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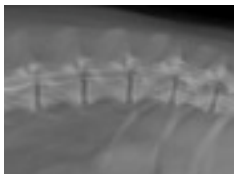
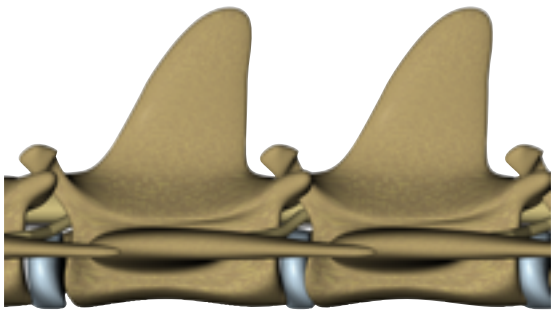


Disc Extrusion in the Dog

Your dog has been presented with clinical signs that are suggestive of disc disease. This handout is intended to answer some of the questions that you may have about the condition, how we will investigate the problem and how we may manage the problem.

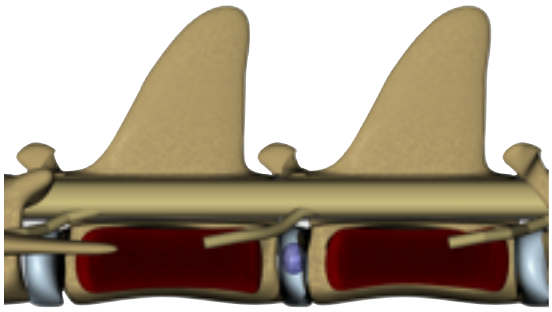
What is the Spinal Column?

The spinal column is a series of back bones interposed by fibrous discs. Each back bone or vertebra has a solid lower section (the body) and a hollow bony tube at the top. The spinal cord is housed in the protective environment of the hollow tube. There are also bony projections that act as anchor points for the muscles (see below).



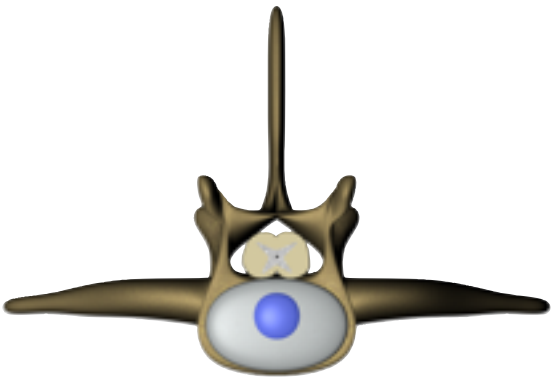
What is a disc?

A disc in this sense means a soft structure between the bones of the spine (vertebrae). It is designed to permit flexibility of the spine in three dimensions whilst ensuring that the flexibility is controlled, the disc is also a shock absorber. Each disc is exactly the same in terms of its structure. In some senses you can think of the disc in a young dog as being like a jam doughnut. There is a blob of jelly in the centre of a dense fibrous capsule. The flexibility and shock absorbing capacity of the disc is largely dependent upon the liquid nature of the gel in the centre. The image below shows a cut away of the back bone to reveal the disc and spinal cord.



How does disc disease occur?

There are breeds such as Dachshunds, Shih Tzu, Lhasa Apso and so on that are called chondrodystrophoid breeds. This means that they have been genetically pre programmed to have shortened limb bones relative to their body (Queen Anne Legs). The same gene that produces this distinctive appearance also causes early dehydration of the gel in the centre of the disc, such that by the time one of these dogs is 12 months old, they have discs that are similar to those of an eight year old German Shepherd (for example). As the centre of the disc is no longer gel like, the shock absorbing nature of the disc is reduced. Now the



