

Degenerative Disk Disease in Dogs

The spinal cord is one of the most important and most sensitive organs in the body. If it is traumatized, its cells may not regenerate; and injuries often result in permanent damage, though there is some repair that can take place over weeks to months. Therefore, the spinal cord is protected in a very special fashion. It goes through a bony canal within the spine where it is surrounded by protective bone everywhere except over the disks. This extreme protection reflects its importance and its fragility.

Disks are rubber-like cushions between the vertebrae. They allow the back to move up and down and sideways without allowing contact between the bones of the spinal column, which would be painful.

Contributing Factors

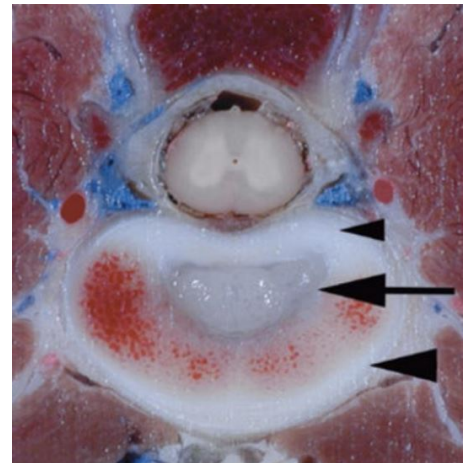
Most owners report that a disk rupture occurred following a traumatic event, such as a relatively small jump or fall. Although this act is frequently blamed for the disk rupture, if the disk had not already been degenerating, the rupture many times would not have occurred. Disk ruptures can also occur for no apparent reason, or as a result of severe trauma to a healthy disk. Disk ruptures are also called “slipped disks” or “herniated disks.”

Prevalence

Disk disease is most often considered to be a spontaneous event that is greatly affected by genetic factors. Certain breeds, notably the Dachshund, Poodle, Pekingese, Lhasa apso, and Cocker Spaniel, have a high incidence of disk disease. Large breeds, such as the German Shepard, Labrador Retriever, and Doberman Pinscher, also have disk disease. Though it is more common in the breeds listed, it can occur in any breed.

What Causes Disk Disease?

The disk is composed of two parts. The outer covering is much like a thick shell. It is comprised of tough fibers that protect and contain the central part (designated by the two black triangles in the photo at right). These fibers are thinnest at the top, an area located just below the spinal cord. The central part of the disk has the consistency of thick toothpaste and is much softer than the outer part (designated by the black arrow in the photo at right).



When the outer shell degenerates, it allows the central part of the disk to escape. This is called a disk rupture. Since the shell is thinnest near the spinal cord, disk material that escapes almost always goes upward, putting pressure on the cord. Because the spinal cord is encased within its bony canal, it cannot move away from the pressure and it becomes pinched or compressed.

Symptoms

The spinal cord is much like a telephone cable that is carrying thousands of tiny wires. When it is crushed, transmission of information through some or all of the wires is stopped. Pressure on the spinal nerves results in pain; pressure on the spinal cord results in pain and/or loss of information transmission. This results in paralysis or partial paralysis.

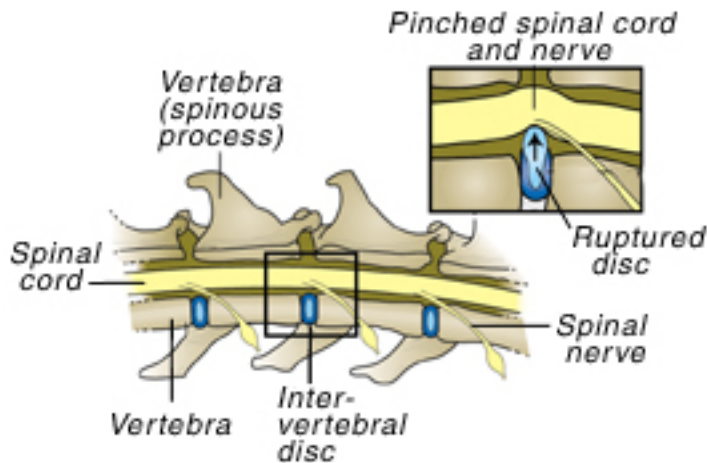
Most disk ruptures occur in the middle to lower part of the back. However, they may also occur in the neck. If paralysis affects all four legs, the disk rupture must be in the neck. Because of the way the nerve tracts are arranged in the spinal cord, disk ruptures in the neck may affect the rear legs first or even exclusively in the dog, and may affect the front legs exclusively in the cat. Neck Disk problems cause the pet to be reluctant to move the head relative to the body, so they move head, neck and body as a block

