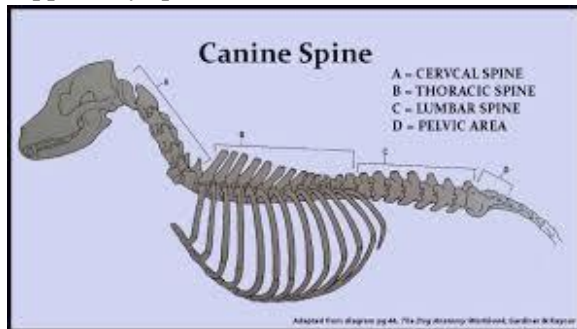


Intervertebral Disc Disease (IVDD) And Other Spinal Disorders

The Spine

The spine arises from the base of the skull and traverses the whole length of the body to the end of the tail. The spine serves multiple functions; it participates in locomotion, is the attachment for the pelvis and various major muscle groups and it is a bony column that protects the spinal cord from trauma. Paired nerve roots exit the spine between each vertebra and supply the entire body with the exception of certain portions of the head and neck that are supplied by specialized cranial nerves.



The spine is segmental in nature and is composed of numerous individual vertebrae separated by intervertebral discs. In the dog and cat, there are 7 cervical vertebrae (neck), 13 thoracic vertebrae (chest), 7 lumbar vertebrae (lower back), 3 fused sacral vertebrae (that the pelvis attaches to), and a variable number of coccygeal vertebrae (those that make up the tail). Certain breeds of dogs, particularly Dachshunds, Boston Terriers and French Bulldogs may have more thoracic or lumbar vertebrae than normal, or may have malformations such as hemi- vertebra. The individual vertebrae in each segment are significantly different from those of another segment and may have additional

functions, such as providing attachment points for ribs (thoracic vertebrae).

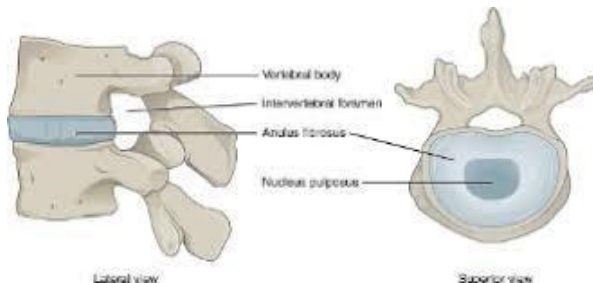
The bony tube formed by the alignment of adjacent vertebra, the neural tube, contains the spinal cord and associated structures such as blood vessels, fibrous connective tissue and fat. This bony canal protects the delicate spinal cord and the associated structures from damage. Anything that effectively decreases the volume of this canal (such as a tumor or extruded disc) or causes misalignment of adjacent vertebrae (such as a fracture or instability), will cause compression of these structures and the spinal cord. Signs associated with spinal cord compression range from mild neurological deficits to paralysis depending on severity.

In between the vertebrae, at the level of the discs, are holes called foramina where nerve roots exit the spine to supply the body. Unlike the spinal cord itself, compression of nerve roots causes pain. The degree of discomfort caused by nerve root compression can vary considerably and include non-weight-bearing lameness of an affected limb (a “nerve-root signature”) to very severe signs frequently associated with neck pain and can be associated with vocalization. The vocalization may be continuous or may be manifested in the form of yelping when the patient moves in a certain manner.

The Intervertebral Disc & IVDD

In between the vertebrae are intervertebral discs composed of an outer ring of dense fibrous tissue (annulus fibrosis) and an inner core of gelatinous material (nucleus

pulposus). The discs perform multiple functions: they provide articulation between the vertebrae allowing for movement of the spine and they provide shock absorption and dissipation during locomotion for activities such as jumping. Tearing of the annulus or changes in the structure of the disc over time can lead to the ejection of the nucleus pulposus into the spinal canal, compressing the spinal cord and/or nerve roots resulting in clinical signs of disc disease. This is called Intervertebral Disc Disease (IVDD). Extrusion of disc material in the neck tends to mostly be accompanied by signs of pain, although neurological signs can occur and tend to be worse in the front limbs than the hind. Disc extrusions in the thoracic and lumbar regions generally tend to produce neurological signs of varying severity, however pain is frequently also associated with these cases.



