

Standing up for Success: How to make the most out of your winter turn-out

Karen Gellman, DVM, PhD and Judith M. Shoemaker, DVM

The air is getting cool and crisp and your last competition of the season is looming fast. What next? For some, a little hiatus until after the holidays is possible. For others, there will be no serious work until spring thaw. Everyone knows that a vacation is often great for a horse's attitude: they need to kick back and be a horse for a while. But did you know that "down-time" in turn-out can be the most valuable time for healing you can give your equine athlete? There's a catch, though--the magic of R & R works only if your horse stands up straight while he's standing around.

Why is standing important?

Except for an hour or two of lying down dreaming, horses are on their feet all day long--from 20 to 22 hours. Their restorative healing sleep is done while standing, four to six hours each day. Our modern horses are freed from the hard labor of working 10-12 hours a day. And they don't have to forage or migrate to feed themselves. Most of them are pampered and beloved athletic partners or pets, who train 1-2 hours a day at most, and spend the rest of their time at leisure. They are standing and eating, standing and snoozing or just standing around. Nowadays, standing is a horse's primary activity.

Because of their large size and high speed capability, horses have slower metabolisms and need to be very economical with their energy resources. In the wild, horses will travel impressive distances daily, looking for food and water. It makes sense that they have adapted through evolution to minimize the metabolic cost of all activities. When a horse stands correctly, the cannon bones are perpendicular, one at each corner, like the legs of a table. This is a neutral posture in which it can stand, relaxed, for hours. Neutral posture uses the least amount of energy, and puts the least stress on the bones, joints and ligaments.



Every member of this family has identical stance and back contour

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While standing neutrally, a horse can heal from the normal wear and tear of life. But a hard working equine athlete can have injuries that are more than normal wear and tear. When a person or a dog injures its leg, they tend to sit or lie down, to avoid weight-bearing while healing. Although a horse lies down comparatively less than a dog, they still need to off-load their injured limb while they are at rest. Neutral stance allows them to easily balance on three legs, while resting an injured limb to maximize healing. Horses who can't distribute their weight evenly on three legs are prone to complications, like laminitis, in their "good" leg while healing from a severe injury.

In the wild, a horse either heals quickly from an injury, or compensates well. Otherwise it becomes a meal for a predator. Their nervous systems are genetically programmed to off-load an injury while standing still, so it can heal. But they can still use it appropriately when movement is necessary, like running away from danger. During the healing process, pain in the injured tissue informs the animal about the progress of healing, telling it how much weight can be safely loaded. Partial loading during the healing process is essential because healing tissue remodels according to the forces it experiences, so that the final result will be perfectly functional for the work it needs to perform. When we take away all of a horse's pain during healing, with analgesics, we may disengage this critical feedback mechanism. This often leads to re-injury and longer healing time by allowing the horse to load the leg too much while resting and too soon in movement.

While horses have evolved over 50 million years to heal quickly and effectively, their recent history of living with humans interferes with this process. We have changed the type of food they eat, the position in which they feed, the ground surface they walk on, what kind of movement they do, and their social interactions, all of which impact the way they use their bodies and stand. Domestic horses are also subject to a wide variety of head and neck injuries from living with restraints: fences, stalls, walkers, halters, bridles, and training gear. All these factors can result in abnormal neural signaling to the postural centers of the brain, causing horses to abandon neutral postures and adopt a compensatory stances. Compensatory postures cause more stress throughout the body, and adversely affect the process of healing. Long term compensatory postures can be the actual cause of musculoskeletal injury, by putting a physiologically inappropriate forces on body structures. Even though horses are genetically pro-

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grammed to stand up straight, for optimized healing, distorted neural signals from different parts of their bodies can make them stand in ways that inhibit healing.

INSET BOX: Injury Forensics

Why is right hock degenerative joint disease the most common athletic ailment in riding horses? How many horses in your barn need to get their hocks injected every six months from the time they are seven? Surely that is an early age for a joint to be wearing out. As it turns out, horses, like people, are either “righties” or “lefties”. Two thirds of horses prefer to put more weight on their left front/right hind diagonal pair of legs. Add a long toes and low heels on the front feet, which causes them to shift their center of gravity rear-ward, and you have more weight on the right hind than on any other leg. The lower hock joints were not engineered to support that proportion of body weight. This overuse leads to more rapid degeneration of the articular cartilage.

