

# Equine Metabolic Syndrome

*This term is often used to describe horses with abnormal fat distributions and insulin resistance*

## Overview

The term “metabolic syndrome” is being used more often in equine practice to describe horses with abnormal fat distributions and insulin resistance. Insulin resistance is a condition in which an increased production of insulin is required in order to maintain (or attempt to maintain) circulating blood sugar levels within normal limits.

While metabolic syndrome is a clearly defined clinical entity in human medicine, it remains rather obscure in veterinary medicine as evidence by its pseudonym “equine syndrome X.” Despite recent research efforts, many questions remain regarding equine metabolic syndrome (EMS). Nonetheless, EMS is important in the equine industry due to the high prevalence of laminitis in horses with EMS.

Insulin resistance is an important component of EMS, but the production of adipokines (similar to the steroid cortisol) by adipocytes (fat cells) and the ability to convert circulating cortisone to cortisol results in clinical manifestations that are similar to horses with Cushing’s syndrome (i.e., horses with an endocrine disorder that ultimately results in high circulating cortisol levels). In addition, the hormone resistin, produced in adipose tissue, is also thought to contribute to the development of insulin resistance.

At-risk horses are commonly either obese or easy keepers, aged eight to 18 years of age; however, even non-obese horses can develop EMS. While any breed can theoretically be affected, EMS is more commonly observed in ponies, Morgans, and breeds that evolved in harsh conditions such as Spanish Mustangs, Peruvian Pasos, Paso Finos, etc.



Horses with abnormal fat distribution and insulin resistance might be considered those with equine metabolic syndrome.

## Clinical Signs

Affected horses typically present with Cushing’s-like signs such as abnormal fat deposits in such areas as the neck, shoulders, loins, tailhead, and in the fat pads above the eyes. In geldings fat can also accumulate in the prepuce. Some horses have a pot-bellied appearance and can present with polydypsia and polyuria (excessive drinking and urination).

Chronic, recurrent laminitis, particularly mild cases, is common in horses with EMS. In fact, some owners might be unaware that their horses have suffered one or more bouts of laminitis. Typical signs of recurrent laminitis include the characteristic rings on the hoof wall, separation of the white line, and an abnormal position of the coffin (pedal) bone within the hoof as determined by radiography (X ray).

## Diagnosis

Due to the challenges diagnosing EMS, it is important to rule out other endocrine diseases that can present with similar signs. The two most common conditions that can easily be confused with EMS are hypothyroidism and equine Cushing’s syndrome.

A hallmark of EMS is insulin resistance. In horses, diagnosing insulin resistance is challenging and multiple factors can impact test results such as stress, time of day (i.e., hormone levels naturally fluctuate throughout a 24-hour period), time of year/season, when and what the horse was last fed, and the horse’s normal dietary components.

A test called the “euglycemic insulin clamp” is currently considered by some as the gold standard for diagnosing insulin resistance. This test involves a slow, constant intravenous infusion of insulin and glucose and subsequent monitoring and analysis of serial blood tests to calculate the amount of insulin necessary to reduce the artificially elevated blood glucose levels. Clearly, this is not a simple or inexpensive test to perform or interpret and therefore is not widely employed for diagnosing EMS in most cases.

One alternative is the combined glucose-insulin tolerance tests (CGIT) that involves administering both glucose and insulin (intravenously) to the horse, then measuring blood glucose and insulin levels over the next several hours. Like the euglycemic insulin clamp, the CGIT is typically performed at a referral center and not on the farm.

In considering convenience, cost, and the horse’s stress level, veterinarians commonly elect to obtain a single blood sample on the farm to measure blood glucose and insulin levels to help diagnose insulin resistance in horses with clinical signs consistent with EMS.

According to the experts in this field, glucose to insulin ratios are not useful for diagnosing insulin resistance or EMS.

## Treatment

There is no specific treatment or cure for

horses with EMS. Drugs typically reserved for horses with equine Cushing's disease, such as pergolide and cyproheptadine, are inappropriate for those with EMS.

Instead, the primary management tools for horses with EMS include dietary changes and increased exercise. Most horses, particularly older inactive horses, can be maintained on a forage-only diet and do not require supplementation with concentrates to maintain a healthy body weight.

Many owners do not realize what a healthy body weight is and unknowingly overfeed their horse. Horses with metabolic syndrome should have only limited (or no) access to pasture.

It is also recommended to increase the affected horse's exercise level. This involves daily or near-daily exercise in the form of hand walking, longeing, long-lining, driving, riding, ponying, or any combination of the above.

It might not be possible to immediately institute an exercise regime if the horse is currently suffering from a laminitic episode. Instead institute dietary changes, wait for the episode to resolve, then slowly

increase your horse's exercise level.

### Prognosis

EMS cannot be cured, but the overall health, well-being, and episodes of laminitis can be improved by instituting the necessary diet and lifestyle changes described above. The most important factor impacting prognosis is laminitis and the degree of rotation or sinking of the coffin bone at the time of diagnosis.

### Prevention

Since there is no specific treatment for EMS, experts recommend that horse owners make every effort to minimize the chances of their horse developing the condition. This involves feeding a balanced, forage-based diet void of concentrates and molasses to maintain a healthy body condition. Do not let your horse become overweight or obese (ask your veterinarian to help determine your horse's body condition score if you are unsure). Regularly exercising your horse will also assist in the maintenance of a healthy body condition and minimize the chances of developing EMS later in life. 🐾

## FAST FACTS

- Horses with equine metabolic syndrome (EMS) have abnormally distributed fat depots and insulin resistance. Insulin resistance is a condition in which an increased production of insulin is required in order to maintain (or attempt to maintain) circulating blood sugar levels within normal limits.
- EMS occurs more frequently in horses eight to 18 years of age who are overweight, obese, or easy keepers, and in specific breeds.
- Chronic, recurrent laminitis is common in horses with EMS.
- EMS is diagnosed based on clinical signs, by ruling out other diseases such as hypothyroidism and equine Cushing's syndrome, and by identifying insulin resistance via blood tests.
- There is no treatment or cure. Preventing the development of EMS is recommended via diet and lifestyle modifications



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