Some Other Spinal Diseases Not Involving IVDD

There are many other diseases of the spine that are commonly seen that do not involve intervertebral disc disease. The following section is not intended to be a comprehensive list of all spinal disorders, but a brief description of some of the more common diseases and their treatments. Detailed descriptions of medical and surgical therapies can be found after this section.

Degenerative Myelopathy

Degenerative Myelopathy is as the name implies, a degenerative spinal disease of usually older dogs, particularly German Shepherd although many different breeds are affected. This disease is progressive and may start with very subtle signs, such as scuffing of the nails in the hind-limbs while walking. This disorder always affects the hind-limbs first and progresses to include the tail, urinary and fecal incontinence and ultimately laryngeal paralysis and death.

The only treatment known to have any impact on the disease is rehab. The typical course is approximately 18 months however with rehab patients may survive up to 3 years. Degenerative Myelopathy is a diagnosis of exclusion, although there is a recently available genetic test to see if a dog carries the gene for the disease. It is important to note that lumbo-sacral disease is frequently misdiagnosed as degenerative myelopathy and it is important to distinguish these diseases, as lumbo-sacral disease is quite treatable.

FCEM/“Spinal Stroke”

Fibrocartilaginous embolic myelopathy (FCEM or “spinal stroke”) is a common condition with an acute onset of neurological signs that are frequently severe and involve paresis or paralysis of one or more limbs. While the exact cause is unclear, it seems to involve embolism of the spinal cord with small pieces of disc material or cartilaginous material. One of the hallmarks of FCEM is that the lesions are asymmetrical (involve one side of the dog more than the other) and this disease is completely non-painful. Dogs may have a history of prior, but less severe episodes on presentation.

The only effective treatment for this disease is rehab and the sooner it is started the

better the prognosis generally. The prognosis for FCEM is fair to good; many if not most dogs will fully recover but some will not. Some may recover some function but have some permanent deficits.

Wobbler's Disease

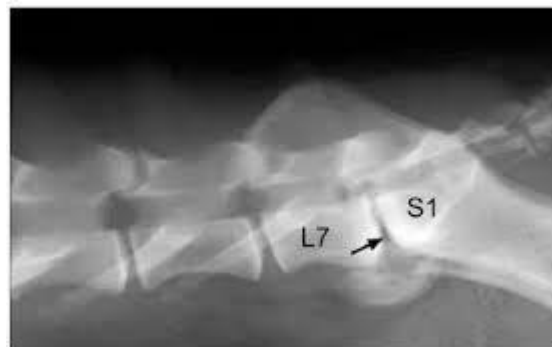
This disease is properly called cervical vertebral instability and has specific breed predispositions involving large and giant breed dogs. Wobbler's disease leads to stenosis or narrowing of the vertebral canal and associated compression of the spinal cord and nerve roots in the neck. Two forms are recognized: bone-associated, which affects typically young Great Danes, Weimaraners, and a few other breeds and disc associated affecting older dogs, particularly Doberman Pinchers.



This disease may be treated either medically or surgically depending on the severity of signs. Like disc disease, medical management is successful in approximately 50% of cases. Surgical management may consist of decompression, stabilization by distraction and fusion of the vertebrae or a combination of both. Surgical management has a much better success rate than medical management but may not be curative and 20% of patients develop disease in the adjacent vertebrae/discs.

Lumbo-Sacral Stenosis/Instability

This is a disease or syndrome that affects the junction between the lower lumbar vertebrae and a special fused group of vertebrae called the sacrum, which attaches the pelvis to the spine. This disease may be manifested as instability and back pain in younger dogs but more typically affects older dogs and cats and involves narrowing of the spinal canal and nerve impingement. It is frequently associated with hip dysplasia but most commonly exists as a separate issue. It is variably called L-S disease, cauda equina syndrome, and lumbo-sacral stenosis or instability – all of these terms relate to the same disease.