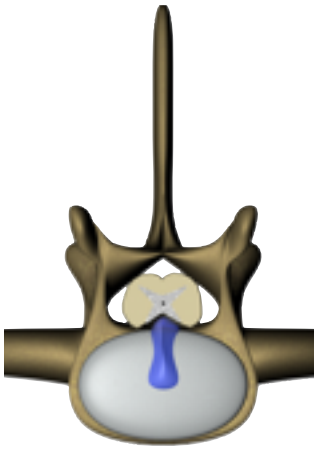
stress and strain of normal movement is

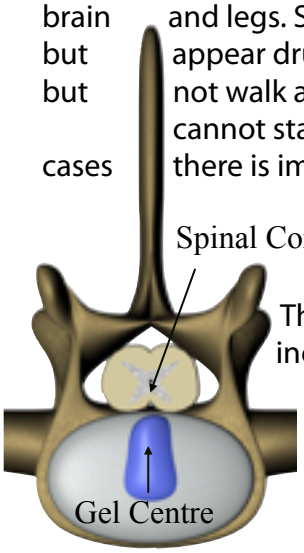
taken by the fibrous capsule. This results in progressive tearing and injury to the fibres and allows the hardened gel to move up towards the spinal cord.

How does this result in paralysis?

In some dogs, the final barrier between the hardened gel and the spinal cord is breached and the disc material is propelled into the spinal canal and impacts the spinal cord. If this happens very quickly (as is often the case), the small mass of material moving very quickly towards the cord possesses a great amount of energy and this energy is absorbed by the cord producing bruising and injury to the spinal cord. It is this bruising and damage to the spinal cord that causes paralysis.

The spinal cord is made up of two types of tissue: White Matter and Gray Matter. In most patients with disc extrusion it is the injury to the White Matter that causes varying degrees of paralysis. The white matter is on the outside of the cord and the grey matter is in the middle. The white matter is like telephone wires allowing communication between the brain and the muscles and joints of the limbs. When white matter is injured (as it always is in this type of disc disease) the result is a break down of communication of varying severity between the brain and the limbs. To continue with the telephone analogy you can think of this as talking to someone on the telephone with interference on the line. If the interference results in you not hearing certain words in a sentence, then it will be difficult to understand what the other person is telling you and it is equally difficult for them to understand you. If the wires are completely damaged then the line will "go dead" and no communication will be possible. The degree of functional loss in your dog's legs will directly relate to the degree of damage to the white matter (or wires) and the subsequent difficulty in two way communication between brain and legs. Some dogs can walk but appear drunk, others can stand but not walk and some dogs cannot stand at all. In some cases there is impoverished communication between the brain and the bladder. This can result in incontinence. This sign is usually seen in cases that are unable to stand and are thus more severely affected.





Do all dogs with disc disease become paralysed?

As mentioned above, the energy of the material that impacts on the spinal cord

depends largely on the speed at which the material is propelled towards the spinal cord. The degree of injury and therefore the severity of the clinical signs displayed as a result of the injury will depend upon the speed of extrusion. We grade disc patients with a system of 1 to 5:

Grade 1: These patients have back pain only without any weakness or incoordination.

Grade 2: These patients may have back pain and weakness of the limbs but can walk.

Grade 3a: These patients are weak and incoordinated when walking.

Grade 3b: These patients may be unable to stand.

Grade 4: These patients cannot stand and will display urinary incontinence.
Grade 5: These patients cannot stand, will be incontinent and will not respond to painful stimuli applied to their feet or legs. The legs are often floppy without any muscular tone.
As you can see from this the extent of the problem is very variable ranging from back pain to complete paralysis. All of these signs come from the impact of the hardened gel on the spinal cord.

What can we do about this problem?

In the consultation we will aim to acquire two main types of information. First we will grade your pet's injury using the above scale. Second we will localise the injury by performing clinical tests that assess reflexes and the areas affected by the injury. Whilst all of your dog's discs will be equally degenerate, most of the problems associated with this relates to the discs in the middle of the back between the chest and the lumbar spine. By testing your dog's reflexes we will be able to identify the general area of the problem. By listening to your pet's history and considering your pet's breed and age we will be able to give some indication of whether the problem is likely to be due to disc problems or some other disease process. In other words, at the end of the consult we will be in a position to make an educated guess as to the location, severity and likely cause of the problem. In most cases this guess is not good enough to direct treatment however and therefore further investigations will be offered. The normal investigations for a spinal patient are as follows:

1. Plain survey radiographs: This is X-rays of your dog's spinal column. This procedure will give us some information about the back bones, the size of the disc space between them and the health of the gel centre. This will help in many cases to rule out certain causes of spinal problems but will not often give a diagnosis. For this reason we will often perform:
2. Myelography: The spinal cord is made of soft tissue and thus does not appear on the plain X- rays. When we perform Myelography we inject a dye that outlines the spinal cord and allows us to see whether it is swollen or compressed (squeezed by the disc material). We will also be able to determine where the compression is in the spinal column and whether it is greater on one side than the other. This procedure therefore will confirm the suspected diagnosis of disc extrusion and allow us to correlate the clinical signs from the consultation with the image on the X-ray.
3. CSF Examination: Sometimes we will collect the fluid from around the spinal cord (cerebrospinal fluid or CSF) and submit this to a laboratory.

Following these tests, we will know the cause of the spinal problem and its exact location. If we see that the cord is being squeezed or compressed by the hardened gel, then we will likely recommend surgical management.

Why is surgery necessary?

If the centre of the disc was still soft and gel like then all of the problems your pet is experiencing would be due to the bruising of the cord alone and as with other bruises this will resolve of its own accord without surgery. If someone has a snowball thrown at them, a bruise may develop but there is no evidence of the cause of the bruise because the snowball was soft and broke up on impact. However if someone is shot, then a bruise will develop and the presence of the bullet may cause further injury if left in place. In most chondrodystrophoid breeds, the injury is much more like being shot than being hit by a snowball

because the gel has turned into a hardened mass, the presence of which in the spinal canal will squeeze the cord and cause further injury, resulting often in a poorer recovery from spinal injury. In these cases we suggest 'decompressive surgery'. In this surgery we make a little window into the spinal canal and remove this hardened material thus relieving the spinal cord of compression. After this has been performed, the bruise will still be present in the spinal cord at the point of impact and this will have to resolve in order for your dog to recover from the injury, however this is much more likely to happen smoothly and progressively once the material has been removed than if it was left in place. The other advantage of surgery is that as well as taking the disc material out of the spinal canal, we will also remove any residual hardened gel from the centre of the problem disc and this will reduce the likelihood of problems with this disc in the future. Disc patients treated non-surgically will often have a recurrence of back problems at the same site. In most cases we will also remove the centre of the disc in front and behind the problem disc. This can often reduce the likelihood of your pet experiencing back problems in the future to that seen in other breeds (very low). In summary surgical management has four goals:

1. To reduce the pressure on the spinal cord.
2. To prevent problems associated with this disc again in the future.
3. To prevent problems associated with the discs surrounding the problem disc.
4. To permit active physiotherapy earlier in the course of recovery. In patients treated non- surgically there is a risk of further material moving into the spinal canal after the initial injury. Non surgical cases with compression are therefore confined strictly for 6 or more weeks after the incident, whilst surgically managed cases do not face this risk and can be active as soon as they are ready (within limits of course).

What can I expect after surgery?

Ninety eight percent of dogs with surgically managed disc disease (of grade 4 or less) will make a progressive improvement in terms of their ability to walk and urinate normally if this has been a problem before surgery. Some dogs will never regain their full pre injury status, however they will ultimately improve to the point of being able to lead an independent and active lifestyle with perhaps a subtle change in the way they use their legs.
When you first see your pet you will immediately be aware that their back has been completely shaved and that there is a 10 cm or so surgical scar in the middle of their back. The incision will heal over the coming week and the hair will regrow over the coming two months or so. They will most likely still be unable to walk or may do so in a very uncoordinated fashion. Every week to ten days however you will see a progressive return of function in their legs beginning with an ability to stand for progressively longer periods. Eventually (usually four weeks following surgery in grade 3b and 4 patients) your pet will take a step or two on their own. This will progress to awkward looking walking that will gradually become more and more controlled and refined. This occurs as the communication between brain and body becomes more fluent and complete. Your pet will still tire incredibly quickly however and even short periods of activity will sap your pet's strength so that they look more wobbly on their legs. This phase will pass and your dog should redevelop his or her original level of stamina over the months following surgery.

