Intervertebral Disc Disease

What is intervertebral disc disease?
Intervertebral disc disease (IVDD) is the most common spinal disease in dogs and is seen occasionally in cats. Intervertebral discs are fibrocartilaginous structures that are located between the vertebrae in the spine (except for the first 2 cervical vertebrae in the neck) that support the spine, allow normal movement, and act as shock absorbers to prevent damage to the spinal cord. They consist of a fibrous outer rim, called the annulus fibrosus, and a jelly-like center, called the nucleus pulposus. The intervertebral discs are supported by several ligaments which act to stabilize the vertebrae and prevent herniation of the discs. Intervertebral disc disease results from degeneration of these discs, which leads to a decreased shock-absorbing capacity, and can lead to disc extrusion or protrusion (termed herniation) which causes spinal cord compression.

Are there certain breeds at risk?
Intervertebral disc disease is most commonly an age-related, degenerative condition. However certain, ‘at-risk’ dogs, (chondrodystrophic breeds and crosses) can suffer disc problems from when they are young adult dogs. Disc degeneration results from the disc becoming dehydrated as they can lose the ability to hold water, and they become calcified. Chondrodystrophic dogs are dogs that characteristically have disproportionately short and curved limbs, such as the Dachshund and Shih Tzu. These breeds of dog suffer early degenerative changes in the disc making them more likely to herniate.

What causes intervertebral disc disease?
There are three types of disc herniation: Hansen type I (nucleus pulposus degeneration and extrusion), and Hansen type II (annulus fibrosis degeneration and protrusion), and Hansen type III (high-velocity).

- **Hansen type I disc disease**
  Dogs with Hansen type-I disc disease are most commonly small breed dogs aged 2 years old and above, although larger breeds can be affected. The onset of clinical signs is generally sudden. The degree and duration of clinical signs is variable but does influence prognosis. Hansen type-I intervertebral disc disease is most easily described as an ‘extrusion’ or ‘herniation’ of the inner contents of the intervertebral disc. In the diseased disc the nucleus pulposus becomes hard and is no longer compressible. Consequently, normal movements put excessive strain on the disc and, eventually the annulus fibrosus tears and allows the nucleus pulposus to explode out. This usually occurs in an upwards direction and compresses the spinal cord above. The velocity of the impact affects the severity of the injury as does the volume of disc extrusion. Clinical signs range
from pain to paralysis. Hansen type-I disc disease is a painful disease and is an emergency situation.

- **Hansen type II disc disease**
  Dogs with Hansen type-II disc disease are similar to human disc disease and occur in non-chondrodsytrophic dogs and cats (animals without disproportionately short limbs). Instead of an extrusion of the centre of the disc there is a bulging and protrusion of the annulus. The annulus can tear protrude into the spinal canal compressing the spinal cord. Sometimes acute tearing is associated with bleeding and the blood contributes to the compression. Clinical signs are similar to dogs with Hansen type I disease. Most dogs present acutely but occasionally signs develop slowly and progressively.

- **Hansen type III disc disease**
  Hansen type-III disc disease is also known as ‘high-velocity low volume’ disc disease. In this case there is a sudden onset typically associated with heavy exercise or trauma, causing a normal nucleus to explode from a sudden tear in the annulus.

The consequence of disc extrusion is pain, and in more severe cases there may be difficulty walking – ranging from poor control of the hindlimbs, termed ataxia, to complete paralysis. Very severe cases may develop myelomalacia (softening and necrosis of the spinal cord) and as it moves up the spinal cord it is usually fatal because it affects the nerves involved in breathing resulting in cessation of breathing.

**What clinical signs will my dog show if they have this condition?**

The most common sign associated with intervertebral disc disease is pain localised to the back or neck.

As nerve fibres travel in the spinal cord down from the brain to the tail, the clinical signs will refer to spinal cord dysfunction ‘down-stream’ of the injury. Disc disease in the lower back can cause hind limb weakness, paralysis or urinary incontinence, and disc disease in the neck can cause weakness or paralysis in all four limbs.

Apart from yelping, common signs of spinal pain are abnormal posture (hunched back), shivering, panting, unwillingness to move and difficulty jumping or climbing stairs. In more severe cases there may be difficulty walking – ranging from poor control of the hindlimbs; either weakness or ataxia, to complete paralysis. Most severe cases have a paralysed bladder and may be unable to urinate, or they may dribble urine unconsciously. The most severe cases have lost the ability to feel painful sensations.

**How is intervertebral disc disease diagnosed?**

Intervertebral disc disease is often strongly suspected based on clinical signs, especially in predisposed breeds. Diagnostic imaging is required to confirm the diagnosis. Spinal radiographs may reveal characteristic changes of disc disease such as calcified disc material within the vertebral canal or narrowing of the intervertebral space or the foramen, however radiographs rarely provide the accurate conformation and localisation required for surgical management. Radiographs are useful in cases of spinal disease as they can help rule out a fractured spine or a tumour.

