

## CONSERVATIVE MANAGEMENT OF INTERVERTEBRAL DISC HERNIATIONS IN THE PARETIC DOG

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The prevalence of intervertebral disc disease (IVDD) in our canine companions is a growing concern. A recent paper from the Dog Aging Project, collected data on 27,541 dogs, listing IVDD as one of the 53 most commonly reported medical conditions.<sup>1</sup>

Intervertebral disc disease may also be one of the most distressing conditions for owners. Urgent decompressive surgery is often presented as the most favorable treatment option for recovery with few if any alternatives provided. Owners are trying to understand why their dog has suddenly collapsed and must face the overwhelming decision of whether or not to do an expensive surgery, or even euthanize their pet.

Regardless of whether conservative or surgical management is chosen, owners are often taking home a dog at best with significant neurologic deficits and at worst, paralysis. In addition, they often have little to no guidance on the aftercare of their paralyzed dog.

As physical therapists, we can support owners and their dogs in multiple ways. In addition to restoring mobility, we provide education and ongoing support around the care of these dogs to improve their quality of life. Even if the dog doesn't recover motor function, physical rehabilitation can help to maximize mobility and function. Within this article we will be reviewing the classification of disc related diseases in dogs, the latest in the literature, conservative management and physical rehabilitation for the paretic dog, grades 3-5.

### WHAT IS IVDD?

Intervertebral disc disease is often used to describe several disc-related diseases that affect dogs. It is, however, important to recognize that IVDD refers to degenerative discs that have the potential to be a problem. For example, in chondrodystrophic dogs, we may see degenerative changes in the thoracolumbar discs but no herniations or neurologic deficits.<sup>2</sup> This would fall under IVDD, whereas intervertebral disc herniation (IVDH) refers to a problematic disc where the disc material is displaced towards the spinal cord, resulting in neurologic deficits. There are then different subtypes which are important to know when considering prognosis and treatment planning which can be found in Table 1 on page 62.

### CURRENT LITERATURE

Until recently, decompressive emergency surgery has been considered the superior course of treatment for non-ambulatory

dogs with acute thoracolumbar disc herniations, and for good reason. The research shows about 90% of dogs that are deep pain positive (DPP) walk again after surgery. The proportion of deep pain negative (DPN) dogs that recover with surgery is between 55 and 60%.<sup>8-10</sup>

The critical timing of surgery is a little more controversial as recommendations come from small retrospective studies that primarily did surgery within a 48-hour window. Studies that have looked at the duration of DPN dogs have been unable to find a relationship between time and outcome.<sup>9</sup>

The fear that DPP dogs will deteriorate to DPN impacts many decisions around treatment. According to Freeman and Jeffery, in an opinion paper in 2022, the evidence that a dog DPP will lose deep pain is mixed. Again, we don't have any solid evidence for DPN dogs, the timing of surgery, or probable outcomes.<sup>8</sup>

The only consistently strong prognostic indicator remains whether a dog is DPP or DPN at the assessment time. When deep pain is present, it is considered a positive indicator of motor recovery.

Dr. Paul Freeman, MA VetMB, CertSAO, DipECVN, MRCVS, is the Principal Clinical Neurologist at the University of Cambridge and lead investigator of the Cambridge IVDD Research Group. They investigated the outcome of non-surgical management of 70 dogs with Hansen Type 1 herniations with very promising results. In the 'Spring 2023 Update', Dr. Freeman stated that almost 100% of the dogs with DPP retained sensation and recovered motor function, and of the dogs that were DPN, about 50% recovered without surgery. This has been unheard of in previous literature and is very close to the estimated chance of recovery of DPN dogs with decompressive surgery.<sup>6,11</sup>

A live virtual event in 2024 was hosted by this author that provided the opportunity to talk with Dr. Freeman. During the interview, he discussed one DPN dog with conservative management who hadn't recovered motor function. Decompressive surgery was performed one month after the onset of the injury. The dog walked independently 3 days post operatively. Dr. Freeman's research suggests that many dogs with IVDD can recover without surgery. Concern of the condition progressing is the focus of many clinical decisions and recommendations, yet if many recover without surgery, much remains to be studied.<sup>11</sup>

### CONSERVATIVE MANAGEMENT OF THE PARALYZED DOG

Where does this leave us when an owner comes into our practice with a dog with paralysis after opting out of surgery? In this author's experience, I have treated several non-surgical cases of the various subtypes, with the majority regaining motor function. Notably, in this author's opinion, there is a significant gap in the education regarding aftercare of the paretic and paraplegic dog for owners, regardless of recovery. Owners are given very little guidance regarding caring for a recumbent dog, especially for incontinence. Physical rehabilitation and its benefits are not often discussed.

