


Conservative Management of INTERVERTEBRAL DISC DISEASE (IVDD)




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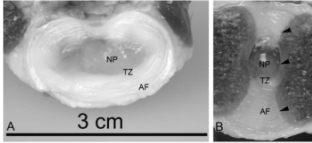
IVDD Conservative Management

- ▶ Topics to be covered
 - ▶ Types of Intervertebral Disc Disease (IVDD)
 - ▶ NON-SURGICAL TREATMENTS



IVDD Conservative Management

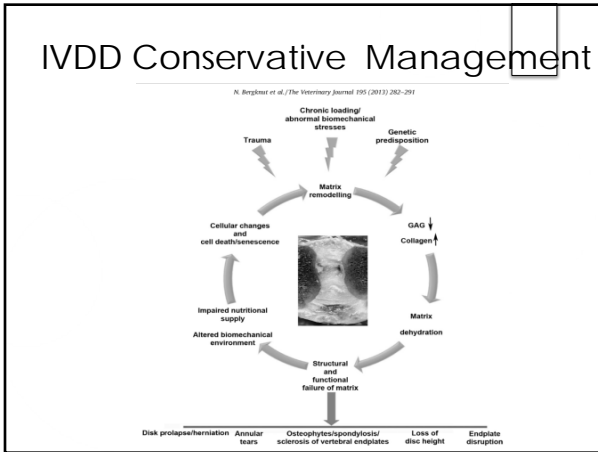
- ▶ Just a little anatomy...
 - ▶ The Intervertebral Disc is composed of a central nucleus pulposus, an outer annulus fibrosus, the transition zone, and cartilaginous endplates.



A 3 cm **B**

Fig. 1. Transverse (A) and sagittal (B) sections through a L5-L6 intervertebral disc of a mature non-chondrodystrophic dog, showing the nucleus pulposus (NP), transition zone (TZ), annulus fibrosus (AF), and endplates (arrowheads). Bergknut et al 2013

Conservative Management of IVDD



IVDD Conservative Management

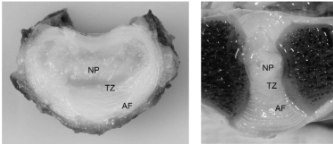
- ▶ Intervertebral Disc Disease (IVDD)
 - ▶ Hansen type 1 IVDD - Chondroid degeneration
 - ▶ Short legged long back dogs
 - ▶ 3-7 years of age,
 - ▶ Cervical or thoracolumbar spine



Smolders et al 2013

IVDD Conservative Management


- ▶ Intervertebral Disc Disease (IVDD)
 - ▶ Hansen type 1 IVDD - Chondroid degeneration
 - ▶ The (transition zone) TZ of newborn CD dogs is relatively wide, occupying most of the annulus fibrosus (AF), and its cells lack orientation
 - ▶ The change from a gelatinous, semi-fluid Nucleus Pulposus to a drier NP can already be observed at 3-4 months of age.



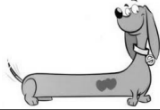
Smolders et al 2013

Conservative Management of IVDD

IVDD Conservative Management




- ▶ Intervertebral Disc Disease (IVDD)
 - ▶ Hansen type 1 IVDD – Chondroid degeneration
 - ▶ By 1 year of age 31.2% of cervical, 62.5% of thoracic, and 43.8% of lumbar Discs in CD dogs show macroscopic signs of disc calcification
 - ▶ Degeneration of the AF in CD dogs always occurs after NP degeneration



Smolders et al 2013

IVDD Conservative Management

- ▶ Intervertebral Disc Disease (IVDD)
 - ▶ Hansen type 1 IVDD – Chondroid degeneration
 - ▶ Spinal cord damage is related to the RATE of extrusion, duration of compression, & amount of extruded material
 - ▶ Mild to severe neurological deficits



IVDD Conservative Management

- ▶ Intervertebral Disc Disease (IVDD)
 - ▶ Hansen type 2: "Fibroid degeneration"
 - ▶ The German Shepherd, Doberman, Rottweiler, Labrador Retriever, Dalmatian
 - ▶ 6–8 years of age,
 - ▶ Caudal cervical or lumbosacral spine, although the thoracolumbar spine can also be affected