What factors affect stance in a horse: The three most important sources of information about posture in domestic horses are the feet, the teeth and the poll.

Feet

For most of our horses, a farrier determines their interface with the ground, whether through trimming, shoeing or both. Even with the best farrier skill and intentions, chronic abnormal foot balance is still common. The human factor interferes with what may be best for the horse, since no farrier wants to make dramatic changes that may make a horse uncomfortable. Unfortunately, small or moderate changes may not sufficient to change the horse’s central neural programming, which has adapted over time to a distorted hoof capsule. If a horse has long toes, the neurologic information from its feet and tendons is identical with the signal patterns that would be sent if the horse were standing on an uphill grade. So it leans forward over its front legs up the imaginary hill, but sits back on its hind end to keep from falling forward, since it is actually on level ground. This creates the most common compensatory posture. We call it “goat-on-a-rock”, because the horse stands with both front and hind legs camped under, as if it were a mountain goat on a boulder. Horses who stand like this much of the time will have sore backs and will overload their hocks and stifles which can lead to degenerative joint disease.

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Goat-on-a-rock posture, with both front and hind legs camped in

Teeth

Our domestic horses rely upon us for maintaining their teeth. Wild horses don't need dentists because they get 100% of their nutrition from grazing and browsing. Pulling up and chewing a variety of feed-stuffs through different seasons exposes the teeth to lots of abrasive material and uses a larger jaw excursion than cut hay, thus avoiding the development of points (the sharp edges that are floated by equine dentists). Wild horses also eat from the ground, which maintains a normal flow of rough and finely chewed food through the mouth and across the grinding surfaces as they eat. This wears down their continuously erupting teeth evenly. When a horse has uneven growth or wear patterns in his teeth that interfere with its grinding or mouth closure, it is called a malocclusion. Malocclusions change the positional relationship of the upper and lower jaw. We all rely upon information from our jaw joint (TMJ) to maintain upright posture. Tracking the jaw position in relation to the skull gives essential information for keeping the head supported by the body in both standing and movement.

INSET BOX: How does jaw position control posture?

Try this exercise: Stand on level ground with your feet shoulder width apart and your arms relaxed at your sides. Feel how your body's center of mass is balanced between your feet. In humans, the center of mass is located between your belt buckle and your lumbar spine. Now, stick your chin out as far as you can, creating a temporary under-bite. Feel how you reposition your balance. Next, pull your lower jaw back towards your neck as far as you can. Your body posture will make the opposite postural adjustment. Try side to side. If your own postural signaling is intact, you will feel your body adjust to placing itself under your jaw position, no matter where you move it.

When horses have an overbite or molar ramps, the postural control mechanisms compensate by pitching the body's center of mass rear-ward. This malocclusion exacerbates "goat-on-a-rock" posture.

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Moderate overbite in a 7 year old TB

Poll

The third critical region that reports to the brain about posture is the head-neck connection, or the poll. As you can imagine, evaluating and controlling head position is not only essential for protecting the brain, but it allows the animal to see, hear, smell and eat. Head position is mainly controlled by the small muscles and ligaments that connect the head with the first two neck vertebrae. In the upper neck, there are many millions of neurons that report to the brain's postural centers about head position. This feedback enables the animal to change its head position as needed to respond to changes in body position, ground surface, or outside stimuli like food or danger. A domestic horse can easily be injured in the poll area by anything that can put inadvertent force on the upper neck--head restraints, low ceilings, automated walkers, etc. Bad information from damaged muscles and ligaments can alter posture.

How can you tell if your horse stands abnormally?

Walk your horse out to a level surface and let it come to a halt. Let a friend hold the lead and step back 10 feet to look at it from the side. Are its cannon bones perpendicular to the ground? Does he align his legs symmetrically, like a table? Try walking and stopping him several times if you are not sure. You can also observe his default posture after he's been standing in long cross-ties for 5-10 minutes, in his stall when he's standing quietly or when he's sleeping.

