

Feeding for Flexibility

Nutrition plays a vital role in a dressage horse's performance. A veterinarian and nutrition expert advises on what your horse needs to feel and do his best.

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SUPPLE FROM THE INSIDE OUT: *The grace of movement depends on protecting the flexibility of all bodily tissues. Photo montage of Tara Stegen and New Tango in canter pirouette.*

Surely no one would argue about the importance of flexibility and suppleness to a dressage horse. Training progressively increases strength, but suppleness is arguably what distinguishes the dressage horse from those in all other equine disciplines.

The ability to perform depends on developing the necessary neurological circuitry but also on strength, integrity and comfort of the musculoskeletal system. The nervous system can learn how to translate your cues into movements, but how smoothly the movements are performed depends on flexibility.

When people talk about a horse's suppleness, they tend to think mostly about the bending of the horse's joints. The joints are a big part of the suppleness picture; but muscles, muscular attachments to bone, tendons, ligaments, and connective tissues also play a role in how flexible and fluid a horse's movements are. In this article, we'll cover these tissues one by one and show you how they are connected and interact.

But first, a few words about nutrition and the equine athlete. A horse can be in good weight with a shining coat yet still lacking in maximal nutritional support for his athletic potential. Obviously, horses survived as a species without any human intervention for a very long time. However, feral horses do not have regular high level exercise demands made of them. They are equipped by nature for short-term explosive efforts to escape predators, not for the demands of regular training. Most horses can rise to the challenge—but for the ones that do not, or that do not live up to their riders' expectations, the reason may be nutrition-related.

The Stresses of Exercise

As far as the horse's body is concerned, any level of exercise beyond what he needs to do to graze and survive is a stressor. Although supplement manufacturers might tell you that you need to feed your horse supplements to help him deal with the stress, this is not necessarily the case.

The bodily defenses against the stresses of exercise come from within. For example, a byproduct of exercise is oxygen free radicals, which are electrically charged particles that are generated any time the tissues burn fuel for energy. Free radicals are chemicals that have an unstable electrical charge. In search of electrical neutrality, they attack the body's tissues to steal electrons that will make them stable. Fortunately, horses' bodies are equipped with a host of enzyme defense systems that "mop up" these free radicals before they can damage the tissues.

Exercise also generates an "alarm system" of messengers called cytokines, which send a message to the horse's DNA



PLEASE PASS THE SALT: *Even horses with access to salt blocks and licks may be sodium-deficient*

to rev up his antioxidant defense systems. Although equine DNA is more than capable of upregulating these defense systems, it needs adequate supplies of the basic nutrients in order to do so. The necessary amino acids and minerals have to come from the diet.

Nutrition and the Muscles

The key to flexibility in muscle is the muscle fibers' ability to relax properly after contracting so that all the related muscle groups operate smoothly to keep the movement fluid and balanced. Also important is the avoidance of muscle pain or fatigue, both of which interfere with the muscle's ability to relax.

Failure to relax and to transfer activity to other muscle groups can have various causes. The most extreme is tying-up (exertional rhabdomyolysis), a condition characterized by exercise-induced stiffness, cramping, and pain. Severe and recurrent cases have a genetic component, such as EPSM (equine polysaccharide storage myopathy). Other cases of tying-up result from a failure of the body's defense mechanisms to keep pace with the stresses being placed on the muscle. In the latter scenario, the reason is often nutritional.

One of the most common nutritional problems I encounter in performance horses is a simple lack of sufficient salt (sodium chloride). The horse's natural diet is severely defi-

cient in salt. Commercially prepared feeds usually contain salt, but not necessarily enough to meet the horse's needs. The horse's body needs sodium in order to hold a normal amount of fluid (water) in the tissues. Even very slight dehydration can have devastating effects on performance.

That's why step one in dealing with any performance issue is to make sure that your horse is eating a minimum of one ounce of salt daily in cool weather, two to three ounces in warm weather. Do not assume that voluntary intake from salt blocks is sufficient. Horses with a longstanding low salt intake reach a compensated state wherein the blood sodium and fluid levels are normal but those of the tissues are low. The brain "reads" sodium levels in the blood, and so if those are normal the brain will not send out the signal for the horse to eat more salt, even though the body may actually be sodium-deficient.

Another common muscle-related problem is pain or tension. Normal muscle has the same consistency on palpation as an uncooked beef roast. Even in very fit horses, muscle should never feel hard or tight. Pain on palpation is another sign of muscle soreness, with some horses objecting to even light touch, especially over hard-working muscles. Inadequate antioxidant protection is the usual cause.

Vitamin E is the major antioxidant in cell membranes.

