

Intervertebral Disc Disease

ABOUT THE DIAGNOSIS

In animals, as in people, the vertebral column (spine) is the part of the skeleton that extends from the skull to the pelvis. Along its entire length, the structure of the vertebral column is like a two-tiered bridge. The upper level of the bridge contains the spinal cord, made up of sensitive nerve fibers that carry information between the brain and the rest of the body, especially the limbs. The lower level is made up mainly of bone (vertebral bodies) that are connected to each other by cartilaginous shock absorbers called the intervertebral discs. These discs contain a gel-like center that is normally very flexible, and a more firm outer shell. Over time, the discs can degenerate and mineralize and bulge into their surroundings, putting pressure on the spinal cord. Ultimately, the intervertebral disc can rupture, equivalent to eruption from the lower deck of the bridge into the upper deck. Intervertebral disc rupture is a sudden and very painful occurrence that propels parts of the disc material into the area surrounding the spinal cord and causes spinal cord inflammation and injury. Symptoms such as pain, weakness, and even paralysis can occur as a result of this rupture process, called intervertebral disc extrusion. The entire spectrum of intervertebral disc degeneration, bulging, and extrusion/rupture is referred to as intervertebral disc disease (IVDD).

IVDD can occur as a chronic (disc bulges chronically over time and may exude disc material slowly) or acute (disc ruptures suddenly) condition. The symptoms an animal feels depend on the time frame, severity, and location of the spinal cord injury. IVDD is rare in cats.

Chondrodystrophic breeds of dogs (breeds with short legs and a long body) such as the dachshund or Pekingese are prone to IVDD because their body shape adds chronic stress to the spine and because genetically they have a higher occurrence of problems with cartilage degeneration, such as the cartilage within intervertebral discs. These dogs most commonly have sudden symptoms at a young age (2 to 7 years). Sometimes, these dogs will show symptoms immediately after jumping down from a bed or out of a car, which is the precipitating event that causes an intervertebral disc to rupture. Therefore, as part of preventing potentially harmful effects of IVDD, it is wise to always avoid letting dogs of these breeds jump in a way that causes strain on the spine.

IVDD often occurs between the thoracic (rib cage) and lumbar (lower back) sections of the spine—the *thoracolumbar (TL) region*. In this typical region of IVDD injury, the disc problem affects the spinal cord in such a way that the front legs are normal, but the hind legs are affected. There may be back pain, and the dog may show symptoms such as squealing when he/she moves or is picked up. When IVDD is present (whether an intervertebral disc has ruptured or even if it is only bulging), the hind legs may appear weak or unbalanced, and the animal typically walks with a clumsy or “drunk”-looking pattern of movement in the hind legs. This is called hindlimb incoordination or *ataxia*. In more severe cases, the hind legs may be partially or completely paralyzed. There may be loss of bladder control and even loss of pain sensation, which is a poor prognostic indicator (indicates a worse outlook for long-term recovery): the body preserves its ability to feel pain as one of the last functions of nerves, so the loss of pain sensation usually occurs only when there has been very severe (but not necessarily entirely permanent) nerve or spinal cord damage.

Other sites of intervertebral disc degeneration in IVDD can include the cervical (neck) spine and the lumbar (lower back, closer

to the tail) spine. The different locations of injury will result in different problems and particular symptoms. For example, IVDD in the neck region can result in weakness or paralysis in all four legs, but most commonly an animal exhibits neck pain.

To confirm IVDD over other spinal disorders and to determine the location of the lesion, your veterinarian will need to collect a complete medical history from you about your pet, asking you questions about the symptoms you observed, how long the symptoms have been present, whether any types of physical activity make them worse, whether the symptoms have affected other vital functions such as appetite, and so on. A complete physical exam and a specific neurologic exam will help identify the location and severity of the problem. These steps are essential to determine if IVDD is the most likely cause of the symptoms or if any of dozens of other types of diseases (that produce similar symptoms but require different treatments) may be present. During the neurologic examination, your veterinarian will observe your pet’s mental status and gait (manner of walking) to rule out disorders involving the brain. He or she will test the balance and sensation in all four limbs and will palpate the spine to localize back pain. To test for pain sensation in the limbs, the toes are pinched. Your dog may pull back his/her leg as a **reflex** but should also react (turn the head) if a pain **response** is present. Withdrawing the limb does not by itself mean that your dog can feel pain. This distinction—knowing whether an animal with symptoms of IVDD can feel pain—is an important indicator of the severity of the problem and may indicate future outcome and likelihood of recovery (see below).

