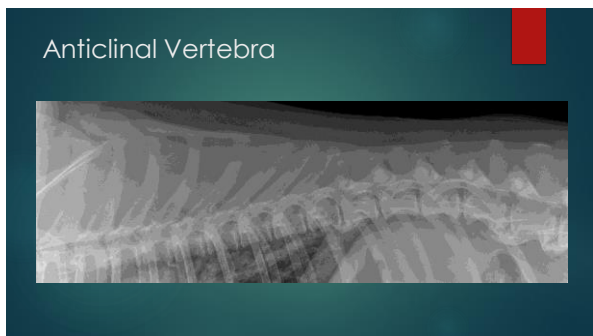
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But the MRI was negative....

Sources of back pain that don't require a protruding disc include:

- ▶ Myofascial trigger points
- ▶ Root pain of spinal nerves secondary to muscular compression
- ▶ Meningeal pain from tension on dural structures
- ▶ Ischemic pain from compressed blood vessels
- ▶ Discogenic pain from degenerated but non-compressive IVDs
- ▶ Vertebral endplates
- ▶ Osteoarthritis of articular facets a/o sacroiliac joints
- ▶ Dorsal longitudinal ligament or ligament flavum pain

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Lower back pain and ataxia

Pre Treatment

Post Treatment

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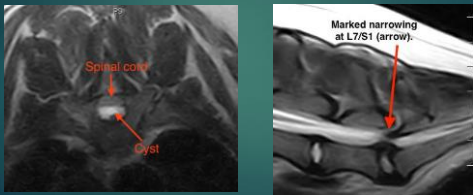


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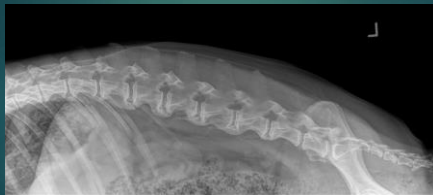
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Treat the patient, not the radiograph (or MRI)



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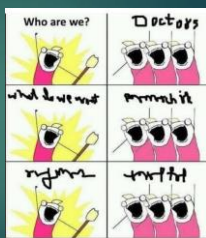
What does spondylosis indicate?



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Faecal incontinence

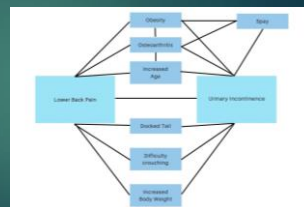
- ▶ Walk and drop



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Urinary Incontinence (UI) and Lower Back Pain

- ▶ 74% showed a decreased frequency in UI overall
- ▶ 32% showed an incomplete resolution and still leaked at least once monthly
- ▶ 28% showed short term complete resolution lasting at least 1 month
- ▶ 18% showed long term complete resolution lasting at least 1 year



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How to diagnose back pain:

- History
- Subjective Gait Analysis
 - Static Examination
 - Altered vertebral mobility during ambulation
- Physical Examination Findings
 - Altered vertebral mobility during palpation (PROM)
 - Pain on paraspinal palpation
 - Asymmetric vertebral or pelvic resting location



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History Clues:



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History clues: Arthritis vs Back origin pain

<p>Limb Arthritis</p> <ul style="list-style-type: none"> ▶ Pay for it afterward ▶ Warm up or improves throughout the day ▶ Less painful during activity, compared to afterward ▶ NSAIDs generally beneficial ▶ Often presents as lameness 	<p>Back Origin</p> <ul style="list-style-type: none"> ▶ Shutting down during walks (can also happen with severe OA) ▶ Nights rest often improves condition ▶ Worsens throughout day ▶ NSAIDs often ineffective ▶ Often presents as IDP vs lameness ▶ Vague regions affected/difficult to localize pain
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History clues:

What effect did medication have?

- ▶ Indicates the pain pathway involved
- ▶ Muscle spasm, pinched nerve pain, tendinopathy are poorly NSAID responsive

Is mood or appetite affected?

- ▶ Continuous vs situational pain
- ▶ Headache
- ▶ Severe pain
- ▶ Visceral pain or some other internal medical issue




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Clinical signs:

The obvious:

- ▶ Painful vocalizations
- ▶ Reluctance/inability to move
- ▶ Difficulty negotiating the home environment
 - ▶ Stairs
 - ▶ Slippery floors
- ▶ Altered topline
- ▶ Pain not typical for osteoarthritis


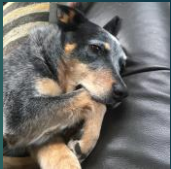


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Clinical signs:

The less obvious:


- Hesitation to jump
- Hesitating on stairs
- Symmetric limb issues
- Reduced athletic performance
- Altered sit posture
- Non-itchy dog chewing at limbs
- Reduced body shake

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Clinical signs:

- ▶ Negotiating stairs
- ▶ Up vs down
- ▶ Accelerating downstairs
- ▶ Transition to upstairs



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Subjective static and dynamic gait analysis




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Static Examination

Static Exam

- ▶ Conformation
- ▶ Weight shifting
- ▶ Sit posture
- ▶ Topline and tail carriage



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Normal vs abnormal spinal AROM

Normal spinal AROM Rigid lumbar AROM



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Gait or Mobility Clues

- ▶ Rotational instability
- ▶ Lateral circumduction



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Physical Examination Clues




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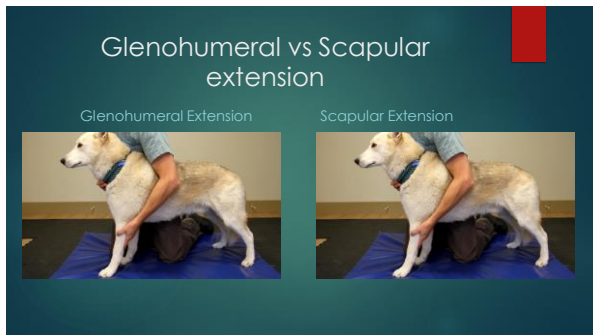
Examination Clues: Facilitate a relaxed examination

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Everyone appreciates a slow hand



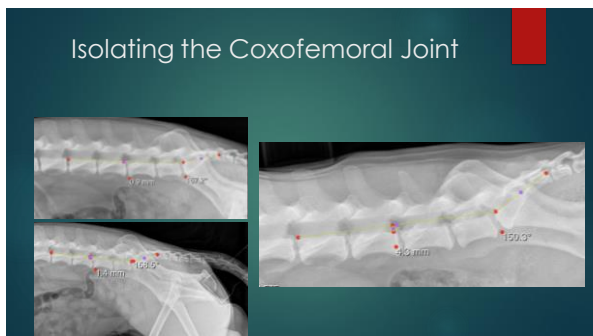
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Differential Diagnosis for pain on hip extension:

- ▶ Coxofemoral Joint disease
- ▶ Iliopsoas tendinopathy
- ▶ Non-specific back pain
 - ▶ Muscular pain
 - ▶ Facet OA
 - ▶ Degenerate non-protruding disc
 - ▶ Tendon/ligament pain
- ▶ IVDD/DLSS (or other cause of mechanical back pain)
- ▶ Hip flexor a/o core muscle pain (Sartorius, rectus femoris, abdominal muscle wall insertion, etc.)
- ▶ Sacro-iliac joint pain



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Be aware of hip position when testing stifle extension



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What are we looking for: Pain



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What are we looking for: Reduced mobility (PROM)

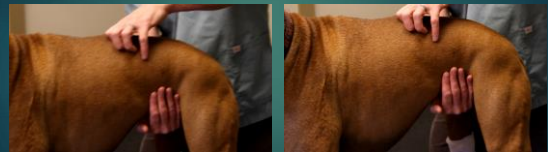


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Thoracolumbar Spine

DV mobility of Lumbar Spine

Lateral mobility of Lumbar Spine



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Assessing Neck Mobility



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What are we looking for: Asymmetric resting position



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Sacro-iliac Joint (SIJ)

The Canine Sacroiliac Joint
Preliminary Study of Anatomy, Histopathology, and Biomechanics

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 R. POOL, DVM, PhD,‡ and P. B. VASSEUR, DVM*

From the Departments of *Surgery and †Pathology, School of Veterinary Medicine, University of California, Davis, California.
 Submitted for publication September 6, 1989 and revised April 29, 1993.

The sacroiliac joint of the dog has been described as being a partly synovial joint and a partly cartilaginous joint. The crescent-shaped synovial part of the joint lies cranioventral to the cartilaginous part, a synchondrosis formed of fibrocartilage.^{1,2} The interlocking of the cranial and caudal iliac spines is produced by the sacrospinous ligaments. The many short, fibrous sacrospinous ligaments form a broad, fan-shaped group running forward.



Binkley, Piermattei & Pol's Handbook of small animal orthopedics and fracture repair, 4th ed.

