

Neuromuscular disease

What is the neuromuscular system?

The neuromuscular system is the nervous system outside of the brain and spinal cord, and includes the nerves and muscles (and their junction). The nerves of the neuromuscular system include both the nerves that of the head (cranial nerves) and nerves leaving the spinal cord that control the muscles of the limbs. The junction between the nerve and the muscle is called the neuromuscular junction.

The neuromuscular system is important for motor activity (walking, standing, chewing food, swallowing). Signals travel along a nerve as an electrical current, which then must travel across the gap (neuromuscular junction) to reach the muscle.

What signs are associated with a neuromuscular disease?

Dogs or cats that present with neuromuscular disease commonly present with varying degrees of weakness, and possible muscle wastage. This weakness can affect any muscle in the body and may cause animals to be unable to exercise normally, or even affect their swallowing and may cause regurgitation.

This weakness may be related to disease in the nerve (neuropathy), the neuromuscular junction (junctionopathy) or the muscle itself (myopathy). In mild cases the weakness may only be intermittent and associated by exercise, in more severe cases the animal may be unable to support its own weight, unable to hold its head up and have breathing difficulty.

What diseases can cause neuromuscular signs?

There are a large number of diseases that can cause neuromuscular signs. These can be directly associated with the nerve, neuromuscular junction or myopathy; or a disease elsewhere in the body that is having an effect on the function of the neuromuscular system.

Diseases that can cause a neuropathy, junctionopathy or myopathy may include:

- Infectious diseases (e.g. neosporosis, toxoplasmosis, tetanus, botulism)
- Immune mediated diseases (inflammation of the nerve – neuritis or polyradiculoneuritis, destruction of acetylcholine receptor – myasthenia gravis; inflammation of the muscle – myositis)
- Toxins
- Inherited and degenerative diseases

Diseases that may cause an indirect effect on the neuromuscular system:

- Endocrine disease: hypothyroidism, diabetes, hyperadrenocorticism, hypoadrenocorticism
- Cancer
- Kidney` disease
- Heart and lung disease

How do we diagnose neuromuscular disease?

The first step to diagnosing neuromuscular disease is to rule out the diseases that may cause an indirect effect on the neuromuscular system. Tests that may be performed include:

- Blood profile (including tests for hormonal and infectious diseases or specific tests if we are concerned about Myasthenia Gravis)
- Imaging (such as an X-ray, ultrasound or CT scan) of the thorax and abdomen

- Electrodiagnostics - this is where a small electrical current is delivered to an individual nerve or muscle and we can evaluate the muscle response to this stimulation.
- Biopsy of the nerve or muscle to try and identify whether there is inflammation or degeneration of the nerve or muscle.

What is the treatment for neuromuscular disease?

The treatment for neuromuscular disease can be varied and depends on the suspected underlying cause. It is important to be aware that even if the underlying cause is treatable, many may take weeks to improve.

What is the prognosis?

The prognosis for neuromuscular disease, much like the treatment, is variable and depends on the underlying cause. Some conditions such as neuromuscular disease caused by cancer, an inherited neuropathy or myopathy may be associated with a poor prognosis. However, many conditions may have a good prognosis with appropriate treatment.