rather than turning the head to one side or the other. Rather than turning the head, they may just move the eyes, carry the head in a low position or even be reluctant to move at all. One of the most common causes of crying out in pain for seemingly no reason is neck or back pain. Symptoms of lower back pain might include rear leg weakness, rigid abdomen, standing in a hunched posture, pain when picked up, reluctance to move. Disk problems anywhere in the neck and back can result in loss of urine and/or bowel control.

Disk degeneration usually occurs relatively slowly, i.e., over several days or weeks. But symptoms can occur all of the sudden, when the disk finally blows. If the disk ruptures, the dog usually experiences pain and becomes reluctant to move. It may lie around for a few days allowing the body to resolve the problem, often without the owner being aware that a problem existed. Disks may also rupture very slowly. Some dogs will go from normal walking to total paralysis in less than one hour. Others will develop gradual weakness over days, weeks, or even months.

Ruptured disks can put pressure on nerves as they exit the spinal canal. This is called a “pinched nerve” because the nerve pressure can cause shooting pains to go down any of the legs, resulting in lameness in that leg or even carrying the leg (a “root signature”).

Diagnosis



A presumptive diagnosis of disk disease is made based on the dog's history of neck or back pain, incoordination when walking, or paralysis. The neurologic examination will indicate that the problem originates from the spinal cord, giving further evidence to disk disease. Another important factor is the breed. If the dog is one of the high incidence breeds, the diagnosis is even more likely.

In some cases, plain radiographs (x-rays) may assist the diagnosis, but they may also be normal since neither the disk nor the spinal cord are always visible. If the diagnosis is in doubt or if

surgery is to be performed, a myelogram, CT Scan or MRI may be done. A myelogram involves injecting a special dye around the spinal cord. It is a more old fashioned way of imaging the spine that is no longer very often done. When radiographs are taken, the dye will be seen outlining the spinal cord. A break or disruption in the continuity of the dye column means that there is pressure on the spinal cord. A myelogram is performed with the dog under general anesthesia. Just like a CT scan or MRI. CT Scan and MRI are rarely done on dogs or cats in general practice – they are usually done by specialists.

It is possible that pressure on the spinal cord is due to a blood clot or a tumor. Both are possible but not very common, especially when compared to the frequency of disk ruptures. If the breed of dog is correct for disk disease, there has been a sudden onset, and there has been no trauma, there is about a 95% chance that a disk rupture is causing the pressure. However, the diagnosis may not be definite until the time of surgery, if that is done.

The purpose of the myelogram, CT or MRI is to identify pressure on the spinal cord. If this advanced imaging is normal, there is no pressure on the spinal cord. This has several important implications. First, it means that surgery will generally not be appropriate because the purpose of surgery is to relieve the pressure from the cord. Second, it means that one of the following conditions is likely to exist.

1. **Spinal Shock.** This is a temporary loss of spinal function that is generally associated with trauma. It occurs suddenly and is somewhat like a concussion of the brain. It may leave permanent damage, or full recovery may occur. Recovery from spinal shock generally occurs within a few hours to a few days.

