

DRESSAGE, EVENTING, HUNTERS, JUMPERS

VOL. 49

PRACTICAL HORSEMAN

# EXTRA

SHARPEN  
YOUR COURSE  
RIDING SKILLS

Nutrition Report:  
Amino Acids

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# SHARPEN YOUR COURSE-RIDING SKILLS

These three exercises will help you zero in on the fundamental skills you need for a successful round.

**By Traci and Carleton Brooks**  
**Photos by Amy K. Dragoo**

**H**ave you noticed that as you ride around a course, it tends to get harder, rather than easier? That's because you have a constant stream of variables to tackle, including the questions posed by the course's turns, jumps and striding options as well as the many aspects of your and your horse's performance, which can change from one second to the next. Maybe he lands off a jump with too little pace and threatens to break to trot or perhaps your balance tips forward onto your hands. If you don't address each variable immediately, you won't be ready to face the next challenge in time, so things can unravel quickly.

Instead of schooling courses over and over again at home, the best way to prepare yourself for these high-pressure



## Carleton and Traci Brooks

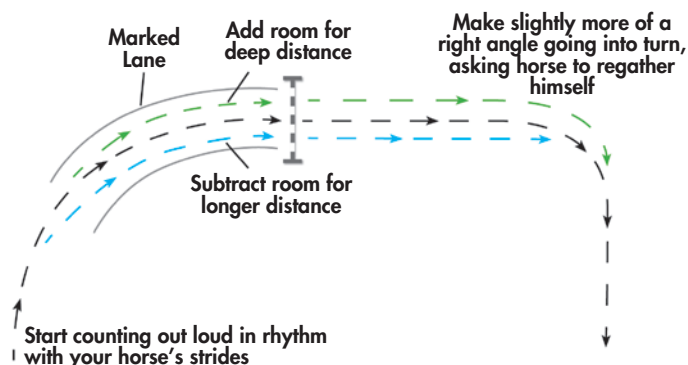
Husband-and-wife team **Carleton and Traci Brooks** run a successful hunter/jumper/equitation business called Balmoral, which they operate in two California locations—Malibu and Brentwood, on the west side of Los Angeles.

This unique setup allows them to provide their horses with plenty of healthy open space while also being accessible to their diverse clientele, which ranges from Short-Stirrup to Adults and high-performance levels. They shuttle horses back and forth between barns almost daily to be sure everyone enjoys plenty of turnout and trail riding.

Traci and Carleton have coached riders and trained horses to a long list of wins, including many Indoors championships and Horse of the Year awards. They developed and competed top show hunters, including Wish List, Triton Z, Ragtime Cowboy, Penn Square, Doubletake, Trinity, Vested, Play with Fire, Calvin, Inspired, Corporate Profit, Center Stage and Buccelatti. Carleton is a popular clinician and a U.S. Equestrian Federation "R" judge. He has officiated at shows such as the Devon Horse Show, the Washington International Horse Show, the USHJA International Hunter Derby Finals, the Pennsylvania National and the Royal Winter Fair.

**Getting your horse to produce his best jumping effort over every jump is all about finding the right canter for the approach and using your eyes. Lexi Wedemeyer is demonstrating this perfectly (photo at top left). She and her horse are both in excellent balance and focused on the jump. She's already found her distance to the takeoff spot and is just about to raise her eyes to a focal point in the distance.**

## Exercise 1: Tune Up Your Eye



Start by picking up the canter on your horse's better lead and establish a good rhythm, making sure he is between your leg and hand. You should feel him "filling in the reins"—offering equal pressure in each hand—so you know that he's ready to respond to your aids. Ask yourself, "Does this feel like the right canter? Could I open or compress the stride if I need to?" Then start counting out loud in rhythm with his stride—"One, two, one, two." As you approach the jump, raise your eyes to a chosen focal point in the distance, parallel to or just above your eye level, while keeping the jump and track to it in your peripheral vision.

**TIP**  
Find focal points at or above eye level.

situations is by practicing specific exercises that zero in on the most fundamental skills you need on course. We'll share three of our favorites in this article. Whether you're a beginner just learning to ride

courses or a more seasoned competitor heading to Indoors, these exercises will improve your balance, accuracy, feel and eye while improving your horse's obedience, adjustability, responsiveness, focus, balance, rhythm and straightness.

When you set up these exercises, we recommend using as many solid obstacles as possible—walls, logs, barrels, etc. These give you an actual barrier to jump, which helps you focus and encourages your horse to jump around the fence in a nice round shape. There is no need to make any of them big (even with advanced horses, we don't go above 3 feet). The purpose of all of these exercises is precision, not jumping high. Beginners can replace any of the fences with small crossrails, cavalletti or ground poles.