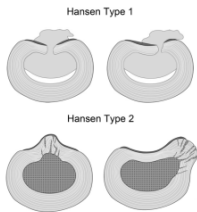


Smolders et al 2013

Conservative Management of IVDD

IVDD Conservative Management

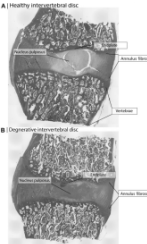
- ▶ Intervertebral Disc Disease (IVDD)
 - ▶ Hansen type 2: "Fibroid degeneration"
 - ▶ Degeneration occurs as described...
 - ▶ A recent study has debunked the myth that Hansen type 2 discs are more Fibroid.
 - ▶ "No fibrocyte-like cells were identified in the NP in any of the Non-Chondrodystrophic and Chondrodystrophic dog samples"
 - ▶ Rather...



Smolders et al 2013; Hansen et al 2017

IVDD Conservative Management

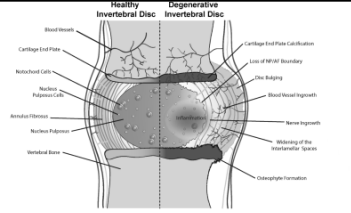
- ▶ Intervertebral Disc Disease (IVDD)
 - ▶ Hansen type 2: "Fibroid degeneration"
 - ▶ RATHER...
 - ▶ The cell types in the Nucleus Pulposus (NP) were either (viable or apoptotic) notochordal cells or chondrocyte-like cells.
 - ▶ And lack of oxygen & blood flow could lead to failure of these cells to thrive...
 - ▶ Leading to disc degeneration



Hansen et al 2017; Risbud & Shapiro 2011

IVDD Conservative Management

- ▶ (IVDD)
 - ▶ Hansen type 2:
 - ▶ As Such...
 - ▶ The process of degeneration is the same (NCD vs CD)...
 - ▶ The degeneration process starts in the Nucleus Pulposus and progresses faster in CD dogs compared with NCD dogs.
 - ▶ "Fibroid degeneration"
 - ▶ BOTH Non-Chondrodystrophic & Chondrodystrophic dogs suffer from:
 - ▶ Chondroid metaplasia




Hansen et al 2017

Conservative Management of IVDD


IVDD Conservative Management

- ▶ Intervertebral Disc Disease (IVDD)
 - ▶ Hansen type 2:
 - ▶ Causes PROGRESSIVE signs of paraparesis, often with some degree of back pain, taking weeks, to months, or sometimes years in development.



IVDD Conservative Management

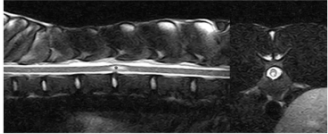
- ▶ Intervertebral Disc Disease (IVDD)
- ▶ ANNPE - Acute Non-compressive Nucleus Pulposus Extrusion
 - ▶ High velocity extrusion resulting in contusion to the spinal cord without sustained compression
 - ▶ Severe, sudden neurological deficits
 - ▶ Affects any breed (& Border Collie...)
 - ▶ Reported only in dogs > 1 year of age
 - ▶ Mean age of 7 years
 - ▶ Associated with exercise or trauma
 - ▶ Vocalization at time of incident



De Riso 2015; DeDecker & Fenn 2018

IVDD Conservative Management

- ▶ Intervertebral Disc Disease (IVDD)
- ▶ ANNPE - Acute Non-compressive Nucleus Pulposus Extrusion
 - ▶ Henke et al, 2013 reviewed 31 medical records & MRI reports of dogs with traumatic disc extrusion.
 - ▶ 71% of the dogs had disc extrusion without evidence of spinal cord compression



Henke et al 2013

Figure 2. T2-weighted MRI of a lumbar (L6/L7) vertebrae exhibiting an ANNPE. Intravertebral a hyperintense signal (1) can be seen over the T12-L13 (2) together with a smaller volume of the remaining NP. The dog had the deep pain perception and recovered.