2. *Fibrocartilagenous Infarct or Embolism (FCE)*. In this condition, a small amount of disk material ruptures and gets into one of the blood vessels leading to the spinal cord. As the vessel narrows, the disk material obstructs it, depriving a certain segment of the spinal cord of its blood supply. Without proper blood supply, that segment of the spinal cord quits working, resulting in paralysis. Surgery will not help these dogs because there is no pressure on the spinal cord. Often, paralysis involves only one rear leg, one rear leg is more severely affected than the other, or paralysis occurs mainly in both front and rear limbs on the same side. Complete recovery may occur in a few days to weeks, or there may be permanent damage to a portion of the spinal cord. Diagnosis of fibrocartilagenous infarct/embolism is based on the correct clinical signs and a normal imaging. Confirmation requires a biopsy of the spinal cord so the diagnosis is confirmed only with an autopsy – that is not usually done, as very few of these dogs have to be humanely euthanized (put to sleep).
3. *Degenerative Myelopathy*. This condition means that the spinal cord is slowly dying. It results in progressive paralysis that begins with the dog dragging its rear feet as it walks. This is called “knuckling over” and results in the toenails of the rear feet being worn because they drag the ground with each step. It progresses to weakness of the rear legs, then paralysis. It generally takes several weeks before paralysis occurs, and it generally occurs in large breeds of dogs, especially German Shepherds. Because there is no successful treatment and paralysis includes loss of urine and bowel control, euthanasia is generally recommended eventually. Diagnosis of degenerative myelopathy is based on the correct clinical signs on neurologic exam, especially in a large breed of dog, and normal imaging. Confirmation requires a biopsy of the spinal cord so the diagnosis is confirmed only with an autopsy.

Treatment

Treatment of disk disease is based on the stage of the disease.

- **Stage I** disk disease produces mild pain and is usually self-correcting in a few days, and no treatment is necessary.
- **Stage II** disk disease causes moderate to severe pain in the neck or lumbar (lower back) area.
- **Stage III** disk disease causes partial paralysis (paresis) and results in the dog walking in staggering or uncoordinated movements.
- **Stage IV** disk disease causes paralysis but the ability to feel is present.
- **Stage V** disk disease causes paralysis and loss of feeling. These stages tend to overlap in some dogs, and dogs may move from one stage to another over a period of hours to days.

Dogs with **Stage II and III** disease are usually treated with anti-inflammatory drugs, pain relievers, and restriction from exercise. Surgery may be considered if the pain or incoordination persists for a prolonged period of time or if the neurological status declines from one day to the next. It is important that the dog not receive pain medication unless total confinement to a crate or cage is enforced. If the pain sensation is taken away, the dog is more likely to progress to total rupture of the disk. The length of confinement will vary among different dogs, but is usually a minimum of 2 weeks.

Dogs with **Stage IV** disease have the best prognosis with surgery, although a some will recover without it. Dogs with **Stage V** disease should have surgery, and the sooner that surgery is performed the better the prognosis. If at all possible, these dogs should be operated within the first 24-48 hours of the onset of paralysis. However, when surgery is done later, it can still be helpful.

The goal of surgery is to remove pressure from the spinal cord. If the disk rupture occurs in the lower back, a window is made in the side of the vertebral bone to expose the spinal cord. This window allows removal of disk material and relieves pressure from the cord. If the disk rupture occurs in the neck, a window is made in the bone exposing the spinal cord. This may be done either from the top or the bottom, depending on the situation and the training of the surgeon.

Following surgery, your dog will be hospitalized for 3-7 days. Bladder and bowel control are often lost when the dog is paralyzed, so it is best for control of these functions to return before going home. However, it is generally best not to extend hospitalization beyond 7 days because regaining the ability to walk partly depends on exercise and motivation. Since motivation is such an important part of the

recovery process, visitation is encouraged beginning the day after surgery. Please ask about scheduling your visits. Within a week of back or neck surgery, the patient should be transferred either to physical therapy for rehab, or home for ongoing physical therapy for weeks or months to come.

Hospital Discharge

If paralysis was present before surgery, your dog may not be able to walk when it is discharged from the hospital. You will be given detailed instructions on the procedures that should be performed. Recovery is dependent on four factors: whether or not permanent damage was done before surgery, if the surgery was performed promptly, physical therapy performed at home, and the motivation of your dog. You will be instructed on ways to achieve the last two. Most dogs who return to walking do so within the first 30-60 days after surgery. However, with extensive physical therapy, it is possible for dogs to begin walking up to a year or more after surgery, or in some cases even with no surgery at all.

If your dog is overweight, achieving ideal body weight can be very important to preventing recurrence of neck or back problems. If this is a problem with your pet, please ask your vet about a weight reduction plan.

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