

# Mysterious Muscle Problems...A Personal Look at EPSM

by Yvonne Welz

For me, this story hits close to home. Way too close! After all, why would a young, healthy horse with good living conditions and proper hoof form suddenly develop insidious hind end lameness problems? Have you ever heard of EPSM?

If I had heard about EPSM at some point (Equine Polysaccharide Storage Myopathy), I certainly did not pay attention. And if I had not experienced the symptoms firsthand these past couple of months, I would be scoffing at yet another “syndrome” with an acronym. Yet suddenly, I had a young horse with a big problem. Here’s our story.

It all seemed to start with the knee injury. Kendra is a 5 year old registered Paint mare, about 16’2 and 1400 lbs. In March, 2004, we attended her first rated dressage show, where she did very well. A week later, she injured her left knee in the pasture. At the time, it really didn’t seem all that serious—she was mildly lame for 2 weeks, but then seemed fine, and was running around in the pasture a lot. When the swelling was not going down, we finally had the vet come out, and he said she had ruptured the common digital extensor tendon. Fortunately, it was not really a big deal, as there were no treatment options even available, other than applications of DMSO. Just don’t worry about it, he said, and the swelling will probably go down.

However, through all this, I had laid off her normal amount of exercise, which previously was about 1 1/2 - 2 hours per day, with lots of trotting and cantering. Since the injury, we had just been mostly walking, and I gave her a few periods of rest from riding. After a couple of months had passed, she seemed sound, and the tendon was healing well, so I slowly tried to get her back to work. That’s when the hind end lameness really surfaced!

It was very vague, and irregular. One day she would be just fine, and the next day, for no reason, she would be terribly stiff. She usually improved with a long, slow warm-up. But then she began to develop a “hitch” in her rear-end, and she started to short-stride with her left rear leg. When these problems surfaced, it was easy to explain away—she was still compensating for her knee and thus straining her rear end. Someone saw her galloping like a wild woman the day before in the pasture, so she must have strained herself. I must be pushing her too hard (though we were hardly doing much!) and just needed to give her time. Every time she improved, I thought we were over it, but the problems kept returning.

During this time, I realized my saddle fit had changed, and her topline seemed different. She was losing weight, which did not make sense. I



Yvonne and Kendra, May 2004

had my saddle restuffed, but that didn’t seem to improve the tension I felt in her back. Her stride has lost its smoothness.

As time passed, we became increasingly frustrated by this mild, chronic, irregular lameness in her rear end. Then on May 14, 2004, things really escalated. During an afternoon ride at a walk only, she appeared to “tie up.” She nearly fell while walking up a small slope, as her muscles literally gave out. Her hindquarters were hard as a rock, and she did the strangest thing I have ever seen—she was lifting each hind leg up really high, alternately, and fairly quickly. It reminded me of a little kid who had to use the bathroom. She literally could not even walk at all for about 3 days! One week later, she was okay, and I was lightly riding her again. But despite my frantic online research on “tying up” and “azoturia,” I still could not figure out what was going on, and I was really worried. The only thing that even resembled the lifting of the hindlegs was “stringhalt,” and I kept reading that was caused by eating poisonous weeds!

Finally the last straw happened one month later, on June 17. During the previous weeks, she had been improving a lot—but on this day, she started out very stiff again. After a long warm-up, she felt much better, and we had a good ride, though I felt some irregularity in her hind end. When I put her up to eat her grain, she walked away from her food bucket, began pacing the pen, and started pawing. Of course, I’m thinking colic, eeeek! But then she did it again—she started lifting her hind legs up individually, alternately, over and over again. 20 minutes later, the episode had passed, and she was just fine, quietly munching on hay.

Now I am determined to get to the bottom of this mysterious problem. Was everything linked together, the hind end lameness, the tying up, and the lifting of the hind legs? It did make sense. Finally, after hours and hours of research, I stum-

bled upon this from Dr. Beth Valentine’s articles at [ruralheritage.com](http://ruralheritage.com):

**Shivers:** Affected hind legs are periodically flexed (bent) and often held up for several seconds. This is most obvious when walking, backing, and turning, but may also be seen when the horse is standing still. This may be mistakenly called stringhalt, or the horse may be described as “stringy.”

And then I read the rest of the symptoms of this syndrome named EPSM:

- Loss of muscle mass or conditioning, especially in the shoulder or hind quarters.
- Abnormal gait due to mechanical lameness in one or both hind legs.
- Trembling, especially after exercise.
- Difficulty rising, backing, or reluctance to back.
- Lack of energy.
- Poor performance.
- Reluctance to pick up feet for shoeing.
- Lifting or “stomping” of hind limb or limbs, especially while standing.
- Episodes of colic, especially after exercise.
- Slightly stiff, awkward, or short strided hind limb gait (often with no hock action).
- Tying up.
- Lying down suddenly, unable to rise.