Conservative Management of IVDD

IVDD Conservative Management

- ▶ Intervertebral Disc Disease (IVDD)
- ▶ ANNPE - Acute Non-compressive Nucleus Pulposus Extrusion
 - ▶ Localization T3 – L3: particularly between T12 – L2
 - ▶ Cervical spine can occur (and does more so than FCEs)
 - ▶ Lateralization occurs in 62 – 65% of cases
 - ▶ Spinal Hyperalgesia is reported in 21 – 57% of dogs with ANNPE



De Riso 2015; DeDecker & Fenn 2018

IVDD Conservative Management

- ▶ Intervertebral Disc Disease (IVDD)
- ▶ HNPE- Hydrated Nucleus Pulposus Extrusion
 - ▶ Extrusion of hydrated nucleus pulposus through a single fissure in the dorsal annulus fibrosus secondary to sudden changes in IVD pressure and biomechanics.
 - ▶ More often in cervical spine
 - ▶ Older dogs (median age: 9 years)
 - ▶ Spontaneous onset
 - ▶ Rarely associated with exercise
 - ▶ Less hyperalgesia than other types

De Decker & Fenn 2018

IVDD Conservative Management

- ▶ Intervertebral Disc Disease (IVDD)
- ▶ HNPE- Hydrated Nucleus Pulposus Extrusion
 - ▶ Rapid improvements after initiation of medical treatment could suggest that spinal cord contusion plays a major role in the pathophysiology of HNPE
 - ▶ The need for surgical intervention is debatable

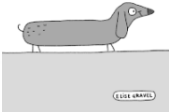


De Decker & Fenn 2018; Borlace et al 2017

Conservative Management of IVDD

IVDD Conservative Management


- ▶ Intervertebral Disc Disease (not-IVDD)
- ▶ FCE - Fibrocartilaginous Embolism
 - ▶ Vascular disease of the spinal cord caused by embolization of spinal vasculature with fibrocartilaginous material histologically and histochemically identical to the nucleus pulposus of the intervertebral disk, resulting in ischemic necrosis of dependent regions of spinal cord parenchyma.



DeRisio 2015

IVDD Conservative Management


- ▶ Intervertebral Disc Disease (not-IVDD)
- ▶ FCE - Fibrocartilaginous Embolism
 - ▶ Generally large / giant breeds & mini Schnauzers
 - ▶ Any age
 - ▶ Lateralization of neuro dysfunction in 53 – 87%
 - ▶ Spinal hyperalgesia is uncommon



DeRisio 2015

IVDD Conservative Management


- ▶ Intervertebral Disc Disease (not-IVDD)
- ▶ FCE - Fibrocartilaginous Embolism
 - ▶ Treatment:
 - ▶ Conservative



DeRisio 2015


IVDD Conservative Management

- ▶ Okay... so it's an IVDD Case...
- ▶ Of some kind...
- ▶ Or an FCE...
- ▶ You need to manage it conservatively
- ▶ What do you do?



IVDD Conservative Management

- ▶ Intervertebral Disc Disease (IVDD)
 - ▶ CONSERVATIVE MANAGEMENT
 - ▶ Physiotherapy / Rehabilitation – (plus Medication)
 - ▶ CAN give good results
 - ▶ For ANNEPE, HNPE, Hansen's Type 2, FCE's or
 - ▶ WHEN surgery is not an option for Hansen's Type 1 IVDD
 - ▶ (Finances, Age, Owner opinions, Medical conditions, etc)




IVDD Conservative Management

- ▶ Intervertebral Disc Disease (IVDD)
 - ▶ CONSERVATIVE MANAGEMENT
 - ▶ Should be GOAL oriented
 - ▶ Should address the underlying pathology
 - ▶ Should address function
 - ▶ Should include routine re-evaluation of the neurologic status of the animal by the therapy provider.

Conservative Management of IVDD


IVDD Non-Surgical Management

- ▶ GOAL # 1
- ▶ Pain Management & Healing of the Disc / Spinal Cord & Reducing Inflammation
 - ▶ Anti-inflammatory OR Corticosteroid
 - ▶ PLUS Adjunctive Pain Medication
 - ▶ Modalities
 - ▶ Laser, Microcurrent, TENS, Heat or Ice
 - ▶ Acupuncture
 - ▶ Manual Therapies
 - ▶ Traction & Mobilizations



IVDD Non-Surgical Management


- ▶ Laser Therapy for PAIN Management
 - ▶ Optimal dosages for pain relief...
 - ▶ Optimum dose per point for an 820-830nm laser was 5.9 Joules
 - ▶ Using a 904nm super-pulsed laser, it was 2.2 Joules.
 - ▶ Number of reps and Rx / week were variable.
 - ▶ Immediate positive effects that can last up to 3 months!