Unless they are kept on pasture, which provides sufficient amounts, horses need supplemental vitamin E. This vitamin can degrade in commercial feeds or in multi-ingredient supplements, so I recommend supplementing with 2 IU per pound of body weight. For best absorption, the E should be in water-soluble form or mixed into a small amount of oil before feeding. You can also use the gelcaps of E in oil sold for human consumption; most horses will eat these in their feed with no problem.

Glutathione, which works inside the cells, is another major antioxidant manufactured by the horse's body. The trace mineral selenium is required to keep glutathione in an active form. A good starting dose for selenium is 2 mg per thousand pounds of body weight. (Most areas of the US are borderline to deficient in selenium, but hays grown in alkaline soils in the Midwest may be adequate. If you are unsure as to whether your horse needs supplemental selenium, talk to your veterinarian and ask about having your horse's whole blood selenium levels checked.) Glutathione production can also be supported by supplementation with the amino acid L-glutamine: 15 to 30 grams per thousand pounds.

A horse that is not building muscle well or that has persistent problems with soreness despite antioxidant support may need amino-acid supplementation with L-lysine and

L-leucine. Lysine levels can be borderline even if your feed contains it. A preliminary study also suggests that lysine requirements for working horses are higher than currently believed. Supplementation at 1 gram per hundred pounds of body weight is reasonable.

L-leucine, a branched-chain amino acid (BCAA), is the predominant amino acid in muscle tissue and is broken down during exercise. Supplementing with this amino acid can bring rapid relief of muscle pain and improved muscle bulk. For best results, use 1 to 2 grams of L-leucine per hundred pounds of body weight, mixed into 1 to 3 ounces of corn syrup. Administer as soon as possible after exercise, or give immediately before exercise.

As with all aspects of your horse's health, it's always best to work with your veterinarian in developing a comprehensive management strategy. Let your vet know about any supplements you give your horse, and consult with him or her if you're unsure about how to administer them or if you don't see improvement in the area a supplement is supposed to be targeting.

Nutrition for Joints and Cartilage

You're probably familiar with the use of joint-health nutraceuticals for horses diagnosed with arthritis. But you may

Effective Doses of Joint Nutraceuticals

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| Glucosamine | 10 mg/lb BW* |
| Hyaluronic acid | 0.05-0.3 mg/lb BW |
| Chondroitin | 7.5 mg/lb BW |
| ASU | 1.4-2 mg/lb BW |

*BW = body weight

not know that early joint changes can result in stiffness and reduced flexibility long before the horse actually shows signs of lameness.

Although data are still sketchy, two studies of guinea pigs, one of humans, one of dogs, and two of horses have shown that glucosamine, chondroitin, oral hyaluronic acid, and ASU (avocado soy unsaponifiables) have protective effects on cartilage in individuals prone to developing arthritis. Much more research needs to be done; meanwhile, feeding one or more of these substances to help guard against the onset of arthritis is reasonable.

Although some manufacturers of joint-health products tout that products containing multiple ingredients are equally effective in lower dosages, this claim has not been studied. To evaluate accurately whether a product will help

with stiffness, you'll need to feed enough so that your horse is getting the full effective dose of the active ingredient(s) (see chart on the previous page).

The nutrients and active ingredients mentioned in this article are available in a variety of commercial equine supplements. Alternatively, you can purchase pure ingredients from a reputable source, such as mybesthorse.com or pure-bulk.com.

The connective tissues between joints and cartilage also play a key role in producing supple and balanced movement. In addition to such familiar structures as the suspensory ligament and the flexor tendons, these connective tissues include ligaments that attach muscles to bones, joint capsules, bursas, collateral ligaments, spinal-cord disks, sheaths encasing muscles, and many others. Injury, inflammation, or both severely compromise flexibility.

Medical research indicates that the enzyme systems that generate the molecule nitric oxide play a critical role in healing injured connective tissue. What's more, the free-radical molecule nitric oxide has been shown to produce dramatic improvement in tendons and ligaments that were degenerative and failing to heal. You can support nitric-oxide levels for relief of connective-tissue pain and support of healing by feeding the Chinese herb jiaogulan (*Gynostemma pen-*

taphyllum). Start dosage at 2 mg per pound of body weight and increase until the horse's gums and tongue are obviously more pink in color. The color change occurs because nitric oxide enhances circulation.

Support for Suppleness—and Overall Health

Adequate flexibility of the tissues is critical for the beauty and smoothness of all your horse's movements. Supporting his inherent ability to protect and repair tissue can help to avoid major problems and to keep him happier and more comfortable in his work. ▲

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