L-S disease is an extremely common and significantly under-recognized and under-diagnosed disease. As the clinical signs tend to develop in middle-aged and older pets, typically large-breed dogs 10-12 years of age, most pet owners ascribe the patient's mobility problems to "old age", "arthritis" or "his hips are gone". Frequently veterinarians themselves lack knowledge of this disease and either fail to appreciate the actual nature of the problem or misdiagnose the issue as another disease. Breeds most commonly affected are German Sheppard Dogs, Labrador Retrievers and many other large breed dogs, including mixed breeds.



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Cats also frequently develop L-S disease as they age.

L-S disease is in fact usually a fairly straight-forward diagnosis, is extremely rewarding to treat, and most patients respond well to treatment. This can usually be diagnosed based on a combination of standard spinal radiographs, history and physical exam findings. MRI is also very reliable in diagnosing L-S and is currently the diagnostic gold standard. Treatment may be either medical or surgical depending on the nature and severity of signs. Surgical treatment usually consists of a dorsal laminectomy to relieve the nerve compression but may include stabilization/fusion in some cases. Surgical patients tend to do very well and most clients report a noticeable improvement immediately after surgery.

Other Spinal Diseases of Interest

These include disk spondylitis (an infection of the disc), spinal tumors, and spinal fractures. These are less commonly seen and will be discussed in detail with clients during the diagnostic or pre-surgical consult as appropriate.

Management of Disc Disease and Spinal Instability

Management of these issues may involve either medical management, surgical management, or a combination of both. Which type of management is appropriate is based on a combination of clinical signs, radiographic findings, and the exact nature of the individual problem and the associated prognosis for each type of treatment. This necessarily must rely on the good clinical judgement of the veterinarian as the individual details and clinical signs vary considerably on a case-by-case basis. It is also

very common for cases to evolve over time and a case that may be managed medically initially can become surgical. Some surgical cases may still require some ancillary medical treatment in the long-term.

Medical Management

“Medical Management” basically encompasses all treatments other than surgery. For IVDD, medical treatment may mean medications, laser therapy, weight management, physical rehabilitation and chondroprotectants. All patients receive some form of medical management either as a primary treatment and post-operatively for surgical cases.

Weight, Diet and IVDD

In any patient with any spinal or disc disease, the most important factor impacting the development of disease, prognosis and treatment is the weight of the patient. Obesity is a major risk factor for the development of IVDD and other spinal diseases. **Regardless of the condition, failure to recognize and address issues of diet and obesity will likely result in treatment failure, no matter how much is invested in treatment and surgery.** Your veterinarian should provide specific dietary recommendations including not only a specific diet(s), strict feeding guidelines that include specific measuring instructions and complete diet counselling. Any complicating medical conditions such as hypothyroidism need to be diagnosed and treated.

Therapeutic Diets – A prescription veterinary diet formulated specifically for addressing obesity and sometimes joint disease and arthritis in our patients may be prescribed. Many older dogs with spinal problems have concurrent joint



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disease such as hip dysplasia and arthritis of the intra-articular facets of the vertebrae is also very common. These diets are designed not only to deal with inflammation associated with joint disease but are excellent at addressing weight issues that will have the most impact on patient outcomes. These diets have had a major impact on how we manage disease over the past few decades.

Medications

NSAID's - All dogs presented with clinical signs initially start on NSAID's as this is our primary means of immediately addressing pain and inflammation. Historically, steroids have been prescribed in acute cases of IVDD, however this has become extremely controversial in recent years. When a disc extrusion has occurred, the resulting inflammation is frequently as significant a cause of compression as the offending disc material. It is therefore imperative that we control this inflammation as quickly as possible. NSAIDs may be a primary means of treatment in medically managed cases or prescribed post-operatively in surgical cases. Often we will withdraw the NSAID's if possible when other therapies have had time to take effect and the patient has responded well to treatment. A number of options are available, including some newer products that have a reduced incidence of adverse effects.

