

A Tale of Pigs, Russian Athletes, and Laminitis

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Recently, I have seen two published reports that contain useful information on the condition of laminitis or founder in horses. Neither seemed satisfactory in their recommendations on measures to avoid this problem, particularly pasture founder that is associated with excessive sugars and starches in pasture grass.

Of all of the problems that we experience with horses feet, founder or laminitis is among the most severe. The sensitive laminae are part of a complex evolutionary adaptation that allows a 1,000 pound horse to run at speeds of 40 miles per hour supported only by the tip of the nail of its middle finger. When horses founder, the laminae fail and the weight of the horse forces the coffin bone to rotate out of position. The condition is painful, exceedingly difficult to repair in severe cases, and frequently fatal.

The first of these reports is a September/October Horse News bulletin from the Culpeper Farmer's Cooperative. The bulletin is an advisory to be alert to the hazards of fall pasture grass. We are usually alert to the dangers of new spring grass. But warm fall days followed by cool nights, especially with frost, are of equal concern. Such conditions produce excess amounts of fructose – a sugar that is difficult for horses to digest and that can overwhelm the insulin response system. Measures suggested to avoid pasture founder included confinement, use of a grazing muzzle, and possible use of a supplement marketed under the name *Quiessence*. Confining the horse is clearly a management problem (unless cleaning stalls is a highlight of your day) and grazing muzzles are often ineffective. The greatest concentrations of fructose are at the growing tip of the grass and remain within the horse's reach. In addition, some horses are such determined grazers that nothing really deters them. The bulletin suggests that *Quiessence* may be effective as an extra source of magnesium. I am concerned that the bulletin fails to mention the possible importance of chromium that is the other primary ingredient in the supplement.

If you look at the feed tag on any feed that you are currently feeding, you should find magnesium, most likely as magnesium oxide, among the listed ingredients. Similarly, most vitamin and mineral supplements will include magnesium among the listed ingredients. You will look in vain, however, for chromium. It is not there. Federal regulations do not allow it.

You will, however, find chromium among the ingredients of most multi-vitamin/mineral supplements that you may be taking yourself. This is where the Russian athletes begin to enter our story. A report from the Fred Hutchinson Cancer Research Center in Seattle found that

people between the ages of 45 and 55 who took a chromium supplement gained 10-12 fewer pounds than those who did not. Why? The Russians and East Germans found the answer years ago when their athletic programs were based on a policy of more medals through better chemistry. Chromium helps metabolism so that fewer calories are stored as fat and more are converted into lean muscle tissue. During the same period, American athletes were advised to eat their Wheaties. Perhaps not as unfair as it might seem since wheat germ is a natural source of chromium. Brewer's yeast and dark chocolate are other known natural sources. Perhaps this justifies drinking more beer and eating more chocolate as part of our diets.

Because US studies are still deemed too inconclusive and, at least in part, because excess amounts of certain forms of chromium do have demonstrated toxic effects, chromium is currently approved for use in animal feeds only for the hog industry. While the results of relevant studies are to some extent inconsistent, there is a sufficient body of evidence that chromium in hog feeds is effective in reducing body fat, increasing lean muscle, and increasing litter size and survival rates.

At this point it is necessary to get just a bit technical. The primary role of chromium, according to a published study of the National Research Council, "is to potential the action of insulin through its presence in an organometallic molecule called glucose tolerance factor (GTF). Evidence for the importance of chromium has been obtained primarily from research and clinical investigations with humans and laboratory animals. People who...are type II diabetics respond well to chromium supplementation."

The second recent study of pasture laminitis needs to be introduced at this point. Dr. David Kronfeld reporting in the Virginia Horse Journal on work recently completed at the Middleburg Agricultural Research Center reports that 54% of laminitis cases traces back to pasture composition, 8% to grain overload, and the remaining 38% to a variety of factors with none accounting for more than 3% of the total. Among several firsts, these studies document an inherited predisposition of laminitis that is more prevalent in mares than male horses, the first statistically significant documentation of insulin sensitivity in a non-human population, and the first demonstration of "compensated insulin resistance" in apparently healthy ponies and exaggerated compensation on ponies early in the clinical stages of laminitis. The recommended countermeasures include:

- removal from pasture
- feed hay low in fructose and starch
- use low glycemic (low-starch) feeds
- avoid over feeding
- reduce body condition
- ensure daily physical activity

Several of these suggestions are not attractive if you are trying to manage your horse as a performance athlete. While there is a lack of specific scientific investigation, I am prepared to

follow the track already laid down by human performance athletes. All of my horses are on a chromium supplement. If there is compelling scientific information that chromium optimizes the performance of insulin in sugar and starch metabolism and that pasture laminitis results when the natural insulin response system is overwhelmed by excess sugar and starch in pasture grass, then I am willing to connect the dots myself. I also know of cases where equine veterinarians have prescribed one of the common chromium hog supplements by brand name for use by horses with a history of founder.*

All of my horses are fed on a line of food products marketed under the name **Horse Sense** and sold through a store in Marshall, VA. Most horses on the **Horse Sense** feeding program routinely use a chromium supplement marketed under the trade name *Mir-a-Chrome* that is formulated for use by horses. I have been on this program for about 5 years and must acknowledge that I work part time at the store. I regularly meet customers who have horses and ponies with long histories of founder problems that are free after starting chromium supplementation. One recent experience was most interesting. A customer came into the store and addressed me at the counter with the remark, "I understand that you have something for founder." Before I could respond even a single word, another customer reached on the display shelf behind her, took a bottle of *Mir-A-Chrome* off the shelf and a 3cc syringe out of an adjacent box and said, "You buy a bottle of this, you measure it with this syringe, and you give it to your horse." The people that I meet consistently mention three things: 1) their horses shed out better in the spring, 2) they develop better muscle condition, and 3) they remain free of laminitis, even horses that have long histories of repeated problems. All of these results relate in somewhat different ways to the chromium GTF factor influencing the effectiveness of insulin utilization.

I have two horses at home that are over 30 years old. Both are on chromium supplementation, both are out 24 hours a day, 7 days a week, 365 days a year in a 10 acre pasture with a run-in shed. I can't say that you can risk the same management with your horses. I am very certain, however, that there is a sufficient body of scientific research to say that chromium does enhance the functioning of insulin and that insulin performance is related to the onset of laminitis. Talk to your vet, do your own research, and if you can reach the same conclusions I have, then you may be able to turn your horses out at night and still get a good night's sleep.

[Ed. Note: Unfortunately, humans using that same form of "designer" Chromium have been suffering liver and pancreatic damage. While hogs are not fed for longevity, most horse owners want their horses to live healthy and long.]