Other important tests include:

- **Blood work**—to help rule out other diseases.
- **Radiographs** (x-rays)—may show abnormalities of the spine, such as compression of the disc space or mineralization, but x-rays alone do not show the spinal cord nor confirm IVDD.

Some tests require referral to a surgical or neurologic facility, and at least one of these, and usually a combination of CSF tap and *any one* of the other 3 (myelogram or CT scan or MRI) is necessary to confirm IVDD:

- **Myelogram**—a special series of x-rays taken under general anesthesia, which make the spinal cord appear on the x-ray. This is possible because radio-opaque dye is injected around the spinal cord, which then can outline the site of damage.
- **CSF tap**—while the dog is under anesthesia, a sample of CSF (cerebrospinal fluid) is collected if other diseases such as meningitis are suspected as the cause of the symptoms.
- **CT scan or MRI**—advanced, noninvasive scans (same as in humans) but which also require general anesthesia in dogs and cats. These are routinely preferred over myelograms (if facilities are available) because of clearer images and lower patient risk.

LIVING WITH THE DIAGNOSIS

Initially, your pet may be in pain, and this is difficult for any pet owner or family member. The veterinarian will often administer medication to your dog including pain relievers, antiinflammatories, or muscle relaxants to control the pain. Some of the testing necessary to confirm IVDD requires general anesthesia (CT/MRI/myelogram, CSF tap), and your veterinarian will discuss the benefits and drawbacks of the options that are available, notably referral to a veterinary neurologist or veterinary surgical specialist. Some of the treatments are also extensive and costly (surgery) or lengthy (physical rehabilitation), and you will need to decide what is best for your

family and for your pet, given your veterinarian's assessment of the condition at hand.

Based on the diagnostic tests and neurologic assessment, your veterinarian will determine a **prognosis**, which is an anticipated outlook for recovery. This is to determine whether there is a reasonable chance of return to function or whether it appears that extensive permanent damage has been done. No two dogs have exactly the same prognosis, so it is important to hear what the veterinarian's assessment is and to decide based on anticipated likelihood; there are no guarantees for dogs recovering from spinal cord injury, just as there are no guarantees for people in the same condition. Some general guidelines can help. For example, the functions of balance, motor control (ability to move the leg[s]), and pain sensation are lost in that order during a spinal injury. Therefore, if your dog cannot feel pain in his or her limbs, it generally means that a severe spine injury has occurred, and the outlook for complete recovery is, on average, less promising than if pain perception remains intact.

You may be faced with the possibility that your dog's injury will result in permanent spinal damage. This can include weakness or paralysis of the hind or all limbs and loss of bladder or bowel control. *Under any circumstance*, it is difficult to accurately predict the outcome of many cases, and your veterinarian will be able to give only a rough idea of whether a full recovery is possible. Dogs vary tremendously in their ability to recover, and in many cases, the only way to know for sure whether recovery is possible is to proceed with treatment (including surgery, if necessary) and nursing care and observe any progress over the next 2 to 6 weeks. The spinal cord can take weeks to recover. Gradual improvement is often seen over a period of months; you must be prepared for a long-term commitment if you choose to treat the injury.

In the worst case scenario, it is worth remembering that paralysis of the back legs does not mean the end of a dog's life. Many dogs, particularly small breeds, can lead happy lives without the use of their hind legs. There are special wheeled carts available for mobility; or amazingly, some dogs manage to walk on their front legs alone. Although you may have to help your dog with toilet functions (see below) or to get around, many families opt to continue living with their pets even with complete paralysis of the hindlimbs. However, if your dog is a larger breed (heavier to carry), is paralyzed in all four limbs, or if your lifestyle or budget cannot accommodate the type of very intensive, sometimes costly, and energy- and time-consuming home care required by a paralyzed dog, you may face some difficult choices regarding treatment versus euthanasia (humanely putting the dog to death).

TREATMENT

Treatment options vary according to the severity of the injury, based on symptoms and your veterinarian's assessment of symptoms. In mild cases, *nonsurgical treatment* may be best:

- Antiinflammatory medication is given by injection or orally.
- Muscle relaxants or pain relievers may also be prescribed.
- Side effects of the above medications can include increased thirst and urination (accidents in the house), sedation, and gastrointestinal bleeding (blood in feces or vomit). Advise your veterinarian if these occur.
- Strict cage rest. It is very important to keep your dog quiet and confined for a period to be determined by your veterinarian (often weeks). This allows the intervertebral disc to stabilize and the spinal cord to heal.