Gabapentin – this is a first-line treatment in any dog that has any significant pain component to their spinal problem. Gabapentin is a neuroleptanalgesic – it controls spinal pain, in a highly effective manner, and is also used in humans for this purpose. At analgesic doses, gabapentin has very low potential for side-

effects, is very safe for long-term use, easy to administer, is highly effective and inexpensive. This makes gabapentin an excellent choice for management of patients with chronic problems.

Codeine – is an opioid medication that is highly effective in dogs for managing more severe pain. Any dog that has severe pain issues (ie vocalizing) will be prescribed codeine preoperatively to manage them pending surgery. Any dog that requires treatment of this nature is definitively surgical. In dogs, codeine does not have significant narcotic effects, but it is a controlled drug and should be handled and stored accordingly.

Chondroprotectants - Recent large-scale studies have shown that glucosamine and chondroitin have no therapeutic value unfortunately. However, since it is important that patients be on an effective long-term joint supplement, most surgeons have shifted their recommendations to a product called Flexadin, which has good evidence to support its use. UCII modulates the immune response to suppress inflammation. This is usually prescribed and supplied in our hospital at the initial visit.

Chondroprotectants otherwise have no value in the treatment of primary spinal disease.

Please note, glucosamine incorporated into dry dog food is not present in sufficient quantities to have a therapeutic effect – most of it is destroyed during processing as it breaks down under the high temperatures and pressures used to make dry kibble. It has to be added to the food after processing, usually as a top-dressing added at feeding time by the client. It is strongly advised to use a veterinary product to ensure that the correct formulation and dose are being administered in a therapeutically useful format.

Laser Therapy

Therapy lasers have become increasingly popular in small animal practice since they became widely available in the past decade. Laser therapy allows us to treat both acute injuries and chronic disease with often spectacular results. It is also extremely helpful for managing post-operative pain, inflammation and swelling and is included in our post-operative management for all surgical cases. This treatment has had a major impact on dramatically lowering our post-op complication rate for a variety of reasons.

A number of studies have shown laser therapy to be an integral component of IVDD management, both pre- and post-operatively and as a primary medical treatment. Patients receiving post-operative laser therapy have been demonstrated to have a much faster return to ambulation (walking). A separate hand-out regarding this therapy is available.



Rehabilitation and Exercise

Rehabilitation (known as physiotherapy in humans), is a vital component of management of IVDD and other spinal disorders and is absolutely essential to patients being treated for spinal disease – **rehab is always prescribed for these patients**. In cases of degenerative myelopathy and FCEM (fibrocartilaginous embolic myelopathy, aka a “spinal stroke”), rehab is the only effective therapy. Without rehabilitation, many dogs with spinal disease will not return to normal function, or will not recover functions as quickly or completely as they otherwise would have. It is important to start rehab on spinal patients **immediately** after initiating treatment or surgery.

Therapies may involve tactile or sensory feedback exercises involving brushing, tapping or tickling feet of paralyzed patients, balance and strengthening exercises in less severely affected patients, to gait re-patterning using lifts, land-treadmills or underwater treadmills. Modalities such as laser therapy and neuromuscular electrical stimulation are usually also employed. The duration of rehabilitative therapy is patient dependant and is based on progress at each assessment. Clients should keep in mind that rehab truly happens in the home, performing these activities with your dog multiple times per day. Simply bringing a patient to a rehab therapist once or twice weekly and expecting the patient to get better without actively participating is unrealistic.

Surgical Management of IVDD and Other Spinal Diseases

Surgical management of disc disease is appropriate for patients with severe pain, neurological signs, instability, unsuccessful medical management and certain deformities. Surgery is most frequently done on an elective basis but may be treated as pressing (patients with neurological signs but are ambulatory or patients with severe pain) or emergent (patients that are paralyzed/non-ambulatory). In some cases, short delays due to imaging review by a radiologist may be necessary.