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Horses standing on a real hill, “goat-on-a-rock” posture makes an imaginary hill, correct posture

If his legs are camped in, like the picture of “goat-on-a-rock” posture above, you can be pretty sure that at least one of the critical posture information providers (feet, teeth, neck) are giving incorrect data to the brain’s postural control center. You can also measure the frog width and length in all four feet. Weight-bearing makes the frog wider. A normal horse should carry 55% of its weight in front and 45% behind. If your horse’s hind frogs are larger than its front ones, chances are it has a “pitch” to the rear. If frogs of a front or hind pair are not similar in length and width, it could have a “tilt” from corner to corner or a “lean” to one side.

Making changes to stand up straight

The good news is that most of these problems can be fixed--often easily. And now is the time to do it, when you are taking a break from intensive training. Let’s start with the feet. To put it simply, the widest part of each foot’s sole is the center of the foot. The heel should extend to the widest part of the frog. If there is more hoof forward of the center than behind it, the effective length of toe is too long and you need to bring its functional break-over back to the right place and extend the posterior support. There are many ways to accomplish this, done with shoes or barefoot. Your farrier will know the techniques needed. The trickiest cases are those with under-run heels. These may require cutting off the distorted heel, and using a frog support prosthetic to give appropriate stimulation to the hoof, so it grows down, not forward. Some farriers may be resistant to making dramatic changes in your horse’s foot balance--you may get better cooperation if you have your vet on board to help with radiographs for accurate placement of shoes.

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When you make these changes, your horse may be somewhat sore for a while--days to weeks. They should be able to stand more correctly immediately, which should then feel more relaxed and happier. The discomfort they can experience is from remodeling the leg and hoof structures to their new, improved stance. Horses who have had long toes for extended periods may even develop abscesses as the hoof starts to heal the micro-damage from constant leverage on the sensitive part of the hoof and there are new pressures on the posterior weight-bearing structures. Don't panic! Most owners who make these changes report that even though their horse may be slightly sore initially, they have never seen them look so beautiful or travel and feel so well. Bear in mind that it will take 18 months (two complete hoof growths) for their reorganized feet to be generally self-maintaining, with even growth and top quality horn. But you should realize the many benefits of their standing more correctly almost immediately.

Next, you need to have your horse's teeth examined by a qualified dentist for malocclusions. There are lots of people who are willing to look after your horse's teeth--ranging from your neighborhood vet to the sophisticated dentistry practitioner, to the local tooth fairy. To correct posture, you need a practitioner who can perform a "dental equilibration", not just a float. What's the difference? A simple float removes the sharp points on the outside of the upper molars and the inside of the lower molars. Usually hand files are used, though some have upgraded to power tools to save time and elbow grease. Like many other areas of the horse world, dental care is full of strong opinions and mythology. Some old timers may say that one doesn't need tranquilizers or a speculum to do the job. Modern equine dentistry is sophisticated accurate work using very specialized tools. Tranquilization allows this accurate work to be done properly. Here are some important points to consider when choosing a dentist, or evaluating the work of your current one:

- 1) Your horse's front teeth (incisors) and back teeth all belong to the same mouth and must be balanced together. Any dental practitioner who doesn't do incisor work when needed is missing half the job.
- 2) To equilibrate the mouth (restore correct occlusion), it is necessary to check how the teeth meet--like when your human dentist asks you to bite down to check how he or she has shaped your filling. Since it is hard to ask even the most cooperative horse how its bite feels, the equine dentist needs to have their patient sedated, so they can move its jaw without resistance and test for places with high spots.

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3) Hand floats have technical limitations. A float is a file, and you make a file work by pulling its cutting edge across the surface to be rasped. A practitioner who only uses hand floats cannot remove points or other abnormalities from a horse's rear-most teeth, because they can't get behind them to pull the file across the surface--the soft tissue of the jaw is in the way. And if you don't use sedation and a proper mouth speculum with excellent lighting, you will never know what toothy monsters may lurk at the back of a horse's mouth.