**Table 1.** Subcategories

IVDE- Hansen Type 1 Excursion
<ul style="list-style-type: none"> <li>• Degenerative disc, nucleus pulposus calcifies and herniates</li> <li>• Compression and contusion of the spinal cord</li> <li>• Primarily chondrodystrophic dogs between 3-7 years but can occur in all breeds</li> <li>• Genetic markers</li> <li>• Onset- acute/sub-acute over days and very painful</li> <li>• Usually significant pain in the neck or back. Most common in the thoracolumbar region</li> <li>• Often affects both pelvic limbs</li> <li>• Conservative management is usually recommended for grades 1 &amp; 2, and surgery for grades 3-5. We will be discussing new research related to this in the following section. Table 2 references the grading of disc injuries<sup>5</sup></li> </ul>
IVDP - Hansen Type 2 Protrusion
<ul style="list-style-type: none"> <li>• Middle-aged and senior dogs, typically medium to larger breeds. Chronic progressive cases</li> <li>• Degenerative changes in the disc result in a weakening of the annulus fibrosis, creating a bulge</li> <li>• Spinal cord compression. Sometimes asymptomatic. Pain is usually mild</li> <li>• Some evidence that surgical cases have better long term outcomes however is difficult to localize as several discs may be degenerative. This is compounded by the older age of the dog and comorbidities. Conservative management may be preferred</li> <li>• Presentation is more commonly asymmetrical but can affect both pelvic limbs</li> </ul>
HNPE Hydrated Nucleus Pulposus Extrusion
<ul style="list-style-type: none"> <li>• Rupture of annulus fibrosus and extrusion of hydrated disc material</li> <li>• Onset is acute and pain is usually mild</li> <li>• Primarily contusive spinal cord injury. Can create some spinal cord compression</li> <li>• More common in the cervical region but can also occur in the thoracolumbar region</li> <li>• Evidence supports both surgery or medical management</li> </ul>
ANNPE Acute Non-Compressive Nucleus Pulposus Extrusion
<ul style="list-style-type: none"> <li>• Rupture of annulus fibrosus</li> <li>• Extrusion of nucleus pulposus under high pressure</li> <li>• Acute onset. The owner will often say they heard their dog yelp, and then they had difficulty walking, but nothing seemed painful.</li> <li>• Majority of cases are asymmetrical. This can appear initially like a CCL tear</li> <li>• No spinal cord compression or contusive injury. Thoracolumbar region</li> <li>• Non-surgical, conservative management, prognosis is good</li> <li>• Progression of symptoms is rare</li> <li>• Border collies over represented in this condition</li> </ul>
Fibrocartiliginous Embolism
<ul style="list-style-type: none"> <li>• Usually medium to larger breed dogs</li> <li>• Disc material is present in the blood supply to the spinal cord. It creates a temporary blockage, resulting in a localized spinal cord region becoming ischemic</li> <li>• Usually affects young to middle-aged large-breed dogs. However, dogs of any breed or age can be affected. Miniature schnauzers and shelties are over-represented</li> <li>• Asymmetrical presentation</li> <li>• Can occur anywhere in the spine and is non-painful</li> <li>• Treatment is conservative, and prognosis is usually good</li> </ul>
Adapted from <sup>2-6</sup> .

**Table 2.** 5-Point Scale: Originally Developed by Ian Griffiths, but Modified by Wheeler and Sharp

0: Normal
1: Pain only, no dysfunction
2: Ambulatory paresis (weakness) with or without pain. May have mild proprioceptive deficits
3: Non Ambulatory paraparesis: total loss of voluntary movement in the affected limbs (and/or tail)
4: Non-ambulatory paraplegia (no voluntary movement) with intact deep and superficial pain sensation
5: Non-ambulatory paraplegia (no voluntary movement) absent deep pain sensation
Adapted from <sup>7</sup> .

Further to this point, the ability to manage the condition at home, especially in cases where the dog is incontinent, impacts the potential for recovery. According to Graner et al., “Appropriate care of the lower urinary tract system in dogs after spinal cord injury is critical because this can affect quality and timing of recovery of function and the future life of the animal.”<sup>12</sup>

The approach to treatment should be goal-oriented for these dogs and include a thorough evaluation and ongoing re-evaluations.

In the early stages, when the dog is exhibiting little to no motor function, rehabilitation focuses primarily on reducing pain and promoting healing. This may include modalities, acupuncture, gentle manual therapy, PNF movements, and neurological re-education of movement. Note - Canadian physiotherapists who are appropriately certified can perform acupuncture. In the United States, acupuncture is performed by veterinarians or an acupuncturist under the supervision of a vet. As the dog begins to regain motor function, reflexes, and movement patterns are used to promote functional movement.<sup>12,13</sup>

Within this process, education is provided on homecare, activity restriction, mobility aids, and toileting. Hygiene and toileting are one of the most stressful aspects of taking care of a recumbent dog. While our therapies can often improve and restore bladder function, we must address management immediately. Many owners do not know how to express their dog’s bladder or the appropriate frequency. Lack of knowledge regarding toileting and hygiene puts these dogs at higher risk for urinary tract infections, pyelonephritis, and urine scald.<sup>12</sup>

## HOMECARE AND HYGIENE

For bladder expression, recommendations vary every 3 to 6 hours during waking hours.<sup>12</sup> This can be done from various positions, including lateral recumbency onto a pee pad, supported standing, or even in a wheelchair. A successful technique for dogs regaining bladder control is to take the dog outside to their preferred “pee spot” and express the bladder there. This is retraining a reflexive behavior to mark over scents, so it can help to have another dog urinate there first.

