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DEGENERATIVE DISC DISEASE

What is a disc, and what is its purpose?

The spinal cord is one of the most important and most sensitive organs in the body. If it is damaged the nerve cells do not regenerate but are replaced with fibrous tissue. Thus injuries usually result in permanent damage. Therefore, the spinal cord is protected in a very special fashion. It goes through a bony canal within the spine; it is surrounded by protective bone everywhere except over the discs. This extreme protection reflects its importance and its fragility.

Discs 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.

What does it mean for a disc to rupture, and how does it happen?

The disc is composed of two parts. The outer covering is much like a thick shell. It is comprised of tough fibres that protect and contain the central part. It is thinnest at the top; this thin area is located just below the spinal cord. The central part of the disc has the consistency of thick tooth paste; it is much softer than the outer part.

When the outer shell degenerates, it allows the central part of the disc to escape. This is called a disc rupture or "slipped" ruptured disc. Since the shell is thinnest near the spinal cord, disc 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.

Degenerative disc disease causes spontaneous degeneration of the outer part of the disc, resulting in escape of the central part. It is not related to injury, although trauma can cause discs to rupture. It is also not related to age. Most dogs with degenerative disc disease are 3-7 years old. It is just a spontaneous event that is most likely controlled by genetic factors. Certain breeds, notably the Dachshund, Poodle, Pekinese, Lhaso Apso, and Cocker Spaniel have a high incidence of disc disease. Other breeds, such as the German Shepherd and Doberman also have disc disease but with a lower incidence. Many breeds never have degenerative disc disease.

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Most owners report that a disc rupture occurred following some kind of traumatic event, such as a relatively small jump or fall. Although this act is frequently blamed for the disc rupture, if the disc had not already been degenerating, the rupture is unlikely to have occurred.

How does a slipped disc affect the spinal cord?

The spinal cord is rather like a telephone cable that is carrying thousands of tiny wires. When it is crushed, transmission of information through the wires is stopped. When the disc degenerates and ruptures, a similar event occurs. The central part is forced upward, putting pressure on the spinal cord and/or the nerves that leave the spinal cord over the discs (i.e. spinal nerves). 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 disc ruptures occur in the middle to lower part of the back. However, they may also occur in the neck. The former often causes paralysis without severe pain; the latter often causes severe pain without paralysis. If paralysis affects all four legs, the disc rupture must be in the neck. Because of the way the nerve tracts are arranged in the spinal cord, disc ruptures in the neck may affect the rear legs first or even exclusively.

How fast do discs degenerate and rupture?

Disc degeneration usually occurs relatively slowly, i.e. over several days or weeks. 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. However, discs may also rupture very acutely. Some dogs will go from normal walking to total paralysis in less than one hour.

How is a slipped disc diagnosed?

A presumptive diagnosis of disc disease is made based on the dog's history of neck or back pain, uncoordinated walking, or paralysis when there is no history of trauma. The physical examination will indicate that the problem originates from the spinal cord, giving further evidence to disc 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 disc nor the spinal cord are visible on x-ray. If the diagnosis is in doubt or if surgery is to be performed, a myelogram may be done. This procedure involves injecting a special dye around the spinal cord while the dog

is under anaesthetic. When radiographs are taken, the dye will be seen outlining the spinal cord. A break in the dye column means that there is pressure on the spinal cord at that point.

How do you know if the pressure on the spinal cord is due to a disc or something else?

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

Are all disc ruptures treated with surgery?

Not necessarily. Treatment is based on the stage of the disease. Stage I disc disease produces mild pain and is usually self-correcting in a few days. Stage II disc disease causes moderate to severe pain in the neck or lumbar (lower back) area. Stage III disc disease causes partial paralysis (paresis) and results in the dog walking in staggering or uncoordinated movements. Stage IV disc disease causes paralysis but the ability to feel is present. Stage V disc 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 mat be treated with strict cage rest and pain relievers. Surgery may be considered if the pain or lack of coordinated movements persists after 4-7 days of treatment or if the neurological status declines from one day to the next. It is important that the dog does not receive pain relief unless total confinement to a crate or cage is enforced. If the pain sensation is taken away completely, the dog is more likely to progress to total rupture of the disc and total paralysis. The length of confinement will depend upon several factors.

Dogs with Stage IV disease should have surgery, although a small percentage will recover without it. Dogs with Stage V disease should have surgery, and the sooner that surgery is done, the better the prognosis. If at all possible, these dogs should be operated on within the first 24 hours of the onset of paralysis.

What is the purpose of surgery?

The goal of surgery is to remove pressure from the spinal cord. If the disc 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 disc material and relieves pressure from the cord. If the disc 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 veterinary surgeon's preference.

What is the success rate for treating disc disease with and without surgery?

Stage	Recovery without Surgery	Recovery with Surgery
I: up to 1 week	80-90%	90-95%
II: past 1 week	60-70%	90-95%
III	30-40%	85-95%
IV: up to 3 days	< 25%	85-95%
IV: past 3 days	< 20%	60-70%
V: up to 24 hours	< 5%	50%
V: past 24 hours	< 5%	<20%

When will we know if the surgery is successful?

When surgery is completed, we hope to achieve two things. First, the dog should be recovering from the anaesthetic. Secondly, the disc rupture should be located and the pressure relieved from the spinal cord. However, the return of walking ability and relief from pain may not occur for several days, or even weeks, so success cannot be determined immediately.

When can my dog go home?

Following surgery, your dog will be hospitalised for several days. Bladder and bowel control are often lost when the dog is paralysed, so it is best for control of these functions to return before going home. However, it is generally better not to extend hospitalisation 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 often encouraged beginning a few days after surgery. Your veterinary surgeon will discuss this aspect with you.

However 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 has relieved all the pressure quickly enough physical therapy performed at home, and the motivation of your dog. You will be instructed on ways to achieve the last two.

Can my dog slip a disc again?

The answer is "yes". However, more than 95% of degenerated discs will heal without surgery. So the chance of your dog needing surgery a second time is less than 5%.

What if the myelogram is normal?

The purpose of the myelogram is to identify pressure on the spinal cord. If the myelogram 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. **Fibrocartilaginous Embolism**. In this condition, a small amount of disc material ruptures and gets into one of the blood vessels leading to the spinal cord. As the vessel narrows, the disc 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 dies, 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, or one rear leg is more severely affected than the other. 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 fibrocartilaginous embolism is based on the correct clinical signs and a normal myelogram. Confirmation requires a biopsy of the spinal cord so the diagnosis is confirmed only with an autopsy.

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 toe nails 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 Shepherd dogs. Indeed it is often known as German Shepherd Dog, or Alsatian Disease. There is no successful treatment and ultimately paralysis can include loss of urine and bowel control, and although no pain appears to be involved, euthanasia has to be considered.

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A normal myelogram in a dog with slowly progressive paralysis is very frustrating because the two most likely diseases (numbers 2 and 3) cannot be confirmed without an autopsy.