Chow et al 2009

IVDD Non-Surgical Management

- ▶ Laser Therapy for PAIN Management
 - ▶ Optimal dosages for pain relief...
 - ▶ LLLT at high doses (7.5 J/cm²) at the target tissue in the first 72 hours (to reduce inflammation & pain)
 - ▶ Followed by the lower doses (2 J/cm²) at target tissues in subsequent days (to promote tissue repair)




Bjordal et al 2006

Conservative Management of IVDD

IVDD Non-Surgical Management


- ▶ Laser Therapy for Spinal Cord Healing
 - ▶ It helps!
 - ▶ Laser: 810nm x 150mW x 1589 J/cm² daily (administering LLLT for 2997 seconds/day) x 14 days) – Byrnes & Wu studies
 - ▶ Speculated only 6% power penetration to the spinal cord
 - ▶ Laser: 780nm x 250mW x 30 min/day x 14 days
 - ▶ Significantly increased axonal number and distance regrowth.
 - ▶ Suppressed immune cell activation and cytokine/chemokine expression.
 - ▶ Increased the length & number of axons & better functional recovery
 - ▶ Return of some aspects of function to baseline levels.

Byrnes et al 2005; Wu et al 2009, Rochkind et al 2002



IVDD Non-Surgical Management

- ▶ Laser Therapy for Spinal Cord Healing
 - ▶ Decisions about dosing
 - ▶ Only 2.45% of 980nm laser light will reach a deeper nerve when lasering from the surface.
 - ▶ So, laser with HIGH doses!!



Anders et al 2014

IVDD Non-Surgical Management


- ▶ Laser Therapy for Spinal Cord Healing
 - ▶ Dog Study! LLLT after hemilaminectomy for a thoracolumbar disc herniation
 - ▶ 200mW, 810nm x 1 minute per area (5 diode cluster probe) = 12 J/cm²
 - ▶ Median time to walking was 3.5 days in the LLLT group and 14 in the control group



Draper et al 2012

IVDD Non-Surgical Management


- ▶ Microcurrent – Cranial Electrical Stimulation for PAIN Management
 - ▶ Decreases pain intensity for persons with chronic pain secondary to spinal cord injury.



Tan et al 2006

IVDD Non-Surgical Management


- ▶ HEALING
- ▶ Pulsed Electromagnetic Field Therapy
 - ▶ Sparse literature...
 - ▶ Enhances motor recovery in cats after spinal cord injury.



Crowe et al 2003

IVDD Non-Surgical Management

- ▶ TENS for PAIN Management
 - ▶ Different frequencies of TENS produce analgesia via different mechanisms
 - ▶ High Frequency Tens (>80Hz)
 - ▶ Stimulates large diameter nerves & blocks nociceptive activity in smaller nerves
 - ▶ Increases β endorphins & methionin-enkephalins
 - ▶ Low Frequency Tens (<10Hz)
 - ▶ Stimulates release of endogenous opiates
 - ▶ Reduces dorsal horn neuron activity, nociception and the consequent pain



Watson & Lawrence 2016

Conservative Management of IVDD

IVDD Non-Surgical Management

- ▶ Hot & Cold for PAIN Management
- ▶ Heat decreases pain by:
 - ▶ Removal of chemical irritants from nociceptors (reducing pain input to the CNS)
- ▶ Cold affects the body by:
 - ▶ Decreasing the conduction velocity of primary afferent fibres and simultaneously increasing pain threshold and pain tolerance
 - ▶ Reduce muscle tone & spasticity & Vasoconstriction of blood vessels



IVDD Non-Surgical Management

- ▶ Acupuncture PAIN Management & RECOVERY
 - ▶ Electro-Acupuncture might provide some mild benefit in regard to severity of postoperative pain in dogs undergoing hemilaminectomy because of acute thoracolumbar intervertebral disk disease.
 - ▶ A combination of electroacupuncture and acupuncture with conventional medicine is more effective than conventional medicine alone in recovering ambulation, relieving back pain, and decreasing relapse.