In more severe cases, in repeat episodes, or if nonsurgical management is not successful, **surgery** may be required. The surgeon must localize the lesion precisely by administering general

anesthesia and performing a myelogram or advanced scan such as a CT or MRI. A laminectomy is a spinal operation that is performed at the location of the ruptured intervertebral disc to remove the displaced disc material. This involves making a tunnel through the bone surrounding the spinal cord. This allows the cord to expand without pressure and allows the surgeon to remove any disc material in the spinal canal. The surgeon may also "fenestrate" (make small windows in the adjacent intervertebral discs) other sites as a prevention against future episodes.

Other types of treatment are also being better recognized. *Acupuncture* has been shown to offer pain relief and may help regeneration of the spinal cord but does not relieve pressure on the spinal cord nor does it replace surgery for sudden and/or severe cases. *Physical rehabilitation* is also beneficial but must be adjusted carefully and performed meticulously to avoid worsening the condition. Exercises, massage, stretching, and swimming may be performed in special clinics or at home.

Last, but not least, *home care* is a very important part of recovery. Helping a paralyzed dog to recover may include:

- Turning him/her regularly to avoid bedsores and providing soft, dry bedding.
- Stretching and range of motion exercises to keep his/her legs limber.
- Swimming in a bathtub or pool to help strengthen limbs.
- Carrying outside to urinate and defecate.
- Expressing the bladder or bowels. Some dogs with IVDD initially are unable to urinate or defecate on their own. You may have to squeeze the belly gently to help empty the bladder. If it is necessary to do this, your veterinarian or veterinary technician should show you the proper procedure. Some dogs require this for a short period (during recovery), while in others this level of care is lifelong.

DOs

- Follow your veterinarian's instructions regarding medication, recheck appointments, physical rehabilitation, and postoperative care.
- Ask your veterinarian sincerely about the likelihood of complete recovery with treatment (including surgery) in order to decide on a plan that is realistic and fair.
- Enforce strict cage rest if advised by your veterinarian. Even if your dog seems to feel better after taking medication, it is important to restrict activity. Failure to do this is the most common reason for the problem to worsen or recur.
- Observe your pet carefully for progression of symptoms—either improvement or worsening—and report these to your veterinarian at the time of recheck.
- Keep your dog clean and dry. If he/she is unable to control bladder function, you may need to give frequent baths and provide fresh bedding. Trimming the hair around the hind end, especially of female dogs, will help prevent painful rashes (urine scald).

DON'Ts

- Do not allow short-legged dogs to jump from beds, sofas, or vehicles.
- Do not allow your dog to become overweight since this can increase the risk for IVDD.

WHEN TO CALL YOUR VETERINARIAN

- If you observe any of the symptoms listed below, contact your veterinarian. In some cases, the spinal cord can deteriorate with time, so it is important to get a diagnosis and treatment quickly (immediately if symptoms of leg incoordination or weakness are

sudden or seem to be progressing on the scale of minutes or hours).

- For a dog that is being cared for at home, contact your veterinarian if you are unable to follow the instructions provided or if you notice worsening of clinical signs.

SIGNS TO WATCH FOR

Any of these could be the first indicators of deterioration of IVDD in a previously healthy dog, or signs of recurrence/relapse in a dog known to have had IVDD in the past:

- Back pain—crying or resentment (turning to nip or bite) when moving neck or when petted, brushed, or lifted up.
- Change in personality—seems apathetic or won't play.
- Change in gait—walking stiffly or “hunched up,” seems unbalanced or drunk, drags toes on ground, seems weak.
- Sudden total paralysis—*this is an emergency, and you should contact your veterinarian immediately*

ROUTINE FOLLOW-UP

- Some dogs make a full recovery quickly, but most dogs with IVDD require long-term management involving physical rehabilitation and ongoing home care. IVDD often necessitates a large commitment in terms of emotions, physical labor, and expense.

ADDITIONAL INFORMATION

- Other diseases can present with similar symptoms and be much less serious or much more serious. These include fibrocartilagenous embolism, meningitis or infection, tumors of

the spine, and certain orthopedic conditions. Therefore, dogs that are suspected of having symptoms caused by IVDD need tests performed to confirm IVDD and to avoid recommending or performing the wrong treatment.

- Future episodes of IVDD can occur at other sites in the spine, and as an owner of a dog with IVDD, it is important for you to be vigilant of recurrent symptoms for the life of your dog.
- Many IVDD-affected dogs lead nearly normal lives, even with neurologic deficits like hind leg weakness or paralysis.

Other information that may be useful postoperatively: “How-To” Client Education Sheets:

- How to Perform Range of Motion Exercises
- How to Provide General Postoperative Care at Home
- How to Monitor a Surgical Incision during Healing



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