Spinal damage in animal leads to loss of nerve function.

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A disc herniation, trauma, spinal stenosis and instability, and vascular events are the most common causes of injury. Because spinal cord tissue does not regenerate effectively, an injury can have disastrous consequences. If the spinal cord is only partially damaged, dogs can recover quickly because the surviving nerves can take over the function of the nerves that have been lost. However, the more severe the injury, the less effective the recovery, and complete injuries that result in spinal cord transection, effectively cutting off all communications between the spinal cord and the brain, result in permanent paralysis. Polyneuropathy in dogs and cats refers to a group of peripheral nerve disorders that are frequently breed-related in these animals.

Polyneuropathy, as opposed to mononeuropathy, indicates the involvement of multiple nerves. Polyneuropathy is most commonly associated with motor nerve dysfunction, also known as lower motor neuron disease [1]. Reduced or absent reflexes and muscle tone, weakness, or paralysis are symptoms. It is usually bilateral and directly impacts the back legs, most are chronic issues with a gradual onset of symptoms, but some manifest suddenly. Botulism is extremely rare in dogs and usually occurs after eating carrion. Weakness, difficulty eating, acute facial nerve paralysis, and megaesophagus are all symptoms. Dogs and cats are less susceptible to botulism than other species. Diabetes neuropathy affects cats more frequently than dogs [2]. It is caused in part by prolonged hyperglycemia and results in tibial nerve dysfunction and a plantigrade stance. Symptoms of distal symmetric polyneuropathy include atrophy of the distal leg muscles and head muscles, as well as rear limb weakness. In cats, hyperchylomicronemia, also known as hyperlipoproteinemia, is a type of inherited hyperlipidemia. Polyneuropathy is caused by xanthomas, which are lipid deposits, stretching or compressing nerves near bone.

Sensory neuropathies are inherited conditions that cause dogs to be unable to feel pain and to lose proprioception [3]. In cats and dogs, spinal muscular atrophy is caused by the death of nerve cells in the spinal cord. Neuropathic pain also tends to affect defined dermatomes, and the area of pain may be limited. Clinicians looking for neuropathic pain look for an underlying nervous system lesion or an inciting cause consistent with the development of neuropathic pain. The obvious presence of an underlying feature or cause is not always detectable, and response to treatment may be used as a surrogate, especially if the underlying lesion diagnosis leaves the patient in pain for an extended period of time. Neuropathic pain has significant physiological effects on the brain, which can result in psychological disorders [4]. Rodent models in which the social effects of chronic pain can be separated from other factors indicate that chronic pain induction can cause anxio-depressive symptoms and that specific circuits in the brain have a direct connection.

Canine degenerative myelopathy, also known as chronic degenerative radiculomyelopathy, is an incurable, progressive spinal cord disease that is similar to amyotrophic lateral sclerosis in many ways. Progressive weakness and incoordination of the rear limbs are frequently the first signs seen in affected dogs, progressing to complete paralysis over time. Myelin is a protective sheath that wraps around neurons in the spinal cord [5]. One proposed cause of degenerative myelopathy is that the immune system attacks and destroys this sheath. This causes a breakdown in communication between nerves in the animal's lower body and the brain. Degenerative myelopathy first affects the back legs, causing muscle weakness and loss, as well as a lack of coordination. These have a stupefying effect and may appear to be arthritis. When walking, the dog may drag one or both rear paws, which can cause the nails on one foot to wear down. The condition can result in complete paralysis of the back legs. As the disease progresses, the animal may exhibit symptoms such as incontinence and difficulty with balance and walking. If the disease is allowed to progress, the animal will develop front limb involvement as well as extensive muscle atrophy and paralysis. Eventually, involvement of the cranial nerves or respiratory muscles necessitates euthanasia or long-term palliative care.

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