

## **CANINE INTERVERTEBRAL DISC DISEASE**

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There are 26 intervertebral discs in the dogs' spinal column. The disc is similar to a jelly donut and is composed of two distinct regions. The inner gelatinous part is called the nucleus pulposus, and the outer fibrous part is called the annulus fibrosus. The discs act as shock absorbers for the spinal column.

### Types of discs:

There are two types of discs. One is a **chondrodystrophoid** disc. These discs degenerate rapidly when the dogs are young. The most common age for this disc problem is between 3 and 7 years. Chondrodystrophic breeds of dogs (Dachshunds, Cocker spaniels, Beagles, and Bassets) are more likely to have disc disease in their lifetime with Dachshunds having the highest risk. The second type of disc is called **non-chondrodystrophoid**, it is also known as a fibroid disc. These discs degenerate slowly over time. They may become clinically significant at 8-10 years of age.

**Disc disease is one of the most common neurological problems seen in dogs.** Other names for this problem include slipped disc, ruptured disc, herniated disc, and prolapsed disc.

### Types of disc disease:

There are two categories of disc disease. **Type I** disc herniation refers to an extrusion of the nuclear material. This usually occurs in an acute and severe manner. The majority of this type of herniation occurs in the chondrodystrophic breeds. It can also occur in any breed of dog with extreme activity or trauma.

**Type II** disc disease refers to a protrusion or bulging of the annulus. Type II protrusions are usually seen in fibroid degenerating discs. This type is usually slow and insidious. It generally occurs in large breed dogs.

### Spinal cord trauma:

The spinal cord is sensitive to trauma. When spinal cord trauma occurs secondary to an acute Type I disc, it must be addressed as quickly as possible to minimize the damage to the spinal cord. The damage to the spinal cord may be reversible depending on the length of time and progression of clinical signs. The type of therapy will depend on the degree of clinical signs. Minor trauma with minimal clinical signs may respond well to medical therapy and exercise restrictions. Moderate and severe trauma needs surgical intervention to allow the spinal cord to recover. If the damage to the spinal cord is not reversed, the spinal cord may die. When this happens the spinal cord becomes myelomalacic (liquefied). Myelomalacia is an irreversible process. It is always best to have your dog evaluated by a neurologist to determine if surgery is the best option.

### Location of disc disease:

The majority (85%) of type I disc disease occurs in the thoracolumbar area (middle back) while 15% occur in the cervical area (neck). The onset of clinical signs may be within minutes, hours, or even days. The signs may be rapidly or slowly progressive or they may remain the same after the initial trauma. A neurological exam can assess the degree of spinal cord damage and the neurologist can recommend the best therapy for the situation.

Spinal pain is one of the first clinical signs of disc disease. Spinal pain may resolve with medical therapy and exercise restriction. Some dogs will have recurrent episodes of spinal pain. Surgical intervention may be necessary to alleviate chronic, unresolving, spinal pain.

### Clinical signs:

**Ataxia** (wobbliness) can develop with mild damage to the spinal cord. These dogs may recover with medical therapy and the prognosis is usually good. If the clinical signs progress, these dogs will need surgical intervention.

Moderate damage to the spinal cord will cause **paresis** (weakness). Although these dogs are weak, they can still move their legs. The prognosis can still be good to great especially if surgical therapy is instituted.

Paresis can progress to **paralysis** where the dog is unable to move its legs. The presence of paralysis carries a guarded to good prognosis depending on therapy. Rapid surgical intervention is needed if the spinal cord is to regain normal function. These dogs can return to normal within weeks of surgery.

Some paralyzed dogs will **lose superficial and deep perception of pain**. This is the worse case scenario. If the animal is to regain function, surgery must be performed immediately. If the animal has lost deep pain perception for over 24-48 hours, the chances of spinal cord recover are low. If an animal has lost deep pain perception for days to weeks the chance of recovery is almost nil. Irreversible damage (death of the spinal cord) may have occurred in this time frame.

Most dogs with cervical disc disease have **neck pain**. They show a reluctance to move their neck, reluctance to lower their head to eat or drink, tight or trembling neck muscles, and crying out when the head or neck is touched. Some dogs will have a front leg lameness associated with the disc disease. Other clinical signs such as ataxia, paresis, or paralysis can be present.

Most dogs with thoracolumbar disc disease will have **back pain**. They may have an arched back or cry if they are picked up. The front legs are normal. Other clinical signs may be present depending on the severity of the disc disease. Dogs may be ataxic, scuff their toenails, or drag their back legs.

