

Radial Nerve Paralysis in Dogs and Cats

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Radial nerve paralysis is one of the most common nerve injuries in dogs and cats. Dogs or cats with radial nerve paralysis are unable to use their front leg normally and appear lame when they walk, often dragging the front paw on the ground.

Anatomy

The radial nerve is the largest nerve in the front leg and is responsible for extending the elbow, wrist and toes. Additionally, this nerve provides sensation to the upper-outside surface of the front leg and upper surface of the paw. The radial nerve originates under the upper front leg from a bundle of nerves called the brachial plexus. The nerves that form the brachial plexus originate from the spinal cord in the neck region. The radial nerve travels from the brachial plexus down the underside of the upper front leg. It then crosses over the outside of the upper front leg just above the elbow. From this point, the radial nerve dives deep and branches into the muscles of the lower front leg. The radial nerve ends in the paw.

Nerve Injury

When the radial nerve is injured, paralysis of the front leg can occur. The severity of symptoms depends on the amount of damage to the radial nerve and where along the limb this nerve was injured. Trauma to the animal's leg above the elbow, where the nerve is close to the surface, is a common cause of paralysis. Additional causes of radial nerve paralysis include excessive stretching of the brachial plexus (most commonly from having the limb pulled away from the body) or by a tumor on or around the brachial plexus.

Signs of Radial Nerve Paralysis

Dogs and cats with radial nerve paralysis lose the ability to control their triceps muscle and the muscles that extend the front leg; for this reason, they won't be able to extend the elbow and lower limb. The leg will remain flexed or bent. The result is a limb that can't be placed to stand or bear weight. The upper side of the paw often drags on the ground. Additionally, sensation to the upper-outside of the fore leg and the upper side of the paw will be depressed or absent.

Prognosis

The prognosis for dogs and cats with radial nerve paralysis is dependent on the extent of the injury to the nerve. Nerves are somewhat like the wires that carry electricity throughout a house. The nerve fibers, or axons, are like the wire and the nerve sheath is like the covering over the wire. There are three levels of injury associated with nerves depending on how much of the nerve is damaged. The level of injury will help determine the prognosis.

Neuropraxia: Temporary loss of nerve functions without anatomical injury. Injuries of this nature can return to normal. This would be like bending a wire.

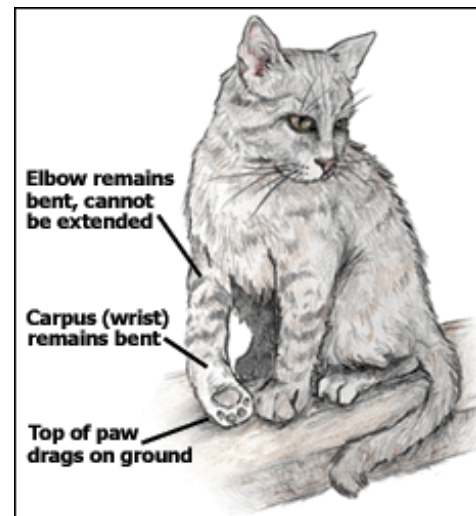
Axonotmesis: Rupture of some nerve fibers within an intact protective covering. This would be like the strands of a wire breaking inside the intact coating. This type of injury happens most commonly by pinching, crushing, or prolonged pressure. The prognosis with this type of injury is guarded. It may take several weeks or months for function to return. Nerve fibers grow at a rate of 1 mm/day. If the distance between the ruptured ends are not too great and the sheath is intact providing a path for the nerve fibers to grow, then there is a chance that the nerve will re-grow and return the limb to some level of function.

Neurotmesis: Complete severance of the nerve, nerve fibers, and protective covering. This would be like cutting the wire in two. Prognosis for recovering use of the leg is grave. Any return of function is highly unlikely.

The extent of injury can be determined during a veterinary examination of the affected limb. If the animal can still detect deep pain in the limb, usually demonstrated by pinching the toe and the animal retracting the limb in response to the pinch, then there is a chance that the limb can return to function because this demonstrates that there are some nerve fibers still intact. If no deep pain is detected, this usually means the nerve has been completely severed. In this case, the chance of the limb returning to function is very slim.

Treatment and Follow-up

It is very important to protect the affected limb during the recovery period. With the dog or cat unable to control his front leg, there is a chance that he may injure the lower limb and especially the paw by dragging it on the ground. When muscles lose their nerve connections they begin to atrophy or shrink, usually within five days of the injury. Physical therapy may be helpful to maintain blood flow in the atrophying muscles. If the injured nerves begin to re-grow, the animal may experience abnormal sensations from the affected limb. This condition is called paraesthesia. The abnormal sensations may lead to self-mutilation of the limb. In this case amputation of the limb may have to be considered if the behavior cannot be controlled.



Nerve injuries are very mysterious. It can be very difficult to predict if function will return after injury. Therefore it is very important to determine the extent of the injury. If the sheath surrounding the nerve fibers is still intact, then there is a chance that the limb function will return. In these cases, time and good nursing care are the best options.