Of course a big “eureka” went off in my head. Finally seeing the big picture, I sat down and wrote out Kendra’s odd plethora of symptoms she had developed over the past 6 months:

1st noticed symptoms in December 2003—lethargy, lack of forward movement, and grumpiness while grooming. She also began to develop crooked wearing on her hind feet. Other symptoms had developed in the past couple months, and become progressively worse.

Symptoms now displayed in June, 2004:

- Hindlimb gait asymmetry, with shortened hind limb strides, left hind shortest. Left hind weakness with abnormal movement to leg.
- When halting, holds left hind leg camped back, or lifts it up to rest.
- When standing, constantly rests hind legs (mostly left), while she used to stand square on them while eating.
- Difficulty cantering, awkward and resistant.
- Muscles have trembled after exercise.
- Difficulty engaging, not moving forward freely, lethargic at times.
- Tucked up abdomen, and muscles bunched up in the flanks.

- One episode of "tying-up," could not walk afterwards and hindquarters hard as rock (May 14), plus shivers.
- When eating grain after a ride, leaves food and paws as though colicking (June 17), plus shivers.
- Shivers: Both hind legs periodically flexed and held up for several seconds, mostly on May 14 & June 17, but occasionally seen other times to a lesser degree.
- Problems turning sharply (stiff hind legs) to either direction, left leg worse.
- Stomping both hind legs while swishing tail, for no apparent reason, while standing (always after exercise).
- Kicks out while being groomed, especially near hindquarters, and acts generally grumpy.
- Recent slight weight loss for no reason. Loss of muscles over topline, saddle fit seemed to change.
- Changes in behavior, off and on: sulking a bit, walking into the corner of the pen and turning her butt to me, or too quiet. But then she'd be normal the next day.

**All these symptoms seemed to point directly to EPSM!**

### Just What is EPSM?

EPSM is the muscle disease Equine Polysaccharide Storage Myopathy. It is a newly recognized disease, and is under research at the College of Veterinary Medicine at Oregon State University. According to leading researcher Beth A. Valentine, DVM, PhD, EPSM has probably existed for hundreds of years. The cause of the problem appears to be an inability of affected horses to properly break down glycogen in their muscles, and the excess of glycogen leads to muscular cramping and weakness.

EPSM has been identified in nearly every breed, but is most common in draft horses, draft crosses, warmbloods, and Quarter horses. Drafts show the most severe form, which can result in death when an affected animal becomes so severely weakened (literally overnight) that it goes down and cannot rise. Light breeds usually show much less severe symptoms, often simply gait abnormalities, hind leg weakness, attitude/training problems and back soreness.

Rather than a "disease," it can be thought of more as a metabolic type. These horses have a metabolism that makes it difficult for them to keep their muscles working properly on normal horse diets. According to Dr. Valentine, "At this point it appears that about two-thirds of all draft related horses and about one-third of light horse breeds



**Kendra posing (notice that left hind leg resting) with my brother Jeff Selden and his wife Nicole Lamartine. Kendra is a very large-muscled horse—could this body type pre-dispose to EPSM?**

have the type of metabolism that predisposes to EPSM. They are often the best built, best temperament, and best performing horses, which makes me wonder if we have somehow selected for this type of metabolism." Any horse that ties up or has any kind of muscle problems, weakness, or hind limb lameness should be suspected of possible EPSM.

While grain feeding does not cause EPSM, it will bring the symptoms out, as will heavy exercise. Late fall 2003 corresponded with an increase in both for my young horse, and this was the beginnings of her symptoms. However, EPSM has also been diagnosed in horses fed no grain at all, as these horses are simply unable to derive adequate muscle energy from carbohydrates.

### How is EPSM Diagnosed?

EPSM is probably a severely under-diagnosed condition. Horses can show different degrees of severity, so a horse with mild EPSM who lived as a pasture potato might go completely unrecognized. As I've been talking with various people this past month, I've found that everyone seems to know of a horse that keeps tying up or exhibiting suspicious symptoms. Often these horses are large and extremely well muscled, and sound like good candidates for EPSM.

The easiest way to test for EPSM is to try the recommended diet (below) for 6 months. A positive response to the diet is good evidence that the horse does have this condition. However, for a definitive test, a veterinarian can do a muscle biopsy to be sent to the veterinary pathology laboratory at Oregon State University. I've opted to try the diet first.