We always advocate using both reins to steer so that you're influencing the largest part of your horse: his shoulders and belly. In general, control your turns by balancing and steadying with the outside rein and leg and guiding with the inside rein and leg. Sometimes you may need to use one rein more than the other, but always keep contact with both.

We're also big proponents of visualization. Before you begin each exercise, study the diagrams, then ride through it in your mind. This will make your sessions more productive.



As you enter the marked lane four to six horse lengths away from the jump, try to judge whether you're going to arrive too close (deep), too far away (long) or just right. Here, you can see Lexi has entered the lane in a nice medium canter—not so forward that she's at the end of her horse's stride, but not short and choppy either. He's traveling in a good balance and "filling in the reins"—you can see the contact is neither slack nor too tight. Lexi has recognized that she needs to move up to a forward distance, so she's lightened her seat. However, she's gotten slightly ahead of the motion. We'd like to see her weight shift back closer to the middle of the saddle, which would open the angle in her elbows more. Lifting her eye and chin would help to accomplish this.

### Exercise 1: Tune Up Your Eye

Your eyes are the most dominant part of your ride. Where you focus them not only determines where your track will be but also significantly affects your balance, which, in turn, influences your horse's balance. Keeping your eyes level helps you maintain your balance and stay anchored and safe on the horse. A common issue we see is being ahead of the motion, which can be resolved by raising your eyes.

Choose focal points that are at or above your eye level. If your eyes are 10 feet above the ground, that means your focal point should be 12 to 16 feet high (depending on how far away it is). We all naturally tend to drop our eyes, so it's always important to raise them slightly higher than the intended focal point before letting them settle down to it. For example, if you've chosen a tree outside the arena to focus on, look first at the very top of it—don't start down at the trunk.

This technique is especially useful over fences. Use it to get the idea of "up and over" in your mind and body. That way you won't be tempted to lead with your shoulders, which tips your



In Lexi's next approach to the jump, the distance to the takeoff spot is a little long, so she opens her inside rein to bring her horse in on the curve slightly. At the same time, she maintains contact with her outside rein and supports him with her outside leg. This controls his belly and shoulders (so he doesn't bulge his shoulder out), as well as his head, so the shape of his body mirrors the shape of the curve. With this slight adjustment, they'll jump the fence where you see the white circle. Notice, too, that she's starting to close her hip angle to be ready to go with the motion when he leaves the ground.

balance too far forward, but rather with your chest and the tops of your hips. The idea is to let your horse jump up to you and then you follow, allowing his jump to close your angle.

As you warm up on the flat, choose a focal point outside the ring and practice riding around a bend or half circle that ends on a line heading toward the focal point. As you trot or canter around the bend, raise your eyes above the focal point, then let them settle down to it.

When you get the hang of this sensation, identify more focal points around the ring and do the same with them. This is a great technique to incorporate into your warm-up at shows, too.

Now set a small vertical on one end of the arena, far enough off the long side so you can jump it on a curve from either direction and then end up traveling perpendicular to that small vertical after landing. Jump this a few times on each lead to warm up.

Next, use agricultural lime (available at garden and hardware stores), spray paint, polo wraps or foam poles (or pool noodles—be creative!)—anything a horse can step on safely—to mark the edges of a curved lane starting at the base of the jump and extending several strides away from it in both directions (so



This time, Lexi's distance to the takeoff spot is deep, so she adds pressure with her inside leg and takes both hands to the left to encourage him to fade toward the outside of the lane, aiming to jump the fence where you see the white circle. Again, she's doing a good job of making the shape of his body mirror the shape of the track (rather than pulling his head to the outside, so his body curves away from the track). Notice how square her shoulders are to the fence. This is easier to achieve if you think of your outside shoulder being the last part of your body to come around the turn. Doing this also helps you to maintain contact on the outside rein and keep your outside leg against the horse's side to provide support.

you can jump it on both leads). Make sure your horse can travel straight for one or two horse lengths before and after the fence. The result will be a large half-circle interrupted midway through by the jump. Make the width of the lane 9 to 10 feet if you're a beginner and slightly narrower if you're more experienced—but no narrower than about 6 feet. Widen the lane by 2 or 3 feet at the base of the jump on both sides. Do not use solid poles for this purpose, as they could injure your horse if he steps on them.

Starting on your horse's better lead, canter a few circles to establish a good rhythm. Then start counting out loud in rhythm with his stride—"One, two, one, two"—as you enter the lane to the jump. Meanwhile, raise your eyes to a chosen focal point in the distance, keeping the jump and the track to it in your peripheral vision.