### Diagnosis:

Intervertebral disc disease is suspected based on the history and neurological examination. The compressed area of spinal cord can not be seen on a plain x-ray. A special imaging test such as a myelogram, myelogram-CT, or an MRI (described below), is needed to definitively diagnose the location of the herniated disc. All myelograms, CTs and MRIs are performed under anesthesia. Blood work and chest x-rays are performed prior to the imaging tests to ensure the patient is healthy to undergo anesthesia. The findings from the myelogram, CT scan, and MRI are used to plan surgery.

A **myelogram** is a series of x-rays taken of the spine before and after a contrast (dye) injection. An iodinated contrast material is injected into the fluid space around the spinal cord. An outline of the spinal cord is seen on the post-contrast x-rays. The area of spinal cord compression by the herniated disc material is also seen.

A **myelogram-CT** is where a CT scan is performed after the myelogram. The CT is done of the specific area of interest denoted by the myelogram to gain more information for surgical planning.

An **MRI** is a series of pictures taken without x-rays. An MRI uses a large magnet, radio waves, and a computer. The pictures from the MRI are very precise and the magnetic fields used are not known to be harmful. The entire spinal cord (inside and outside), spinal nerves, discs, and surrounding spinal structures are seen with an MRI.

### Decompressive surgery:

Surgery is performed to relieve the compression of the spinal cord. The surgery site is determined by the results of the myelogram, CT or MRI. A window is drilled in the bone of the spinal canal, and the disc material is removed from under and around the spinal cord and spinal nerve. A surgery called a '**ventral slot**' is usually performed in the cervical (neck) region, while a '**hemilaminectomy**' (back) is performed in the thoracolumbar region.

Sometimes disc **fenestrations** are performed. This is a prophylactic procedure to reduce the incidence of disc herniations at a later date although it is not a guarantee. A small window is cut in the disc and the inner portion (nucleus pulposus) is removed with special instruments. Fenestrations are usually performed in the cervical region from C2-C3 (second and third cervical vertebrae) through C5-C6 or C6-C7. Fenestrations are usually performed in the thoracolumbar region from T11-T12 (eleventh and twelfth thoracic vertebrae) to L3-L4 (third and fourth lumbar vertebrae).

Almost all dogs with neurologic signs secondary to acute disc herniation will improve with surgery. Decompressive surgery should be performed as soon as possible to stop the progression of spinal cord injury and permit the patient to recover quickly. Dogs that are paralyzed and have lost superficial and deep pain sensation should have surgery right away. The prognosis for recovery decreases dramatically even with surgery, if deep pain sensation is lost for more than 24-48 hours.

### Post-operative care:

All paralyzed dogs need to be kept well padded after surgery and turned every 4-6 hours to prevent decubital ulcers (pressure sores). The bedding needs to be kept clean and dry to protect the dogs from lying in urine and getting urine scald. The bladder needs to be emptied properly 3-4 times a day until the animal is able to urinate on his or her own. Some dogs will develop urinary tract infections because they are not emptying their bladder completely. A urine culture should be done and the correct antibiotic started.

Dogs that can move their legs need to be carried outside to urinate and defecate. They can be assisted to walk with a towel or a padded sling. They should be strictly confined for the first two weeks after surgery to allow the surgery site to heal. The dogs should not be allowed to run, jump, play, or go up and down stairs.

The dogs can go on short harness walks during the 3<sup>rd</sup> and 4<sup>th</sup> weeks after surgery. Most dogs can return to normal activity during the 5<sup>th</sup> and 6<sup>th</sup> weeks after surgery. Jumping on and off the furniture should be discouraged long term.

### Physical therapy:

Physical therapy is instituted in all post-operative cases. It is very helpful in dogs with severe clinical signs to keep the muscles and joints mobile. Owners can perform massage and passive range of motion exercises (**PROM**) at home. Flexing and extending the legs gently for 5-10 minutes twice a day is recommended.

**Hydrotherapy** (swimming) is a great form of therapy because the limbs can move in the water without having to support the weight of the dog. Most small dogs can swim in a bathtub or Jacuzzi if the water is at the correct temperature. Large dogs will need to swim in a heated pool. Physical therapists for animals offer a variety of rehabilitation services.

### Recovery:

The length of recovery varies with the severity of the damage to the spinal cord. Recovery can be very quick (within 1-2 weeks) or it can be prolonged (3 to 6 months). Generally most dogs will improve within the first 4 weeks. Improvement in neurological function is usually not seen after 6 months.