Decompressive Surgeries

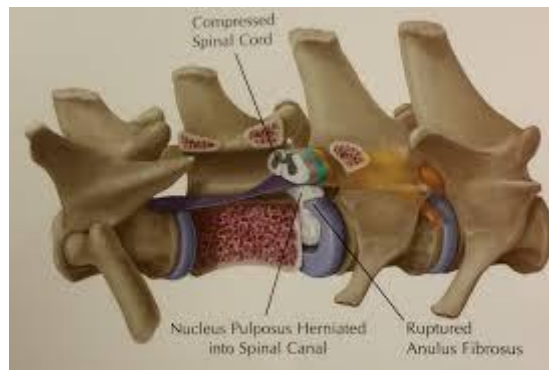
Decompressive surgeries are those that aim to decompress or relieve impingement of the spinal cord or nerve roots. This is usually to remove extruded disc material from the spinal canal but may also be used to remove blood clots, tumors or relieve stenosis by effectively making the spinal canal larger. The most common decompressive surgeries are ventral slot decompression, dorsal hemilaminectomy and dorsal laminectomy.

Ventral Slot Decompression – this technique is used specifically in the cervical spine (ie neck) to relieve disc extrusion. It is performed by incising the skin over the throat and retracting all of the vital structures of the neck to either side, exposing the vertebral bodies and associated discs. The correct disc is located and a small slot is burred through the disc and adjacent vertebral bodies to expose the spinal canal and remove the extruded disc material.

Dorsal Hemilaminectomy – this technique is used primarily in the thoracic and lumbar spine but may also be used in the cervical region under certain circumstances. In this case an incision is made down the midline of the back and some of

the muscles on the side of the lesion are carefully elevated to expose the correct vertebrae. A high-speed burr is then used to remove the articular facet or joint between the adjacent vertebrae. The burr is then used to cut a window through the underlying vertebral bone to expose the spinal canal and foramen through which the nerve root is exiting. This then gives the surgeon access to remove the offending disc material or mass.

Dorsal Laminectomy – this surgery is most commonly performed to treat L-S disease but may be performed anywhere along the spine if circumstances warrant, usually to relieve stenosis. In this case the top of the vertebral canal is removed over the disc of interest and always involves partial resection of the top of two adjacent vertebrae. This may be combined with a stabilization or fusion procedure should circumstances warrant.



Stabilization/Fusion Surgeries

These techniques are used to treat spinal instability and fractures and involve applying implants to prevent two or more vertebra from being able to move relative to each other. Implants used to perform these procedures include wires, pins, screws, various plates, bone cement and meshes and may involve a combination of implants. The goal is usually to fuse two or more adjacent vertebrae and bone grafting is often employed to accomplish this.



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Some of these surgeries may also involve distraction prior to fusion or may be combined with other decompressive surgeries. Specific details of these surgeries are discussed with clients as appropriate during the patient work-up/consult.

Prognosis and Complications

A great deal of published data exists with respect to the prognosis and complication rates associated with various treatments for spinal disorders. In general, medical management of IVDD is successful in approximately 50% of cases. It should be noted that the likelihood of successful medical management of a particular case will vary according to severity – less severely affected patients will tend to do better than those more severely affected. Patients treated with a combination of medical management and acupuncture have an initial success rate of 69% but a subsequent 37% reoccurrence rate. The prognosis with surgical treatment is excellent – 94.4% is the most frequently quoted success rate.

It is important to note that there may be a significant difference between an outcome that is considered “successful” and a patient that has been “cured”. The surgeon will define the parameters of success during the consult as they may vary depending on the nature and severity of the case. A paralysed patient that has no deep pain perception (which carries a grave prognosis), would not have success defined as complete resolution of signs, whereas a patient with more mild signs, such as neck pain, would be expected to see significant improvement if not complete resolution.

