

### What are the signs of Degenerative Myelopathy?

Degenerative myelopathy initially appears as weakness in the hind limbs. Often the dog's gait appears drunken or unstable, which is called "*ataxia*." In addition, knuckling of the hindpaws when walking, which is referred to as "*proprioceptive deficits*"

, " may often be present. The symptoms are often assymetric - often affecting one hind limb more than the other. Weakness in the hindlimbs may be present. As the disease progresses, normal reflexes in the hindlimbs may be diminished or absent. As the disease progresses, the neurological signs may progress to the forelimbs as weakness, reduced reflexes, and four-legged paralysis/paresis. Difficulties with maintaining urinary and bowel function may also be present. In very advanced stages, difficulties with swallowing may occur. While the disease can progress over 3 years or more, many owners elect to euthanize within a year due to hindlimb weakness/paralysis. However, a two-wheeled K-9 Cart dog wheelchair allows many of these animals to live a relatively normal life in the early stages of the disease. Disease progression from the back to front limbs is variable. For dogs in wheelchairs, the progression of fore limb weakness will require the addition of front wheels or modification of a K-9 Cart dog wheelchair to given front support or be fully supportive in all four limbs.

### What dogs are affected by Degenerative Myelopathy?

In addition to German Shepherd dogs, the most common breeds affected are the Pembroke Welsh corgi, Boxer, Rhodesian Ridgeback, and Chesapeake Bay Retriever. Records from the Orthopedic Foundation for Animal of [genetic testing results](#) conducted in concert with the University of Missouri in a much smaller number of other dog breeds has shown that more than 50% of Bernese Mountain Dogs, Cardigan Welsh Corgi, Collie, and Kerry Blue Terrier as well as others may also be predisposed for the disease. The disease typically affects middle age dogs that are at least 8 years old at the onset of showing symptoms. There does not appear to be any difference in the number of female versus male dogs that are affected.

### How to Diagnose Degenerative Myelopathy?

Since degenerative myelopathy symptoms share many commons syptoms of other spinal cord diseases, such as fibrocartilagenous emboli or spinal cord tumors, one must rule out other causes of cord compression or disease. In addition, to physical and neurological examination by your veterinarian, your vet may recommend an X-ray contrast dye study of the spinal cord or *myelogram*

, a Magnetic Resonance Imaging (MRI) exam, or computed tomographic (CT) examination. Since DM affects the spinal cord, the only definitive method to diagnoses the disease is with microscopic analysis, which can only be done as part of a post-mortem examination. However, recently researchers at the University of Missouri have found mutation in the gene for the superoxide dismutase 1 protein (SOD1) that is highly associated with degenerative myelopathy

in the top five dog breeds recognized with the disease. This is similar to the breast cancer genes seen in people. Thus, genetic testing of your dog may reveal that your dog has either one or two copies of this gene that is associated with degenerative myelopathy and may raise suspicion that your dog has degenerative myelopathy rather than some other treatable disease. Some dog breeders are also using the genetic test to help guide their breeding programs.

Many large breed older dogs may have other arthritic type diseases, but these seldom lead to the wobbly gait or knuckling of the hind paws that occurs with DM. DM is also seldom associated with obvious pain. If treatment with analgesics, like aspirin, carprofen (Rimadyl), (Dermaxx), etc., for arthritis does not seem to show improvement, then DJD or oarthritis may not be the problem. If your dog breed is one of the ones named above or cited in the OFA statistics, talk to your vet about whether your dog's problem may not be arthritis but DM.

### **How to Genetically Test for Degenerative Myelopathy?**

Genetic testing for the SOD1 gene mutation is performed by the University of Missouri. The OFA has a method for ordering a test kit for at home testing and registration of the results. The OFA test kit contains a card for DNA sample collection with directions. The owner can perform the testing at home without visiting the veterinarian. DNA is collected from the mouth of the dog and then the sample kit is returned to the University of Missouri College of Veterinary Medicine. Genetic testing results are issued to the OFA, who in turn notifies the owner of the results as well as registers the information in their database. The test kit costs \$65 and includes the laboratory processing and registration of the information by OFA in their database.

For several dog breeds, one can obtain free genetic testing from the University of Missouri in their ongoing collaboration with the Broad Institute of MIT and Harvard University. The criteria are:

- Any dog (any breed) presumptively diagnosed as affected with DM by a veterinarian or veterinary neurologist
- All dogs 10 years of age or older from the following breeds ONLY:
  - Boxer
  - Chesapeake Bay Retriever
  - French Bulldog
  - Pembroke Welsh Corgi
  - Rhodesian Ridgeback.

To obtain a free test, your veterinarian will need to submit a small blood sample to the University of Missouri. Click [here](#) for more details.