Laim et al 2009; Han et al 2010

IVDD Non-Surgical Management

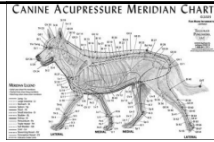
- ▶ Acupuncture PAIN Management & RECOVERY
 - ▶ Electroacupuncture combined with standard Western medical treatment was effective and resulted in shorter time to recover ambulation and deep pain perception than did use of Western treatment alone in dogs with signs of thoracolumbar intervertebral disk disease.
 - ▶ Electroacupuncture was more effective than decompression surgery for recovery of ambulation and improvement in neurologic deficits in dogs with long-standing severe deficits attributable to thoracolumbar IVDD.



Hayashi et al 2007; Joaquim et al 2010

Conservative Management of IVDD

IVDD Non-Surgical Management



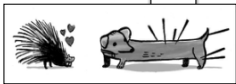
► Acupuncture for PAIN Management & RECOVERY

► POINTS USED

- Two points on the bladder meridian rostral and caudal to the incision, ST36, SP6 and BL60; Alternate Session – GV14, Bai Hui, BL11, BL40, GB34 & 30, and LV3
- Bladder meridian points adjacent to the lesion and bilaterally distantly at GB30, GB34, and ST36.
- SI3, BL62, BL20; BL23; ST36, KI3, BL60; GV1, lumbar Bai Hui, & in some dogs L4 (large intestine) instead of SI3; BL25 (instead of BL20, as local point); and GB30 only for dogs with grade 1 and 2 dysfunction without severe paresis
- BL18, 24, & 40; KI3; GB34; & ST36

Laim et al 2009; Han et al 2010; Hayashi et al 2007; Joaquim et al 2010

IVDD Non-Surgical Management



► Acupuncture for PAIN Management & RECOVERY

► WHY might it work / help to heal?

- Pain reduction (PNS, CNS, ANS, & Endocrine Systems)
- Local increase in circulation
- Mechanotransduction – i.e. Mechanical or electrical force causes biochemical signals
 - Cell migration (bringing in fibroblasts or mast cells)
 - Mast Cell degranulation
 - Fascial system transport of O2, nutrients, & waste

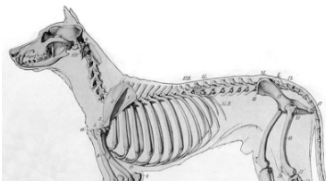
So... you can still have these effects even if you don't do acupuncture!

Fung 2009

IVDD Non-Surgical Management

► Traction for HEALING & PAIN

- Goals: Increase blood flow to the disc & spinal cord



Conservative Management of IVDD

IVDD Non-Surgical Management


- ▶ Traction for HEALING & PAIN
 - ▶ Traction therapy might play an important role in the treatment of acute Neck or Back Pain caused by Lumbar Disc Herniation.
 - ▶ (5X / week for 3 weeks, plus conventional physiotherapy)
 - ▶ Reduced herniation
 - ▶ Reduced pain
 - ▶ Reduced Disability
 - ▶ Improved ROM (lumbar flexion)
 - ▶ No change for back extensor endurance



Karimi et al 2017; Fritz et al 2014

IVDD Non-Surgical Management

- ▶ Traction for HEALING & PAIN
 - ▶ Exposure of herniated disc material to vascular environment (i.e. epidural space)
 - ▶ = resorption and/or regression
 - ▶ Large extruded discs regress more rapidly
 - ▶ Early intervention is most favourable




Auto-Distractor
Automatic pull and release from 5 to 60 seconds

Constantoyannis et al 2002; Malanga & Nadler 1999

IVDD Non-Surgical Management

- ▶ Traction for HEALING & PAIN... Animal Models!
 - ▶ Traction treatment is effective in enhancing nutrition supply and promoting disc cell proliferation of the degraded discs.
 - ▶ Porcine study - In Vitro
 - ▶ Gentle traction helped maintain disc height of degenerated discs, and it might be a potential intervention to slow down the process of degeneration
 - ▶ Rat study In Vivo




Kuo et al 2014; Lai & Chow 2010

Conservative Management of IVDD

IVDD Non-Surgical Management

- ▶ Traction for HEALING & PAIN
 - ▶ In clinic & home program (with detailed instruction)

Neck traction in sternal recumbency



IVDD Non-Surgical Management

- ▶ Traction for HEALING & PAIN
 - ▶ In clinic & home program (with detailed instruction)


Side lying neck traction Traction of neck and skin



IVDD Non-Surgical Management

- ▶ Traction for HEALING & PAIN
 - ▶ In clinic & home program (with detailed instruction)


