INTERVERTEBRAL DISK 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 disks. These disks contain a gel-like center that is normally very flexible and a more firm outer shell. Over time, the disks can degenerate and mineralize and bulge into their surroundings, putting pressure on the spinal cord. Ultimately, the intervertebral disk can rupture, equivalent to eruption from the lower deck of the bridge into the upper deck. Intervertebral disk rupture is a sudden and very painful occurrence that propels parts of the disk 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 disk extrusion. The entire spectrum of intervertebral disk degeneration, bulging, and extrusion/rupture is referred to as intervertebral disk disease (IVDD).

IVDD can occur as a chronic (disk bulges chronically over time and may exude disk material slowly) or acute (disk ruptures suddenly) condition. The symptoms an animal feels depend on the severity and the 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 disks. These dogs most commonly have sudden symptoms at a young age (2 to 7 years). Sometimes, the animal shows symptoms immediately after jumping down from a bed or out of a car, which is the precipitating event that causes an intervertebral disk to rupture. Therefore, as part of preventing deterioration of IVDD, it is wise to 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 disk 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 disk 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 gait in the hind legs. This is called hind limb incoordination or ataxia. In more severe cases, the hind legs may be partially or completely paralyzed. There may be loss of bladder control and pain sensation.

Other sites of intervertebral disk 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 determine a diagnosis and the location of the lesion, your veterinarian will need to collect a complete history, asking you questions about the symptoms you observed, how long they 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 discern the location and severity of the problem. These are essential to help determine if IVDD is likely as the 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 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 or cry out) 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 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 disk space or mineralization.

Some tests require referral to a surgical or neurologic facility:

• **Myelogram**—a special series of x-rays taken under general anesthetic, which make the spinal cord appear on the x-ray. Radio-opaque dye is injected around the spine, 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 tests also requiring general anesthesia.

**Living with the Diagnosis**

Initially, your pet may be in pain, and this is difficult for any owner. The veterinarian will often administer medication to your dog including pain relievers, anti-inflammatories, or muscle relaxants to control the pain. Some of the testing necessary to confirm IVDD is invasive (myelogram, CSF tap), and your veterinarian will discuss the benefits and drawbacks of the options that are available. 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. The functions of balance, motor control, and pain sensation are lost in that order during a spinal injury. Therefore, if your dog cannot feel pain in his limbs, it generally means that a severe spine injury has occurred, and it is less likely that motor function (ability to walk) will be recovered.

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 are very variable 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 days to 2 to 3 weeks afterward. The spinal cord can take weeks to recover and may never completely return to normal function. 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. 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.

**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:

• Anti-inflammatory 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 disk 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 disk to remove the displaced disk 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 disk material in the spinal canal. The surgeon may also “fenestrate” (make these small windows in the adjacent bone) other sites as a prevention against future episodes.

Other types of treatment are also being recognized. Acupuncture has been shown to offer pain relief and may help regeneration of the spinal cord but does not 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 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, physiotherapy, 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:
  - Back pain-crying 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, CONTACT YOUR VETERINARIAN IMMEDIATELY.

**Routine Follow-Up**

- Some dogs make a full recovery quickly, but most dogs with IVDD require long-term management involving physiotherapy and home care. This disease 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 this 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.