### How to Interpret Genetic Testing Results?

All dogs carry two copies of the SOD1 gene. The genetic testing results will tell you if the mutation is present and if so whether one or both genes is involved. Possible results:

- **Normal/Normal (N/N):** Both genes are normal and do NOT carry the defect in the SOD1 gene. In the seven dog breeds that the University of Missouri has extensively studied, no dog that has two normal genes has ever had a confirmed diagnosis of DM. If used in a dog breeding program, N/N dogs will pass the normal gene onto the puppies. Thus, the puppies should be free of DM also.
- **Abnormal/Normal (A/N):** This dog has one normal and one abnormal gene and is called a "*carrier*." Carrier dogs in the seven breeds studied by the University of Missouri have never had a confirmed case of DM. However, as a carrier, this dog could transfer the abnormal gene to the puppies.
- **Abnormal/Abnormal (A/A):** This dog has two abnormal copies of the SOD1 gene and is *at risk* for developing DM. All dogs that have had confirmed cases of DM that were tested by the University of Missouri in their study also had two abnormal genes. However, not all dogs that will test positive (A/A) and be at risk will show signs of DM. In part, this is because DM is a disease of middle to old age. So younger at risk dogs may not look normal and not show signs until much older. Some of the at risk dogs may never reach an old enough age to show signs. But all dogs that are A/A will pass on one copy of the genetic defect to their puppies.

### My Dog has been diagnosed with DM - Now What Should I Do?

A presumptive diagnosis of degenerative myelopathy can be very discouraging for many owners. At present, there is no cure, and the disease will likely progress. There are many unproven therapies that range from homeopathic medicines, diet, acupuncture, water exercise, and stem cells that can be considered. If your dog is showing early signs of DM and just knuckling, then you can consider protection from wearing away the skin on his paws. This can be as simple as protective [boots](#) .

If your dog is stumbling and needs assistance with support on the hind end, a handheld harness can be considered. There are several types of handheld harnesses. The simplest support

system is a towel just in front of the hind limbs or one towel around each leg. While inexpensive, the towel support can lead to owner's straining their backs and for male dogs they may often be urinated upon. Commercial handheld harnesses are made from many substances including webbing and neoprene. The webbing support-type, such as the bottom's up leash, does not offer much padding where the webbing contacts the body. Neoprene-style harnesses, such as the [Walkabout](#), can be used for hind end support. The Walkabout harness is more involved to put on, but it can be left on the dog for short periods. However, the material is similar to a wetsuit and may be hot for dogs in warm climates. The [E-Z Sling](#) is a *K-9Cart.com exclusive item*

that is based on our dog wheelchair support system. It is easy to put on and adjustable. The soft padding can be molded to your dog's body. While the E-Z sling cannot be left on like the Walkabout, it is designed to resist soiling by urine and feces.



*Corgi with degenerative myelopathy regains mobility with dog wheelchair.*

If your dog shows good forelimb strength, then a good alternative to a handheld sling would be a dog wheelchair. Many wheelchair companies have adopted the design of the original K-9 Cart and provide both walking and non-walking models. Thus, the dog can be encouraged to maintain muscle tone by using the back feet. Stirrups on a K-9 Cart dog wheelchair also allow one to sling up the paw to prevent dragging. Boots are another option if you want to encourage use of the back feet but prevent abrasions. At K-9 Cart Company East, the top five breeds for DM comprise a large bulk of our dog wheelchair business. While we fit more Boxers, Corgis, and German Shepherd dogs than Rhodesian Ridgebacks or French Bulldogs, this is probably more due to the popularity of the first three breeds amongst Americans.

Some owners feel that a K-9 Cart dog wheelchair slows the progression of the disease. It probably does help to maintain better muscle tone. But since DM is highly variable, a dog wheelchair assists more with maintaining quality of life rather than any scientifically proven

benefit in disease progression.



*New four wheel fully adjustable K-9Cart.com dog wheelchair*

One concern of many dog owners, since the disease is progressive, is whether I can upgrade a two-wheel dog wheelchair to a four-wheel dog wheelchair. Designing a four-wheel dog wheelchair for a dog that provides support, especially for a large dog, that retains adjustability is especially challenging. Currently, we have developed a **new [front-extension dog wheelchair](#)** at K-9Cart.com that provides the ability to vary the height and location of the front wheels. We hope that this new innovation that can be adapted to existing K-9 Cart two-wheeled dog wheelchairs will offer help to dogs with DM that develop forelimb weakness. The new design allows adjustment in height and width of both front and rear wheels. Length adjustment of the two-wheel cart is maintained in the new four-wheel design.

However, for the best fit, a visit to our shop in Oxford, MD or returning your existing two-wheeled dog wheelchair remains the best option. There is never any additional charge for our veterinary expertise at K-9 Cart Company East in Oxford, MD.

Have questions? Call K9 Carts East toll-free at 866-K9-CARTS and talk with a vet!

Information contained in this article is based on data obtained from the OFA and the University of Missouri College of Veterinary Medicine Degenerative Myelopathy.