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Nutritional Minute



Vitamin E and Equine Motor Neuron Disease

What is Equine Motor Neuron Disease?

Equine Motor Neuron Disease (EMND) is a degenerative disease of the motor neurons located in the spinal column and brain stem. Motor neurons are the nerves responsible for signaling muscles to contract and move. The motor neurons of horses with EMND become damaged. The damaged neurons send incorrect signals to the muscles and affect the musculature of the horse. Symptoms associated with EMND include:

- A constant shifting of weight on their hind legs
- Difficulty standing
- Excessive recumbency (lying down)
- Fasciculations (spontaneous muscle contractions)
- Gait is stiff rather than ataxic (uncoordinated)
- Low head carriage
- Muscle atrophy
- Trembling
- Weight loss, despite a normal or increased appetite

Vitamin E Status and Treatment

Equine Motor Neuron Disease was first discovered in 1990. Initially, experts did not understand all the factors leading to the illness. They observed that a large majority of horses with the disease had little to no access to fresh pasture or were on high-grain diets and dried forage. They also knew that fresh pasture is the best source of natural vitamin E and that grain and dried forage are typically low in vitamin E. They questioned if vitamin E deficiencies might be contributing to EMND. Veterinarians proceeded to collect data on the vitamin E status of horses showing signs of EMND. They discovered that affected horses did in fact have very low or deficient vitamin E levels in circulating blood and in the muscle tissue surrounding the tail head.

These findings led researchers to look more closely at the relationship between vitamin E in the diet and development of EMND in horses. In 2007, Mohammed and others at Cornell University fed horses diets that were deficient in



vitamin E for an average of 38.5 months. Of the 11 horses on the deficient diet, 10 developed EMND. This study helped confirm that a prolonged vitamin E deficiency is a risk factor in the development of EMND.

New research suggests that identifying vitamin E deficiency in the early stages of the disease and providing vitamin E treatment can improve the outcomes of horses with EMND. Bedford and others (2010) confirmed vitamin E deficiencies in horses that were displaying slight muscle weakness and atrophy consistent with early signs of EMND. The horses were treated with vitamin E until levels returned to normal. The treated horses exhibited improved muscle mass and strength. Early detection and treatment can improve the prognosis of horses with EMND.

Vitamin E in the Diet

Many factors contribute to a horse's health. Research shows that a prolonged deficiency of vitamin E is a contributing factor in the development of Equine Motor Neuron Disease. Providing appropriate levels of natural vitamin E in the diet may help prevent the onset of EMND. Horses can meet their daily requirement for natural vitamin E by grazing on high-quality fresh pastures. However, fresh pasture is not always available due to seasonal changes, dietary restrictions, training and competition schedules, or stabling circumstances. When daily access to fresh pasture is limited for one reason or another, it is recommended that horses be supplemented with natural vitamin E.

Not all vitamin E supplements are created equal and care must be taken to provide a natural, bioavailable source of vitamin E. Natural vitamin E, rather than synthetic, is more readily absorbed and retained by horses. In fact, research shows that natural vitamin E is 2 to 3 times more potent than the synthetic vitamin E! When determining whether a vitamin E supplement contains natural or synthetic vitamin E, look at the ingredients on the label. Natural vitamin E will be listed as d-alpha tocopherol. Synthetic vitamin E will be listed as dl-alpha tocopherol or "vitamin E supplement." Levels of natural vitamin E supplementation should be based on your horse's needs and activity levels.

Recommended levels

| | |
|--------------------------|------------------------|
| Maintenance | 1,000-2,000 IU per day |
| Intense Training | 3,000-5,000 IU per day |
| Pregnant/Lactating | 3,000 IU per day |
| Foals | 3,000 IU per day |
| Stallions | 3,000 IU per day |

Horses under a veterinarian's care that are exhibiting neuromuscular symptoms can consume up to 10,000 IU of natural vitamin E per day.

A qualified equine nutritionist or veterinarian can help you determine if your horse has appropriate levels of vitamin E in his diet. If your horse is displaying any symptoms of EMND, consult with your veterinarian immediately.



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