Hygiene trims are recommended for dogs with longer fur, and belly bands for male dogs can be useful to keep them clean and dry.

Education about feeding to maintain a healthy body weight is essential, as well as providing plenty of access to fresh water.

## BEDDING AND POSITIONING

Egg crate-type memory foam or orthopedic beds help to disperse body weight. For cases with high risk for pressure sores, a wheelchair-type cushion designed to alleviate pressure sores is recommended. To further reduce risk, the dog should be repositioned every 4-6 waking hours to relieve pressure on bony prominences. The skin should be checked daily for injuries and signs of pressure sores. Positioning the dog in functional postures with props/pillows can help restore normal movement patterns using the premise of the neurodevelopmental sequence technique. Supporting the dog for very short periods in an upright, weight-bearing posture, either over a peanut or in a wheelchair, has aided in restoring motor function in this author’s experience. Especially when combined with passive exercises like approximations, rhythmic perturbations, and bicycling with flexor withdrawal.

## MOBILITY AIDS

In the early stage, a full support harness, such as the Help ‘Em Up Harness, promotes good body mechanics for the owner and functional positioning for the dog, making transfers safer. Owners should be taught to keep it clean and dry. A trick for incontinence is to use a maxi-pad or incontinence pad on the pelvic support pad to absorb moisture. Peanut balls and some sensory mats are useful for getting dogs upright for posturing, exercise, and even hygiene. Mobility and traction aids for slippery floors can include various socks, figure 8 wraps, and toe up devices to aid in gait retraining. Early introduction of a dog wheelchair as a gait training aid can be quite useful. Wheelchairs need not be saved as a last resort or for dogs who are fully paralyzed.

In addition, canine rehabilitation and therapeutic exercise may commence during the crate rest period, which the veterinarian often prescribes. The time for crate rest varies and is prescribed by the veterinarian. The ACVIM consensus statement recommends at least 4 weeks of restricted activity, allowing only for rehabilitation exercises and outdoor toileting.<sup>15</sup>

## CASE STUDY - HARVEY

Harvey was a 3-year-old French bulldog who presented with acute onset Hansen Type 1 disc herniation at T12-13. At the onset, he was non-ambulatory, parietic, withdrawal and patellar reflexes were hyper reflexive, and the bladder was tonic.

Harvey began acupuncture 3 weeks post-injury with a local veterinarian and began physical rehab 4 weeks post-injury. He presented non-ambulatory paraparesis, absent conscious proprioception, normal withdrawal, patellar reflex hyper, and extensor tone present. While Harvey was non-ambulatory, he was initiating hip flexion. He appeared to have discomfort at T12-13. Harvey was also incontinent of urine, and they were using belly bands.



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Goals at this stage were primarily focused on reducing pain, promoting healing, early mobilization, integration of reflexive movements, and normalizing tone.

Early rehab - PEMF bed, LLLT, NMES on either side of the spine, toe touching traction, shoulder stretches, PNF patterns pelvic limbs, supported standing with perturbations, joint approximations, bicycling with facilitation, supported positioning in sternal and sitting.

## LIFESTYLE MANAGEMENT

A toileting routine with bladder expression every 4 hours while awake was implemented. A Help em Up Harness and socks for paw protection were recommended.

Within 2 weeks, Harvey was ambulatory with proprioceptive ataxia, max support needed. The focus shifted to motor learning and restoring functional movement. Exercises focused on core stabilization and using reflexes to aid in gait retraining. NMES was used on the gluteals and hamstrings during gait training. Home exercises included supported walking on non-skid flooring, with the aid of a homemade "Bikko" brace using theraband and soft hair elastics.

A Wiggleless back brace and an Assisi loop for home use were introduced after Harvey slipped outside and showed signs of pain. LLLT was used and he was referred back for a recheck with his veterinarian. The Wiggleless was used for about 2 months to help with central stability during unsupported ambulation. As function improved, an emphasis was put on increasing pelvic limbs strength and cardiovascular endurance.

Harvey is 2.5 years post initial injury and has recovered well with no further recurrences of paresis or pain.

## CONCLUSION

There are lots of treatment options for dogs with IVDD and IVDH, and there is a lot we are still learning. Canine physical rehabilitation can play a significant role in promoting healing and restoring motor function. Rehabilitation therapists can help restore mobility even without full motor function, providing dogs with a good quality of life and, in all cases, providing support and education to the owner.

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