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SIJ Palpation



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Resting Atlas Position

- ▶ Atlas position
 - ▶ fingers between occiput and atlas
 - ▶ Higher or more cranial than the other
 - ▶ Mood changes



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Treating Back Pain



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Step 1: Resolve Pain and restore flexibility



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Manual therapy:

- ▶ Mobilizations
- ▶ Manipulations
- ▶ Stretching
- ▶ Massage
- ▶ Fascial techniques



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Manual therapy:

Manipulations:



Mobilizations:



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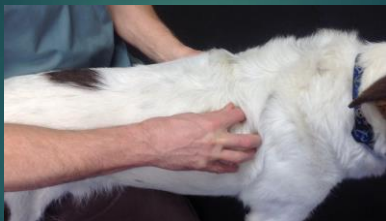
Acupuncture:

- Acupoints (TCM)
- Electro-acupuncture
- Dry needling (IMS)



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mfTP & Local Twitch Response



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Combined Acupuncture and Manual Therapy (CAMT)

Effectiveness of combined acupuncture and manual therapy relative to no treatment for canine musculoskeletal pain, CV1


David Lane & Sarah Hill

Blinded randomized controlled therapeutic trial

2 CAMT treatments improved:

- dog behavior (P=0.003)
- walking (P<0.001)
- resting (P<0.002)
- sleeping (P<0.001)
- descending stairs (P<0.003)
- rising from a lying position (P<0.001)
- reduced stiffness (shorter P<0.001) or following exercise (P<0.001)

• Head, vitals, and ear parameters also improved but did not attain statistical significance.



Changes in Walking, Resting, Post-Exercise Stiffness after CAMT

Week	Walking	Resting	Stiffness
1	~45	~40	~35
2	~48	~42	~38
3	~50	~45	~40
4	~52	~48	~42

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Photobiomodulation (Laser)

Indications:

- Increase perfusion of mfTP
- Palliative for OA of facet joints, inflamed degenerative IVD
- Healing of poorly vascularized tissue (tendons/ligaments/IVD/nerves)



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Extracorporeal Shockwave Therapy (ESWT)

- Indications:
 - Stimulate repair of delayed or non-union fractures (as well as stabilizing loose press-fit THR)
 - Palliative OA
 - Pain control more consistent in chronic patients than acute
 - Increased tendon and ligament repair
 - Soft tissue ossifications




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Treating back pain: Pharmaceuticals

Muscle Relaxants

- ▶ Methocarbamol
- ▶ Tramadol?
- ▶ Benzodiazepines???



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Pulsed Electromagnetic Field Therapy (PEMF)



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Epidural Methylprednisolone

486 © Schattauer 2009 Clinical Communications

Lumbosacral degenerative stenosis in the dog

The results of epidural infiltration with methylprednisolone acetate: a retrospective study

L. Janssens; Y. Beolier; R. Daems
Analis Veterinary Clinic for Companion Animals, Aartselaar Antwerp, Belgium



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Step 2: Prevent recurrence



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Optimize body condition:

Lose excess body fat:

- Adipose is a pro-inflammatory endocrine organ
- Biomechanical stress
- Altered movement patterns

Adipokine	Major Actions	Association with OA
Vitelin	B cell insulin secretion (RAID pathway), leukocyte adhesion, NO2 upregulation	Negative
Omentin	Functions vary depending on cell type, insulin resistance in muscle, insulin sensitization in adipocytes, chemorepellant for immune cells	Negative
Adiponectin	Insulin sensitization (via AMPK), anti-inflammatory (decreased NF- κ B), reduced glucocorticoids, increase FFA oxidation	Positive
Leptin	Appetite regulation, increase energy expenditure, lipid oxidation, chronic inflammation	Negative
Resistin	Insulin resistance (decreased AMPK), increase IL-6, and TNF- α secretion, increased glucocorticoids	Negative
IL-6	C reactive protein production, increased secretion of VLDL, inflammation, reduces adiponectin, increases leptin and chemokine	Negative
TNF- α	Increase adhesion molecules, macrophage and inflammatory cell migration, insulin resistance, NF- κ B induction	Negative


From: Obesity, Exercise and Orthopedic Disease. Fyfe, CW et al. Vet Clin Small Anim 46 (2011) 831-841

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Optimize body condition:

Maintain/build muscle mass:


- Minimum 25% animal protein in diet (3g/kg lean body mass)
- Fortetrolin
- Appropriate exercise
 - o Exercise modification
 - o Therapeutic exercise



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Exercise modification:

- ▶ Not cage rest!!!!
- ▶ Pain free movement
- ▶ Easy, fluid, low velocity, low impact, short duration activity proportionate to degree of injury
- ▶ Avoid sudden changes in velocity or direction
- ▶ More frequent but shorter duration



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ACVIM IVDE position statement


- ▶ at least 4 weeks of **restricted exercise** is recommended to promote healing of the annulus fibrosus
- ▶ No off leash walking, no jumping on or off furniture and no access to stairs during this time.



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Therapeutic exercise:


- First work on flexibility and facilitating normal muscle firing patterns
- Strength training once pain is controlled
- Improve "core" strength



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Address underlying causes :

- Just because the back is the part that hurts the most, doesn't mean it started this fight
- Resolve any underlying or concurrent appendicular pain



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Spinal cord dysfunction



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Treating spinal dysfunction:

Goals

- ▶ Use it or lose it – keep firing motor and proprioceptive nerves
- ▶ Maintain comfort (ie; address back and OA pain as previously discussed)
- ▶ Focus on preserving ability to perform ADLs

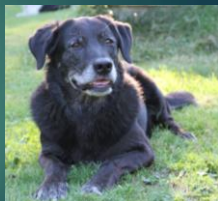


4 dogs of the apocalypse: toilet paper shredding, counter surfing, poops on the back deck, and eats things he shouldn't!