Please note, “chiropractic” treatment is NEVER appropriate for veterinary patients with spinal disease. Such treatments are not only futile but carry a high probability of causing further harm, which may include paralysis and death. They may also cause significant pain and distress to the patient with no therapeutic benefit.

There are risks associated with surgery. As the spine and associated neurological structures are very robustly supplied with blood, significant and even life-threatening hemorrhage is possible, although the risk is relatively low. More frequently, hemorrhage in the form of “nuisance bleeding” may obscure the surgical field and prevent the surgery from being completed on the first attempt. While this rarely occurs, it is sometimes necessary to post-pone completion of the surgery for 48-72 hours to allow vascular contraction to occur around the surgery site then re-operate. This is extremely frustrating for the surgeon as the surgery is typically almost completed when this occurs.

Another major risk associated with surgery is damage to the neurologic structures in and around the surgery site. While great care is taken when operating the spine, there are risks of damage to the spinal cord itself or the adjacent nerve roots. This can lead to a worsening of signs, permanent deficits or even death. The risk of such an occurrence is admittedly extremely low.

Finally, a condition known as ascending myelomalacia can rarely be seen with spinal cord trauma which results from the spinal cord being so badly damaged as to cause it to progressively die-back along its length. This is most frequently associated with deep-pain negative patients. This syndrome is absolutely fatal and affected patients must be euthanized as left untreated the eventual cause of death is



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respiratory paralysis resulting in slow suffocation. This is fortunately a rare occurrence.

Lack of efficacy is also a risk – ie the patient fails to improve. This represents a small percentage of cases. Residual pain may sometimes be an issue, either due to residual disc material left in the canal or more commonly, due to fibrosis and contracture around nerve roots in chronic cases. The vast majority of patients with this problem are successfully managed with minimal to moderate longer term medical therapy.

Post-Operative Care

Client compliance with post-operative care is extremely important – **failure to meticulously follow instructions can and usually does result in severe complications and treatment failure.** It is our preference whenever possible to provide complete and comprehensive case management for the entire post-op period. In our practice, we perform laser therapy during the first two weeks post-op to aid with recovery and pain management. Other pain management such as NSAIDs, opioids(codeine), etc, are provided, as is a short course of antibiotics.

As a general rule, patients that walk into the hospital for surgery under their own power are discharged the following day. Patients that are non-ambulatory due to paresis or paralysis will be managed in hospital until such time as they are capable of being managed at home by the owner under reasonable circumstances.

Rehabilitation is a crucial component of post-op management and is discussed in detail at discharge. Other than prescribed rehabilitation,

absolute exercise restriction is necessary and off-leash activity is strictly forbidden. Unrestricted access to flights of stairs in the house is to be avoided, however going up and down exterior stairs to get in or out of the house is permissible (on-leash only!).

Further patient specific instructions are given on a case-by-case basis at discharge.

Cost

The cost of these procedures is as follows:

Consult and imaging/CT exam: \$1500 + HST
(includes consult, sedation and whatever x-rays and CT scans are necessary)

Radiologist Referral (if necc): \$450 + HST

Radiologist Referral Stat (If necc): \$650+HST

Surgeries:

(includes any required stabilization procedures, post-operative laser therapy sessions, all routine post-op medications, suture removal, rechecks, etc.)

Ventral Slot Decompression \$4500 + HST

Dorsal Hemilaminectomy \$4500 + HST

Dorsal Laminectomy \$4500 + HST

L-S Instability \$4500 + HST

Cervical Vertebral Instability \$4500 + HST

Note that post-op x-rays are **not** included in the cost of surgery.

****A non-refundable deposit of \$2000.00 is due at the time of booking any orthopedic/spinal work-up and/or surgery****



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***Financing options are available. Please contact reception for further details.**

NOTE: Surgical discharge with Dr. Rocheleau is scheduled for 8:30am the morning following surgery (unless otherwise stated). It is imperative that a patient's owner(s) be present at the hospital at this time. Failure to do so will result in a missed surgical discharge and may lead to post-operative complications which will be at the expense of the owner(s).