Tail traction



IVDD Non-Surgical Management

- ▶ Traction for HEALING & PAIN
 - ▶ In clinic & home program (with detailed instruction)

Toe-Touch Hanging Hanging Traction



IVDD Non-Surgical Management

- ▶ Traction for HEALING & PAIN
 - ▶ In clinic & home program (with detailed instruction)



One-man standing traction


IVDD Non-Surgical Management

- ▶ Mobilizations – for HEALING & PAIN
 - ▶ NEUROPHYSIOLOGICAL effects:
 - ▶ Reduce pain
 - ▶ Inhibition of reflex muscle contractions
 - ▶ Hysteresis effect...
 - ▶ Reduce nociceptor activity
 - ▶ Reduce pressure in the joint(s)
 - ▶ Reduces nerve firing to/from joints

Zusman 1986; Katavich 1998; Bjornsdottir & Kumar 1997; Zelle et al 2005; Conroy & Hayes 1998; Sterling et al 2001

IVDD Non-Surgical Management


- ▶ Mobilizations – for HEALING & PAIN
 - ▶ Manual therapy using joint mobilization techniques and flexion-distraction techniques
 - ▶ Improves low back pain
 - ▶ Improves disc height



Choi et al 2014

IVDD Non-Surgical Management

- ▶ Mobilizations – for HEALING & PAIN
 - ▶ In humans... we always incorporate some rotation (Maitland et al 2005)
 - ▶ Benefits may be due to the oblique orientation of the annular rings of the disc.
 - ▶ Rotation would impart a gentle 'stretch' on these structure...



Lift the pelvis via the legs
– at or above the stifle(s)

See video next slide

IVDD Non-Surgical Management

- ▶ Mobilizations – for HEALING & PAIN
 - ▶ Rotations

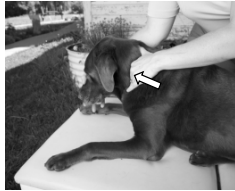


Conservative Management of IVDD

IVDD Non-Surgical Management

► Mobilizations – for HEALING & PAIN

- Use the side of one hand (at the 2nd phalanx) to medially glide the side (transverse process) of one vertebra and then side bend the animals head 'over' your hand and the vertebra.



Cervical Side glides

- Mobilize by rhythmically pushing medially
- Pain free motion only – on either side

IVDD Non-Surgical Management

► Mobilizations – for HEALING & PAIN

- Thoracic mobilizations – Chest Lifts
- Lumbar mobilizations – Abdominal Lifts



IVDD Non-Surgical Management

► Mobilizations – for HEALING & PAIN

- Thoracolumbar or Lumbar FLEXION mobilizations

- With the dog in standing over your knee or leg, or in side lying with your knee placed into the abdomen.

- Passively flex and extend the spine.
- Always within tolerance



Passive flexion in standing



Passive flexion in side lying

Conservative Management of IVDD

IVDD Non-Surgical Management

- ▶ Mobilizations – for HEALING & PAIN
 - ▶ Myofascial Techniques (Stimulating Nerves, Muscles, & Fascia)



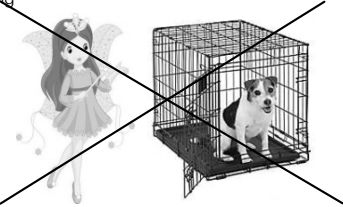
Dog these instead of 'Massage'



IVDD Non-Surgical Management

- ▶ GOAL # 2 – RETRAINING FUNCTION
 - ▶ Neuro Rehab
 - ▶ Strength Training
 - ▶ Coordination Training
 - ▶ Movement

There is no "Crate-Rest-Fairy"...
Get your patients moving!



IVDD Non-Surgical Management

- ▶ RETRAINING FUNCTION
- ▶ Neuro Rehab
 - ▶ To re-establish neural pathways & motor control
 - ▶ Active spinal movement
 - ▶ PNF (Proprioceptive Neuromuscular Facilitation)
 - ▶ Neuro-Developmental Techniques (NDT)
 - ▶ Sensorimotor Techniques
 - ▶ Postural Reactions
 - ▶ Gait training

Conservative Management of IVDD

IVDD Non-Surgical Management

- ▶ RETRAINING FUNCTION
- ▶ Non-painful Active Range of Motion
 - ▶ Cookie exercises



IVDD Non-Surgical Management

- ▣ Functional Training - Neuro Rehab (i.e. PNF)

PNF Patterning:
Do this instead of Passive Range of Motion!