Advanced imaging is required to obtain a definitive diagnosis of intervertebral disc disease. At North Coast Veterinary Specialist and Referral Centre we have access to MRI and CT scanners. This provides more information than radiographs to enable us to make a rapid diagnosis and plan surgical intervention. Patients must lie completely still for their scan, and this is only possible with the use of general anaesthesia. Your pet will have dedicated one-to-one care during their MRI or CT scan by one of
our vets and nurses. The decision to perform either CT or MRI will be discussed at consultation, depending on the presentation of your pet.

**Is conservative management an option and what does it involve?**

Conservative management is indicated for patients with pain only or for those with mild clinical signs of neurological deficits. Conservative management has the advantage that it is comparatively inexpensive and avoids surgery. Disadvantages of conservative management include a higher rate of recurrence of clinical signs and a higher chance of deterioration or persistent neurological deficits. In addition diagnostic tests may not be performed so the animal may be receiving inappropriate treatment.

Conservative management revolves around restriction movement, and as such we will recommend that your animal be confined to a cage or crate. This limits further disc extrusion and exacerbation of the damage to the spinal cord, and gives the animal the opportunity for their spinal cord to heal.

Should your pet remain in the hospital for conservative management, all of their daily needs including pain management, feeding and general TLC will be provided. If you are providing conservative management for your pet at home our surgeon or nursing team member will keep in close contact with you to monitor your pets progress and allow the opportunity to identify any signs of deterioration. They will also ensure your pet receives adequate pain relief if required.

**Will my dog have to have surgery?**

Cases in which the animals are showing only mild clinical signs can do well when managed conservatively however in cases with paralysis the prognosis is better with surgery. Your pet is more likely to regain walking function and be pain free; is more likely to improve quickly; and is less likely to have recurrences if surgery is performed. Cases where pain sensation in the hind limbs is absent are a surgical emergency and have a poor prognosis for improvement.

**What does the surgery involve?**

The most common type of surgery we perform at North Coast Veterinary Specialists and Referral Centre is termed a decompressive surgery, whereby the extruded disc material is removed from the vertebral canal. This surgery is more technically difficult and requires specialised equipment and training compared to other surgical procedures. The type of decompressive surgery performed depends on the site of the problem. In the neck a ventral approach is favoured (ventral slot) and a window is drilled through the vertebral bodies. For the thoracolumbar spine, the most common procedure is a hemilaminectomy, where entry into the vertebral canal is made from the side, directly above the disc space. For lumbosacral problems a dorsal laminectomy is used where the “roof” is taken off the vertebral canal allowing direct visualisation of the cauda equina and the lumbosacral disc. In all these procedures, the extruded disc material that is compressing the spinal cord is removed to maximise your pets chances of making a complete recovery.

**What happens to my dog after surgery?**

Immediately after surgery your dog will be given the opportunity to recover from the anaesthetic peacefully. Post-operative analgesia (pain-killers) and supportive therapy will be provided in our designated recovery ward whereby your dog will be monitored and nursed by a dedicated team of nurses and vets. Ultimately rest and recuperation from the anaesthetic are the most important factors. The next morning following assessment from their surgeon your dog will be assessed by our in-house
physiotherapist and they will design and implement a physiotherapy and rehabilitation programme specific to your pet. Physiotherapy plays a vital part in the treatment of animals with spinal cord disease. Inactivity and recumbency results in decreased joint movement, stiffness and muscle weakness and contracture and physiotherapy aims to prevent all these complications from occurring.

**When can my dog go home after spinal surgery?**

The length of stay in the hospital following spinal surgery varies from patient to patient depending on their comfort levels, functional movement and urinating ability. Generally, all dogs will stay in the hospital until they can urinate independently and show voluntary movement in their legs. Upon discharge you will have an appointment with one of our physiotherapists and your dog whereby you will be taught how to perform the necessary physiotherapy techniques and exercises to ensure your dog continues to make progress at home. During this appointment any out-patient physiotherapy and / or hydrotherapy appointments will also be scheduled through our very own rehabilitation service at North Coast Veterinary Specialists and Referral Service.

**How long before my paralysed dog will walk again?**

This is variable between each patient, and depends on their initial status, but typically recovery occurs over several weeks. Some cases improve more quickly and, sadly, in some cases there is no improvement.

**Will the problem recur?**

If the spinal surgery has been successful then it is unusual for there to be a problem with the same disc. However there may be a problem with other remaining degenerate discs, but we cannot predict if, or when this will occur.