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Treating spinal dysfunction: Acupuncture

- ▶ Neural stimulation
- ▶ Pain modulation
- ▶ Benefits for Hansen type I disease
- ▶ Effectiveness for Hansen type II is unresearched
- ▶ Consider as part of a multimodal rehabilitation program



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Influence of in-house rehabilitation on the postoperative outcome of dogs with intervertebral disk herniation

Michelle M. Hodgson, John M. Bevan, et al.

- ▶ Retrospective study of 248 dogs with Type I IVDD
- ▶ More dogs returned to full neurologic function when in-house rehabilitation was included in the postoperative management (33% compared to 9%)



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Recovery times for dogs undergoing thoracolumbar hemilaminectomy with fenestration and physical rehabilitation: A review of 113 cases

Laura L. Hady and Peter D. Schwarz

- ▶ "Physical rehabilitation improves the recovery in a portion of patients undergoing hemilaminectomy with fenestration for type I TL IVDD"
- ▶ More time in formal rehabilitation ($P < 0.001$) and more underwater treadmill sessions ($P < 0.001$) increased the dog's chances of improvement.



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Daily Controlled Physiotherapy Increases Survival Time in Dogs with Suspected Degenerative Myelopathy

I. Kathmann, S. Cizinauskas, et al.

- ▶ Animals that received intensive physiotherapy had longer survival time (mean 255 days), compared with that for animals with moderate (mean 130 days) or no (mean 55 days) physiotherapy
- ▶ Dogs which received physiotherapy remained ambulatory longer than did animals that did not receive physical treatment



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Treating spinal dysfunction: Therapeutic Exercise



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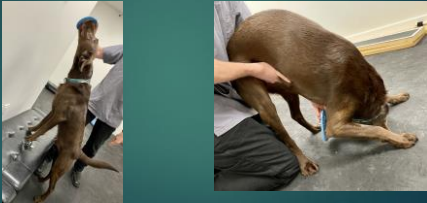
Treating spinal dysfunction: Flexibility Exercises

- ▶ "Cookie Stretches"
- ▶ Side Bends
- ▶ Think of every yoga class speech you have ever heard



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Treating spinal dysfunction: Flexibility Exercises – cat/cow




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Treating spinal dysfunction: Therapeutic Exercise

Maintaining Proprioception

- ▶ ADL activities – walking on variable terrain
 - ▶ Wooded Trails
 - ▶ Urban parkour
- ▶ Cavalettis



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Treating spinal dysfunction: Therapeutic Exercise


Strength Training

- ▶ This needs more “hands on” training to do safely
- ▶ Form and specific muscle activation is important




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Core Fitness: Single leg lifts



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Core Fitness: Isometric balance work



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ADL exercises: Patient intent

- ▶ Stairs and other varied terrain
 - ▶ Assisted stair walks – strength, flexibility and CP
- ▶ Incorporate patient desire



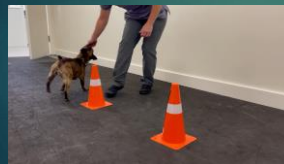
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ADL exercises: Sit or lie to stand



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ADL exercises: Figure 8's & Cavaletti's



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Sideways & backward walking



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Aquatic Exercise



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Treating spinal dysfunction: Husbandry

Household Modifications

- ▶ Ramps
- ▶ Runners
- ▶ Landing pads
- ▶ Elevated food bowls

Patient Modifications

- ▶ Trim toenails
- ▶ Clip foot hair
- ▶ Toe grips
- ▶ Booties

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Assistive devices:

- ▶ Wheelchair/chariot
- ▶ Harness



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Treating Back Pain

Short term:

- ▶ Laser
- ▶ ESWT
- ▶ PEMF
- ▶ Acupuncture
- ▶ Manual Therapy
- ▶ CAMT
- ▶ Pharmaceuticals

Long Term:

- ▶ Therapeutic Exercise
- ▶ Optimize Body condition
- ▶ Address Co-morbidities (OA)
- ▶ Pharmaceuticals
 - ▶ Prevalar/DA options
 - ▶ Muscle relaxants
 - ▶ Palliative epidural

Treating Spinal Dysfunction

Short term:

- ▶ Address musculoskeletal pain
- ▶ Acupuncture to stimulate nerves

Long Term:

- ▶ Managing Environment
- ▶ Therapeutic Exercise
 - ▶ Proprioceptive training
 - ▶ Flexibility exercises
 - ▶ Strength/fitness training

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