See how the lower row of teeth has a big spike way in back

It is also may be difficult to make precise changes in the front teeth with a hand file. Modern burr tools give the skilled dental practitioner the ability to make tiny alterations in the occlusal surface and shape of the teeth that can make a big difference in how they use their mouth, and subsequently change the postural information from the temporo-mandibular joint.

Happily, there are more and more veterinarians who are taking a special interest in dentistry and getting advanced training. There is also a growing group of equine dental technicians who are highly trained in all aspects of dental equilibration and certified by the International Association of Equine Dentistry (You can find a practitioner through their website: <http://www.iaedglobal.com/>). So, if you hear about a great dentist, find out what training they have had, what kind of tools they use and whether or not they will be working with the horse sedated. If they are IAED certified and have been trained within the past 15 years, they can probably be relied upon to give thorough and accurate dental care. If your veterinarian

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has undergone several advanced training courses with AAEP and is a member of dental specialty associations, you can be reasonably sure they can do an adequate job. Most of the time, many of the most common malocclusions can be managed by a skilled equine dentist. Since teeth erupt slowly, it make take more than one session to completely balance the mouth. Even problems that can't be truly fixed, like a twisted jaw-bone, can be made more functional by a knowledgeable and experienced dentist. Proper dental management has a profound influence on balance, posture and overall quality of life.



and legs?

See how this horse's crooked mouth is echoed in his crooked stance

Remember also, that a horse is designed to eat with its head down most of the day, and drink water from below the level of its feet. The closer you can get your horse's lifestyle to mimic these natural activities, the better off he will be in body and mind.

What if your horse still can't stand up straight after you fix its teeth and feet?

For most horses, if you restore a mechanically and physiologically functional structure to their hooves and teeth, and give them ample opportunity to move freely in turn-out, they will successfully reprogram the remainder of their postural inputs and stand up straight. Sometimes, in horses that have had improper foot balance or inadequate dental care for a long time, the abnormal postural patterns persist, especially if they have other neurologic challenges (like EPM) or don't have access to prolonged turn-out. These horses will probably benefit from an experienced equine chiropractor, who can reset the receptors of the upper cervical area ([link to AVCA](#)). If you are lucky, there may be a practitioner in your area who has advanced training in postural reprogramming.

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Gravity. It's not just a good idea. It's the law.

If you live on earth, every molecule of your body is adapted to living with gravity. Gravity creates weight, which is the downward force acting on the musculo-skeletal system. If your horse has had an abnormal relationship with gravity because of issues with its feet, teeth or neck, the best way to fix that (after fixing his structural problems) is through movement. The horse needs to experience its body with correct neural inputs and variety of stimulations, to teach its nervous system to integrate its new, correct posture. The best possible management for a horse recovering from poor posture is full time turn-out in a large area with a variety of terrains and footing. In this situation, the horse is able to run its postural program on each terrain and integrate the results. If, however, your situation requires your horse to spend extended time in its stall, it is absolutely critical that you make its stall floor completely level beneath the bedding.

INSET BOX: Leveling the standing surface

Try standing on a lumpy hill of shavings or an overlapping stall mat for 10 minutes. Notice how you have to shift your posture to avoid losing your balance. Notice the strain in your legs and back. Imagine standing in that stall for 20 hours a day. (photo of lumpy stall)

The body needs to move in order to restore normal postural control. If your horse's access to turn-out is severely limited, you must spend more time hacking or hand walking your horse to provide that movement. Exercise without a rider is best, since the horse will only need to accommodate the reorganization of its own weight and balance, not the rider's as well.

What to expect when you go back into training

After time spent standing up straight, your horse will have a whole new relationship with gravity and its environment. You may find former training issues have disappeared, that he learns faster and with less resistance. Some will come back from turn-out more athletic and fit than when they left training. Others may need specific exercises to help them explore the new boundaries of their physical abilities.

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Similarly, attention to posture and balance for the rider is essential for performance, health and well-being. Now it's time to take care of yourself!!