

## DEGENERATIVE MYELOPATHY

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### Degenerative myelopathy

Canine degenerative myelopathy (DM or chronic degenerative radiculomyelopathy/CDRM) is characterised by slow progressive loss of hindlimb function. Over months to years the paralysis eventually ascends to involve the thoracic limbs. It used to be regarded as a German Shepherd dog disease however it is now recognised in many other breeds.

### Cause of degenerative myelopathy

Dr Joan Coates and her team at the University of Missouri. has pioneered work into understanding this disease. Genome studies have revealed a mutation within the canine SOD1 gene. If a dog has 2 copies of the mutation then they are at risk of developing degenerative myelopathy. Mutation in superoxide dismutase-1 (SOD1) results in overproduction of damaging reactive oxygen species (ROS) i.e. oxidative or free radical injury to the nervous tissue. Microscopic examination of spinal cords from affected dogs has revealed myelin and axon loss affecting the lateral white matter and neuronal cytoplasmic inclusions that bind anti-superoxide dismutase 1 antibodies. Canine DM is a spontaneously occurring animal model for amyotrophic lateral sclerosis (ALS) (Awano and others 2009).

### Clinical signs of degenerative myelopathy

Affected dogs are generally 8 years of age or older. Typically, owners will notice a subtle weakness of one pelvic limb which progresses to a tendency for the limb to be dragged and the toenails worn. Within weeks to months the other hindlimb becomes involved. The gait is often described as uncoordinated or drunken with a tendency to fall when cornering. However, despite the disability the dog is often keen to exercise and does not have spinal pain. Neurological examination in the early stages of disease reveals a strong "knee" jerk reflex (hyperactive patella spinal reflex), consistent with disease of the spinal cord between the third thoracic vertebrae and the third lumbar vertebrae. As the disease progresses, the dog becomes less able to walk and/or support their own weight. At this time the knee jerk reflex can be lost. Later in the disease course the dog can develop faecal incontinence and if euthanasia is delayed, the clinical signs will ascend up the spinal cord, causing flaccid tetraparesis. The presentation of the disease can vary between different dog breeds with some of them (e.g. Corgi and Rhodesian

Ridgeback) having more obvious disease of the (lower) motor neuron rather than the spinal cord (Coates 2009).

### Diagnosis of degenerative myelopathy

A DNA test for the mutation causing the disease in German Shepherds and other breeds is available through many laboratories that offer genetic testing. Determining that a dog has the mutation does not prove absolutely that he/she has the disease i.e. the mutation increases the risk rather than meaning an animal is predestined to develop the disease. Other causes of spinal disease should be ruled out e.g. with diagnostic tests such as MRI (normal) and cerebrospinal fluid analysis (cell counts normal; protein may be raised). In some cases the dog may have more than one potential or actual cause of the spinal cord disease e.g. disc disease and degenerative myelopathy.

### Management of degenerative myelopathy

Mutation in superoxide dismutase-1 (SOD1) results in overproduction of damaging reactive oxygen species (ROS) i.e. oxidative or free radical injury. There is unfortunately no treatment; however since the nerve is susceptible to free radical injury then there is a rationale for supplementing the diet with free radical scavengers such as such as Vitamin E, Omega-3-fatty acids, Gamma linoleic acid and, L-Carnitine. However, our experience is that if this helps then it only does so in the early stages of the disease.

Keeping the dog active has been shown to slow deterioration i.e. maintain walking and other exercise. It is worth arranging a session with a chartered physiotherapist (e.g. contact ACPAT [acpat.org](http://acpat.org)) with the aim of learning techniques to maximise remaining ability and neurological function. If possible, hydrotherapy is also recommended, preferably also under the guidance of a chartered physiotherapist (e.g. contact Canine Hydrotherapy Association [www.canine-hydrotherapy.org](http://www.canine-hydrotherapy.org)). If the dog has degenerative joint disease (i.e. arthritis) or other spinal disease then this should also be managed so that pain does not limit activity. The disease course of degenerative myelopathy can wax and wane. There appears to be an immune mediated component and some acutely deteriorating cases of degenerative myelopathy can benefit from short courses of corticosteroids at anti-inflammatories doses (not with concurrent nonsteroidal anti-inflammatory drugs).

### Degenerative myelopathy and carts

Many people elect to euthanize their pet when the dog is unable to support themselves to stand/walk. However, some people feel that a quality of life can be maintained and by using a cart the dog can yet again enjoy the pleasures of "going for a walk". However, a limiting factor can be the size of the dog (and therefore cart). If the forelimbs are weak then a cart is unlikely to be suitable option. Incontinence can also be a management problem.

## References

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