Initially aim for the center of the vertical. After your horse lands, keep straight for one or two horse lengths, then make your turn in the next corner slightly more square (closer to a 90-degree angle) while asking him to regather himself for the next straightaway. Then circle across the arena to jump the fence again. After doing this six or seven times, change direction and

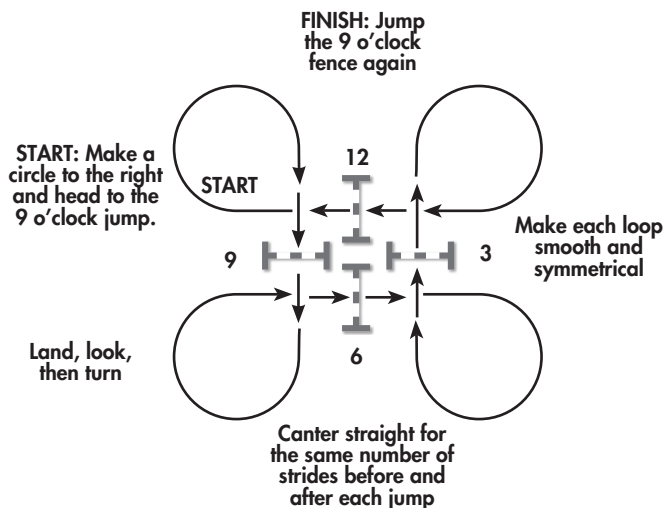
## Exercise 2: Cloverleaf Pattern



Lexi begins by jumping the 9 o'clock fence. In the air, she shifts her eye to the right to plan her track. It looks like she might be a little ahead of the motion. We'd like to see her hips back a little more over the saddle, which would take some bend out of her elbow. The horse drifted right in the approach, so she's shifted some extra weight into her left stirrup to correct him. By the time she lands, her weight will be equal in both stirrups again. She'll then canter straight for several strides before initiating the turn.



After landing, Lexi immediately reorganizes, getting her legs down around his sides and sinking her weight more into the saddle. He's gotten a little low on his front end and is probably leaning on the reins a little. To correct this, she'll sit deeper and use her legs and seat to encourage his hind end to step underneath his body and lift her hands a few inches. When he's reset his balance, she'll relax her aids and allow him to carry himself. She continues to look ahead to her planned track.



When you're jumping on a curve like this, changing your track by as little as 4 inches to the left or right can add or subtract as much as a foot to or from the distance your horse has to travel to the takeoff point, so keep these adjustments very small. Be mindful about his entire body, not just his head and neck, asking him to be perpendicular to the fence one to two horse lengths before and after it.

After doing this six or seven times, change direction and do the same on the other lead.

Developing a good eye takes time, so be patient with yourself. Instead of concentrating on the jump, think of it as just another canter stride. Try to keep the same pace and rhythm throughout the approach, jump and recovery. If you have trouble judging whether you need to fade to the outside or inside in the approach, ask an experienced rider to stand about six lengths in front of the jump (and a few feet to one side, so you don't risk running him or her over) and give you input as you ride by.

do the same on the other lead.

Next, approach the vertical with a new plan: When you're four to six horse lengths away from it, try to judge whether you're going to arrive too close (deep) or too far away (long). Adjust your track accordingly: If you're going to be deep, open your outside rein slightly and use some inside leg to encourage your horse to fade toward the outside of the lane. If you're going to be long, open your inside rein and use some outside leg to bring him in a little.

### Exercise 2: Cloverleaf Pattern

Use all the skills you practiced in Exercise 1 as you negotiate this more complex jump configuration, which is an excellent prep for the intensity of a challenging course, as it offers no breathers. Because the jumps come up so quickly, the landing of each one is also the approach to the next one. So you'll quickly get in the good habit of landing off a jump and asking yourself, "What's next?" This great mental exercise will turn



As she completes the loop, she straightens up for the approach to the 6 o'clock fence. She's regained her good balance and rhythm—and has her eye on a focal point in the distance. Again, her seat has crept forward toward the pommel—we'd like to see it a little closer to the middle of the saddle. This would help to soften the angle in her elbow and relax her arm.



This balanced approach produces a nice square jump, although Lexi is still a little ahead of the motion. Next time, we'll remind her to drop her heel down more and keep her leg closer to the girth so she can bring her seat nearer to the middle of the saddle, then let the horse "go first." When she allows the horse to jump up to her, her hip angle will close more.

you into a forward thinker.

Set four simple verticals and/or oxers with wingless standards in the middle of the arena where you'll have plenty of space to maneuver around all of them. Place them at right angles to one another as if they were the arms of a clock in the 3, 6, 9 and 12 o'clock positions. Adjust the distance of each jump from the center of the exercise depending on your experience level. If you're less experienced, set each near standard 10 to 12 feet from the center (20 to 24 feet away from the standard of the opposite jump). If you're more experienced, you can tighten the configuration up until the inside standards of the jumps are right next to each other.

