



## Equine Metabolic Syndrome

Sports Medicine, Lameness, Reproduction and Dentistry

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Equine metabolic syndrome (EMS), also known as insulin resistance or equine diabetes is an endocrine disease found in many of our domesticated equids. It is one of the most diagnosed endocrine diseases found in our patients, and one of the leading causes of metabolic founder. Insulin is produced by the pancreas in response to increased levels of glucose circulating in the blood. Once released by the pancreas the insulin is utilized by the liver, skeletal muscle, and fat cells to take up the circulating glucose and metabolize (alter) and store the glucose as glycogen for later energy use. When levels of glucose are low the insulin levels will decrease. Therefore as horses eat and the glucose increases the insulin increases, and when they are fasted the insulin will decrease. This gives the waxing and waning effect seen on blood draws.

With EMS the insulin produced by the pancreas is not being utilized by receptors that are found on the skeletal muscles, fat, and liver. Therefore the high levels of glucose circulating in the blood are not being lowered and the pancreas will continue to release the insulin. With a normal horse the stored glycogen is removed from the energy stores and utilized for energy when



Figure 1 Google Image of pony with a BCS of 8/9

the horse needs the energy. Since the high levels of glucose are circulating in the blood the stored glycogen is not utilized and the horse starts packing on weight and will become fat (Body condition score (BCS) greater than 6/9). The high levels of glucose circulating in the blood will lead to metabolic laminitis (inflammation of the lamina) which if not treated quickly and correctly will lead to founder (rotation and sinking of the coffin bone).

**What are the signs of EMS?** Typically, EMS is seen in ponies, and over fed under worked horses. They are typically known as “easy keepers”. They are overweight (cresty neck, fat over the ribs, fat pads over the tail head and hind quarters), will often times show soreness in their feet (short stride, positive to hoof testers, or laminitic stance), have increased digital pulses and heat in the feet, and will gain weight despite receiving little to no grain.

**What can be done to know if my horse has EMS?** A physical exam and evaluation of the type, quantity, and quality of feed are first examined. An insulin and glucose blood test can be

sampled (normal insulin is between 2 -25 micro IU/ml and glucose is 70 – 120 mg/dl). Physical exam findings with elevated blood levels of insulin and glucose are diagnostic for EMS. Many times these horses are not examined until they begin to show laminitis and founder.

***How can we treat the disease?*** There are several treatments available, but there is not a cure. The best way to treat the disease is: diet management, exercise, supplements to help utilize the insulin receptors, and if needed proper shoeing and trimming to treat founder. Horses with EMS will need to be placed on a diet low in calories (DE digestible energy), carbohydrates, and sugar. The diets can be high in protein, fat, and contain the proper micro-nutrients (calcium, phosphorus, magnesium, selenium...). The horses should be fed good quality grass hay which can be soaked in water to reduce the sugar content. High quality hays such as Alfalfa and clover hays (legumes) should be avoided. There are several diets available such as: Safe choice, L/S, Ultium (low starch high fat for skinny horses with metabolic syndrome). There are feed supplements such as Enriched 32 and Microvet which can be fed to horses who don't need grain but will still need the proper amount of micronutrients. The most important thing to look for in a low starch feed is the NSC (non-structural carbohydrates) quantity. Ideally this number should be under 10 for an EMS horse. Powder supplements such as Chromium yeast, and HEIRO (Healthy Equine Insulin Rescue Organicals) can be used to increase the utilization of the insulin receptors. Thyro-L (thyroid supplement) can be used for the extremely obese horses to help increase their metabolism and fat loss, and sensitize receptors to insulin. If your horse has shown or is showing signs of founder/laminitis, radiographs and farrier work should be done as soon as possible. Increasing the exercise routine, as long as there is no evidence of laminitis, will not only increase the weight loss and metabolism, but will increase the GLUT 4 receptors on skeletal muscle which are the receptors for insulin. Each horse is different; therefore each horse will have a treatment plan tailored to their life style.

***What about grass?*** Although grass is the main food source for our horses, it is full of sugars. Sugars are stored in the grass through the process of photosynthesis, therefore they are highest during the day, and lowest at night. Sugars are also concentrated in the grass during times of drought and hardship. Just because your pasture is turning brown in the summer, does not mean it does not have a lot of stored sugar. You must be cautious when keeping your horses out on pasture. Grazing muzzles are a great way to allow your horse to enjoy the freedom of the pasture, while slowing down and limiting the grass intake. Some horses will not handle grazing muzzles and may need to spend part of their day in a dry lot or arena.

With the knowledge and understanding of the disease, you as the owner, are the biggest key to keep your horse healthy. They cannot decide what to eat and when to exercise, so you are their nutritionist and their trainer. Tough love is what these horses need to stay happy. If handled correctly these horses should live long, normal, happy lives.