How can I help my dog after surgery?

There are two main things that will help both yourself and your dog in the first

two months following discharge. The first is to try to remain happy with your dog's current status whilst encouraging improvement and the second is to be patient. This is not always easy as progress can seem relatively slow at the beginning and our only wish is for our dog to be normal again. This can lead to frustration and a feeling that your dog will never get better and this gives rise to obvious distress. If we feel like this our interaction with our dog will be flavoured by disappointment and what can be a unique opportunity to deepen our bond with our pet can turn into a tortuous process. In order to avoid this think about how long it takes a baby to learn to walk and how complicated walking is, think how long a baby spends in nappies and how complex the act of appropriate urination is. Your dog will not take that long and things only seem to be dragging because you are focussing so intently on your dog's disability rather than their progressive improvement in ability. Remember to keep life normal, do not spend every minute with your dog looking for progress, do not become housebound; go out and meet friends and family as you would normally, in this way 'the kettle will boil'.

Apart from staying optimistic, there are activities that will help your dog on the road to recovery. All activities should be kept reasonably short (5 minutes at most) in order to prevent fatigue from hiding your dog's ability.

- Massage of the muscles of the limbs is useful before and after any activity as a warm up and cool down session.
- Taking your dog out to the garden frequently to allow them to urinate appropriately. You may need to use a towel to support your dog if they have no ability to walk. Allow them to sniff at their usual spots and so forth and use encouraging words. If your dog does not like to soil in the garden, then carry them if possible to a place that they usually go to.
- Try to make your dog stand by placing the feet in a normal position and gradually allow them to take their own body weight. Time how long they can stand.
- Following the stage above, place one foot in front of the other and encourage stepping.
- When your dog is beginning to walk, keep the sessions very short as tired legs make for reinforcement of negative habits.
- Swimming can be useful unless your dog is afraid of water. Even suspending them in a half full bath so that their feet are just touching the base of the bath can be useful especially if combined with massage.
- Reduce your dog's food intake in order to minimise the risk of weight gain which will make progress slower.

Do not try to do all of these things at once, introduce them gradually as your dog gains function and ability. Later on you may begin postural correction exercises. This is when your dog has strength to stand for extended periods and entails gently and slowly pushing them over from one side whilst having a hand to the other side to prevent them from actually falling. This will improve your dog's ability to correct themselves when they turn.

Remember we are here to help you throughout the period of recovery. Our nurses and physiotherapist will be able to help you with specific problems or difficulties with the exercises, you do not need to do this all on your own!

What will the process of recovery be like?

This depends upon the starting point of recovery, however if you look at the grade list of spinal injuries, recovery is in the reverse order. In other words a grade 5 patient will first regain pain sensation in the limbs. Following this there will be

a gradual improvement in hindlimb strength and return of continence (occasional accidents may still happen even after your pet can stand but these will eventually cease). Standing will be achieved when placed in a standing position although they will not be able to voluntarily get into a standing position. The length of time that they can stand will extend and then a few steps will be taken. After this the progress is defined by gradual improvement in coordination and stamina. The time taken from injury to return of independent function may be up to 3 months although improvement will still continue six months after surgery. In this latter stage the rate of improvement is slower and the process is more subtle, but it will happen.

Summary

Discs age differently in different breeds. In breeds such as Dachshunds, Lhasa apso and so forth with foreshortened limbs relative to body, this process of degeneration occurs very quickly. Thereafter the disc struggles with its shock absorbing function. As a result, in some dogs the hardened centre of the disc may break through the top of the disc and impact on the spinal cord. This causes bruising and crushing of the spinal cord resulting in reduced spinal cord function of varying degrees. In most cases this injury is reversible and this is aided by decompressive surgery (removing the material from the spinal canal). The rate of recovery following surgery is reasonably variable, however most dogs are walking in a still incoordinated fashion within a month of surgery. You can assist in the recovery by helping with standing and early attempts at walking. You should keep activity sessions short, productive and enjoyable. Remember your dog is not made of crystal and you do not need to be fearful of handling and lifting.