

## **Intervertebral Disc Disease**

Intervertebral disc disease (IVDD) is one of the most common spinal cord conditions in the dog. Cats are less commonly affected. The spine is composed of bones called vertebrae. The vertebrae form a canal that surrounds the spinal cord. Between adjacent vertebrae there are discs (intervertebral discs) composed of a fibrous outer portion (annulus fibrosis) and a gel-like center (nucleus pulposus). These discs act as cushions between vertebrae and provide strength and stability to the spine. IVDD is a general term that refers to the condition in which the intervertebral disc protrudes from its normal anatomic location, usually as a result of degeneration of the disc. This herniation of the disc results in compression of the spinal cord. Three types of IVDD occur in the dog: Type I occurs with degeneration of the disc (primarily the nucleus pulposus) caused by loss of water content and calcification (mineralization). The nucleus pulposus may extrude out of the annulus fibrosis toward the spinal cord. In Type II, degeneration of the disc causes it to bulge or protrude into the spinal canal. Type III is a noncompressive herniation in which a small amount of disc material moves at high velocity into the spinal cord, resulting in spinal cord injury.

The age, breed, onset of clinical signs, and treatment options vary with the type of IVDD: Type I primarily affects young to middle-aged (3-6 years) dogs with short legs and long backs, such as the dachshund, Lhasa apso, shih tzu, beagle, cocker spaniel, and corgi. Onset of signs is typically sudden. Type II primarily affects older, large-breed dogs such as the German shepherd dog and the Labrador retriever. Onset of clinical signs is often slow, over weeks to months. Dogs with type III IVDD have a sudden onset of clinical signs. Neurologic signs are dependent on the location of disc herniation and the degree of spinal cord injury. Signs often occur in stages: Mild compression or injury may only cause pain. More severe compression or injury causes an unsteady gait, crossing over of the legs when walking, scuffing of the nails, and weakness. As the spinal cord injury worsens, the animal loses the ability to move the legs (paralysis) and may have difficulty urinating voluntarily. With the most severe injuries, affected animals are unable to feel a deep, painful stimulus applied to their toes. Some dogs progress

through these stages of neurologic dysfunction rapidly, whereas other dogs experience only pain. Because prognosis and treatment options vary with each level of neurologic dysfunction, it is important for affected animals to be examined by a veterinarian at the onset of clinical signs. The degree of spinal cord compression does not always correlate well with the severity of the signs. Dogs with acute onset of signs may have severe neurologic problems despite mild compression of the spinal cord. In dogs with slow onset of signs, compression can be severe but only mild to moderate neurologic problems occur. Dogs with pain as the only sign can have severe compression of the spinal cord. Compression of the spinal cord in the neck region causes signs in all four legs, whereas compression in the chest or back region causes signs in only the hind legs. Disc herniation can occur anywhere along the vertebral column; however, the thoracolumbar area (end of the chest and beginning of the back) is the site most commonly affected.

IVDD may be suspected based on history and neurologic findings; however, additional tests are required to confirm IVDD and allow appropriate treatment planning. X-rays may indicate IVDD, but they can be normal and do not provide enough information to plan surgical treatment. Myelography is an x-ray study that involves injecting a dye into the cerebrospinal fluid (CSF) that surrounds the spinal cord. This study can demonstrate spinal cord compression, but it is not specific for IVDD, and a swollen cord may hide the location of the disc herniation. Computed tomography (CT scan) can identify the site of disc herniation and can be combined with myelography. Magnetic resonance imaging (MRI) is the best imaging modality to evaluate the spinal cord and intervertebral discs, and it provides enough details to plan appropriate treatment. If surgical treatment is pursued, a myelogram, CT, or MRI is often needed, and all of these procedures require general anesthesia.

Treatment of intervertebral disc disease (IVDD) consists of conservative and surgical therapies. The degree and duration of the neurologic signs are important factors when deciding among treatment options. Conservative therapy can be tried in dogs if mild pain and incoordination are the sole clinical signs; that is, the dog can walk but with an unsteady gait (ataxia). Dogs with Type III IVDD may also

be treated conservatively, because often little to no compression of the spinal cord is present. Conservative therapy consists of exercise restriction, anti-inflammatory drugs, and pain medications. Exercise restriction involves strict confinement and limited leash walking (only for the purpose of urinating and defecating). Dogs should not be allowed to run, jump, or play during their confinement. Exercise restriction typically lasts 4-6 weeks and is followed by a gradual return to normal activity over an additional month. Anti-inflammatory drugs, such as nonsteroidal anti-inflammatory or steroid medications, can be used. These two classes of drugs are not used together because of their combined side effects. Pain medications may be used to alleviate discomfort. Surgical therapy is usually chosen in dogs with severe neurologic problems, such as moderate to severe incoordination, weakness, inability to walk, paralysis, or pain that is unresponsive to medications. Surgery is also considered in dogs whose signs recur. Surgery involves the removal of herniated, compressive disc material followed by exercise restriction as outlined for conservative therapy. Surgery may require removal of a portion of the vertebra at the site of compression to provide access to the spinal canal. After removal of the bone, the disc material is delicately removed from within the spinal canal to relieve spinal cord compression. Postoperatively, the animal is strictly confined for 4-6 weeks. Manual emptying of the bladder may be needed if the dog cannot urinate voluntarily. Good nursing care is important until the dog can walk well by itself. Pain and anti-inflammatory medications may also be used after surgery. It is critical to monitor for any decline in neurologic function or pain during the recovery period. Notify your veterinarian if any signs recur.

Recovery time varies depending on the onset (acute versus chronic) and severity of the clinical signs. Typically, time to recovery for dogs treated with surgery is 1-2 weeks. Severely affected dogs may require months to regain function of their legs and bladder; however, dogs treated conservatively may also require 1-2 weeks to regain function. Some severely affected dogs do not regain the ability to walk again, and some have persistent urinary incontinence. Carts (similar to wheelchairs) have been developed to assist dogs that are unable to walk. Maximal improvement occurs in the majority of dogs by 3 months after the

initial injury to the spinal cord. Further improvement after this time is unlikely. Periodic rechecks are often needed throughout this period.

Most dogs with only mild to moderate pain or mild neurologic signs return to normal function with conservative therapy. Prognosis for more severely affected dogs treated with conservative therapy is poor. Dogs that are managed with surgery have a good prognosis for return to normal function even if they initially have moderate to severe neurologic signs. As long as the dog can still perceive a painful stimulus applied to the affected legs, and even if the legs are paralyzed, there is a reasonably good chance that normal function will be regained with surgery. The prognosis is very poor (guarded) for dogs that are paralyzed and unable to perceive a painful stimulus in their legs. If treated surgically within the first 24 hours after onset of paralysis, dogs unable to perceive deep pain have a 50% chance of regaining the ability to walk. If left untreated for longer than 48 hours, these dogs have a grave prognosis for regaining the ability to walk and for having control of their bladder. Recurrence of clinical signs suggestive of another intervertebral disc herniation can happen in some dogs. Recurrence is most likely within 2 years after the first episode and tends to occur more often in dogs that were managed conservatively.