IVDD Non-Surgical Management

- ▣ Functional Training - Neuro Rehab (i.e. PNF)

Compressions & Distractions



Conservative Management of IVDD

IVDD Non-Surgical Management

- ▣ Functional Training - Neuro Rehab – Neurodevelopmental



Volitional movements in different positions



Retrain proper movement patterns (how to get from position to position)

IVDD Non-Surgical Management

- ▣ Functional Training - Neuro Rehab – Neurodevelopmental
 - "Kick backs" – for foot placement training



IVDD Non-Surgical Management

- ▣ Functional Training - Neuro Rehab – Neurodevelopmental



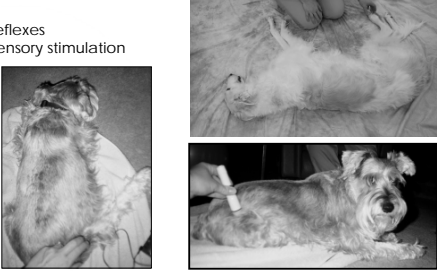


Conservative Management of IVDD

IVDD Non-Surgical Management

- Functional Training - Neuro Rehab (Sensorimotor)

Use of reflexes
Use of sensory stimulation



IVDD Non-Surgical Management

- Functional Training - Neuro Rehab (Sensorimotor)

Whole body shake



IVDD Non-Surgical Management

- Functional Training - Neuro Rehab (Sensorimotor)

Whole Body Vibration - increases blood flow & limb muscles



Galea 2012

Conservative Management of IVDD

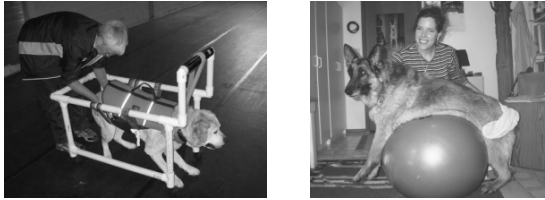
IVDD Non-Surgical Management

- ▣ Functional Training-
Neuro Rehab -
Postural reactions




IVDD Non-Surgical Management

- ▣ Functional Training- Standing Practice



IVDD Non-Surgical Management

- ▣ Functional Training- Standing Practice



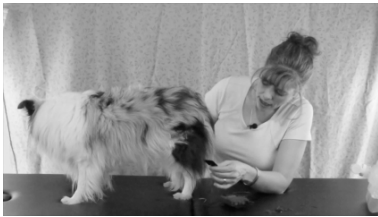
IVDD Non-Surgical Management

- ▣ Functional Training- Standing Practice



IVDD Non-Surgical Management

- ▣ Functional Training- Standing Practice
- Electrical Muscle Stimulation



IVDD Non-Surgical Management

- ▣ Functional Training- Walking Practice
 - REPETITIVE LOCOMOTION Has been shown to improve Brain Derived Neutrophic Factor
 - This helps with pain and function
 - Aids in reducing neuroinflammation



Frank & Roynard 2018

Conservative Management of IVDD

IVDD Non-Surgical Management


- ▣ Functional Training- Walking Practice



The Help 'Em Up Harness
Available in Our Online Store


IVDD Non-Surgical Management

- ▣ Functional Training- Walking Practice



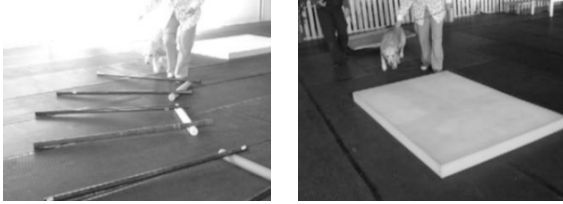
IVDD Non-Surgical Management

- ▣ Functional Training- Walking Practice



IVDD Non-Surgical Management

- ▣ Functional Training- Walking Practice



IVDD Non-Surgical Management

- ▶ Conclusion
 - ▶ Conservative management of Hansen's Disc lesions 1 & 2, ANNEPE, HNPE, & (FCE's) is possible...
 - ▶ Further research is needed...
 - ▶ But now you have a plan!





Thank you for listening!

www.FourLeg.com



Conservative IVDD

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