### What is the Treatment?

The treatment is a diet change to decrease soluble dietary carbohydrates (grain) and increase fat. Dr. Valentine developed these dietary recommendations and has found that many cases of EPSM show 100% improvement with the dietary thera-

py. The diet is most effective when started in the early stages. Horses on this diet show improved muscling, increased energy, and are able to perform with minimal muscle damage.

Dr. Valentine writes, "The horse's hay and pasture are generally not altered, but the addition of fat to the diet is critical, regardless of whether the horse is on grain or not. By increasing the fat and decreasing the carbohydrates in the diet, the horse's muscle is gradually "trained" to use more fat for energy than it normally would, decreasing its reliance on glycogen (animal starch)."

What is the diet? Grain is replaced by a low starch, low sugar feed (such as alfalfa pellets, some senior feeds or special low-starch feeds, or beet pulp) and oil and/or high fat feeds (such as rice bran, full-fat flaxseed, or one of the newly developed high fat horse feeds) are added to increase fat intake to 20% of the daily calories (calories, not weight). For a 1,000 lb horse, this is equivalent to 1 lb of fat, or 2 cups of vegetable oil per day.

From the natural horse care standpoint, this just doesn't sound very natural at all—so I started doing more research into the feeding of fat to horses. What I discovered was quite surprising.

It isn't natural for horses to eat large quantities of grain, either. In *Equus* #289, Joanne Meszoly writes "Odd as it seems, a growing body of evidence suggests that the best way to counteract the effects of an "unnatural" equine ration is to increase the proportion of a dietary element [fat] in a way that has no known parallel in the wild. Researchers recognize the paradox."

Although I had previously heard that feeding oil interfered with vitamin absorption, there is currently no evidence to support this. The article goes on to explain the extremely efficient process in which the equine gut digests fat. Broken down in the small intestine by bile and pancreatic lipase, the fat soluble vitamins then ride along with the fat and all are absorbed into the circulatory system. Danger of losing vitamins could happen if the horse had diarrhea, but gradual introduction should prevent that.

I'd also heard about the dangerous possibility of quantities of oil disturbing the gut bacteria. The *Equus* article continues, "...the ingestion of large quantities of fat does not disrupt activity in the hindgut the way a starch overload does. Instead, extra fat molecules simply pass undigested through the hindgut without affecting the balance of the flora." Research at the Middleburg Agricultural Research and Extension Center has not turned up any adverse affects after supplementing fat at levels up to 17% (by weight) for over 8 years.

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“Providing there has been a gradual increase in dietary fat intake, horses are able to digest and utilize up to 20% of the diet (by weight) as oil.” (Ray J. Geor, *The Horse*, Nov. 2002) Since the EPSM diet is only recommending 1 lb of fat for a 1000 lb horse who will eat 20 lbs or more per day, suddenly the diet doesn’t sound so extreme after all. Although there is not any data on the long-term effects of feeding a high fat diet, for horses with EPSM, it has been a lifesaver.

Along with the diet, exercise is part of the therapy. EPSM horses need as much regular exercise as possible, and (surprise!) should be turned out 24/7. It is also recommended that the horse be tested by your veterinarian for selenium levels, and a vitamin E and selenium supplement should be added according to these results. I had Kendra’s levels of selenium and vitamins E & A checked, and all were in the normal range. By the way, my veterinarian congratulated me on figuring out what is going on with my mare!

### **Progress**

Just three weeks into the diet, Kendra has transformed. Dr. Valentine had suggested that horses showing immediate response were the ones most in need of this diet. Her energy has gone through the roof, and she has become quite a lively ride (sometimes a bit too much so!). We are back to riding for 1-2 hours per day, and the hind-end hitch appears to be gone. I am prepared for possible setbacks, though, as full fat adaptation can take many more months, and so she is still susceptible to problems. From what I understand, as long as positive results are seen with the diet therapy within the first 6 months, you can expect progress to continue. Most EPSM horses can go on to live normal, athletic lives, but must remain on their special diet.

It is my hope that by sharing my story with others, more EPSM horses will be recognized and receive the help they need. I want to thank Dr. Valentine for all her efforts on spreading the word about EPSM. 

### **For more information about EPSM:**

Please visit [ruralheritage.com](http://www.ruralheritage.com); the EPSM articles by Dr. Beth Valentine are located at:  
[http://www.ruralheritage.com/vet\\_clinic/index.htm](http://www.ruralheritage.com/vet_clinic/index.htm)

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