

## **Equine Metabolic Syndrome—Is It Making Your Horse Lam Or Injury-Prone?**

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Are you the owner of a sport horse who struggles with a tendency to be overweight or cresty? While we all know that allowing our horses to be overweight is probably not optimal, there is now evidence that being overweight is potentially more harmful to equine athletes than we had realized. New research into human tendon injuries is showing that obese humans, particularly those with Metabolic Syndrome, may be disproportionately affected by problems like Achilles tendonitis and shoulder rotator cuff tendinitis due to effects of their disease on tendons and other connective tissues. Is the same true in horses?

Many overweight or obese horses are affected by Equine Metabolic Syndrome (EMS). EMS is a condition characterized externally by excess fat accumulation primarily in the crest of the neck, the tail head region, and the sheath in males. Some breeds are much more predisposed than others (think very thrifty breeds like Arabians, Paso Finos, Mustangs, Morgans and Warmbloods) but all breeds can be affected. It has similarities to a pre-diabetic state in humans, also called Metabolic Syndrome, although it is not a true diabetes. Affected horses do have insulin-resistance, meaning the body's cells fail to respond normally to insulin and so the pancreas pumps out more and more, resulting in excessive blood levels of insulin ("hyperinsulinemia"). EMS also results in increased systemic inflammation throughout the body, linked to production of inflammatory proteins by adipose (fat) tissue.

The most dramatic health consequence of EMS is laminitis (founder), which seems to be directly related to the high blood insulin levels, and possibly to high levels of an inflammatory protein called serum amyloid A. Research has shown that normal horses given insulin via IV infusion rapidly develop laminitis.

However, there is growing evidence that EMS can also affect soundness in more insidious ways than laminitis. The excessive fat deposits in humans and horses with Metabolic Syndrome are actually hormonally active, producing substances called pro-inflammatory cytokines that can increase harmful inflammation throughout the entire body, including in connective tissues such as tendons and ligaments.

In addition to having more frequent injuries of the Achilles tendon and shoulder, humans with Metabolic Syndrome have been shown to have increased levels of inflammation throughout the body, abnormal fat deposition within tendons, and altered function and structure of tendon components (particularly collagen) due to interactions with excessive blood glucose levels. Humans with true diabetes frequently have multiple musculoskeletal problems associated with their disease, thought to occur because end products of improperly processed sugars react with the proteins and cause stiffening of connective tissues. While there is not yet any published research establishing the same is true in horses, many veterinarians suspect it to be the case. In our practice, I feel I see a disproportionate number of suspensory ligament branch injuries in the "pleasantly plump" hunter set who are worked relatively lightly. These injuries sometimes progress to a degenerative suspensory ligament desmitis rather than making progress towards healing the way they more typically would in a Thoroughbred race horse, for example. Dressage horses are also notorious for developing chronic suspensory ligament origin problems in the rear limbs, which often do not respond well to treatment. Is there a reason other than biomechanics that this occurs so frequently? I look forward to our profession delving more into this relationship in the future.

So, what can you do to prevent your horse from suffering these effects? First, knowledge is power. A blood test for insulin is readily available and fairly affordable. Work with your vet to determine whether your horse has elevated insulin levels, and if so, to what extent. Some horses that appear to be only slightly overweight actually have insulin levels high enough to put them at significant risk of laminitis, and there would be no way of knowing that short of doing bloodwork. Testing leptin levels may also be helpful in some horses, as it correlates closely with insulin-sensitivity.

If your horse is found to have elevated insulin or leptin levels, what then? In most cases, insulin levels can be decreased with changes to diet, exercise, and judicious use of medications. Hyperinsulinemic horses usually cannot tolerate access to grass pasture. Research shows that insulin levels are consistently higher in horses with grass access compared to those fed hay. Be especially careful about grass intake when sugar levels in grass tend to be highest, in both the spring and the fall. We see peaks in laminitis cases both in the spring and fall each year associated with these changes in the grass. If your

horse is already overweight, do not allow access to lush green spring grass!

Weight loss at the rate of 1% per week via caloric restriction (“dieting”) has been shown to significantly improve insulin-resistance in horses. Total hay intake may need to be reduced to as low as 70% of a horse's maintenance needs (in other words, a 30% decrease compared to their usual diet), meaning as low as 12 pounds of hay per day. Hay should also be tested to determine its sugar content. Hay can vary dramatically in this regard, and its appearance is not a good guide to sugar content. In other words, hay that looks to be fairly poor quality can actually have high sugar levels. Hay testing for sugar levels is available via a laboratory named Equi-Analytical in Cornell, NY, for about \$50.

Work with your vet to determine an appropriate restriction and overall weight loss plan for your horse, which may include addition of medication and periodic blood testing. Some horses may benefit from supplementation with a medication called thyroxin. While we now know that most overweight horses do not actually have reduced thyroid function, supplementation with extra amounts of thyroid products can safely help speed weight loss and improve the body's sensitivity to insulin. And finally, get out and ride some more! Consistent moderate and heavy intensity exercise and its tendency to result in weight loss are well-known to improve insulin-resistance in both humans and horses.

**Biography:**

Dr. Wendy Krebs graduated from the Oregon State University College of Veterinary Medicine in 2002 and went on to complete a 1 year internship program and then a 4 year Equine Surgical Residency program at Bend Equine Medical Center. She became a partner in Bend Equine in 2008. She lives in Tumalo, OR and confesses that she has had an addiction to eventing since she was 11 years old. She currently trains and competes with her ISR mare, Aria. She is married and has a two year old son, Finn.