Study the diagram on page 6 very carefully before beginning this exercise. It's easy to take a wrong turn and find yourself driving "up the exit ramp" instead of down. The general pattern is to work your way over the jumps in either a clockwise or counterclockwise direction, jumping each fence consecutively, always turning after a fence in the same direction you approached it, then making a loop before approaching the next jump. So, for example, if you start over the 9 o'clock fence in a counterclockwise direction (traveling from top to bottom if you are looking down at the diagram), start with a right-lead circle to jump the fence, then land, take a few straight strides, and then make a loop to right before jumping the 6 o'clock fence. Turn right again, jump the 3 o'clock, turn right, jump the 12 o'clock, then right loop to finish over the 9 o'clock again.

## Take an Eye Test

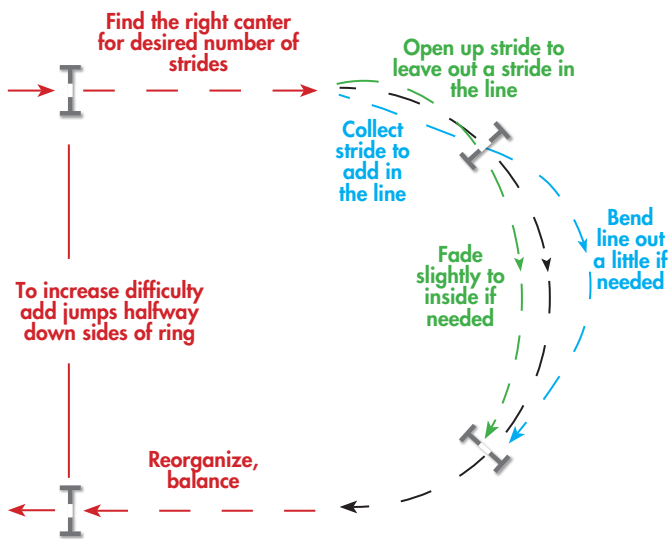
To see how influential your eye is on your position, try this test at a standstill: Drop your chin down toward your chest. Notice how it affects your entire position? You're no longer as balanced and secure as you were with your eye level. Keep this in mind if you worry that your horse has a habit of tripping, for example. If you maintain your balance, he will too!

Another good position check is to ask yourself, "Where would I be if I took my hands off the reins" and put them out to the side at the halt or walk. Then raise your eyes higher and feel your weight lift upward and balance over your feet. Note how all the other parts of your position fall into place when your eyes are up.

As in Exercise 1, your horse should be perpendicular to the jump for approximately two or three strides before and after each fence.

To practice the exercise on the left lead, you'll do the opposite: Jump the 9 o'clock fence heading in a clockwise direction (traveling from bottom to top if you are looking down at the diagram), then turn left afterward and make a loop to the 12 o'clock jump, turn left, jump the 3 o'clock, turn left, jump the 6

## Exercise 3: Jump Two Fences on a Curve



NOTE: The middle track (black dotted line) on the curve should be 84 feet long from the center of the first jump to the center of the second.

This exercise will help give you an idea of what a 10-, 12- and 14-foot stride feel like. If your horse has an average stride and the fences are about 3-foot, the middle track above should work out to a comfortable six strides at a medium show-ring canter. Every horse's medium canter is different, so modify this distance as necessary to suit yours. There's no right or wrong in this exercise. If your horse has a shorter stride and/or you're jumping smaller fences or ground poles, shorten the distance to 82 or even 80 feet.

o'clock, turn left and finish over the 9 o'clock.

When you first try this exercise, keep it really simple. Start with just the first two fences. Make your loops comfortably large so you have plenty of time to organize and get your bearings in between jumps. Straighten your horse several strides before each fence and jump it squarely, then canter the same number of strides afterward before initiating your turn to the next fence. If your horse lands on the wrong lead, make a simple or flying change before the next turn. Always turn your head first to plan your track before you initiate each turn.

When this is going well, add the third and fourth jumps.

Try to make the loops as symmetrical as possible. If you have trouble controlling their shape and size, check to be sure you're steering with both legs and reins. It's easy to fall into the trap of pulling on one rein or the other, which will throw your horse off balance. Instead, initiate the loop by putting both legs on and steering with both reins. Then apply more pressure to whichever rein you need while still maintaining the contact with the other rein to prevent oversteering or zig-zagging.

Be sure to ride forward away from each jump. It may be tempting to land and pull backward on the reins to give yourself more time to organize, but this will kill your pace and rhythm, making it impossible to get to the next fence in good form. Many mistakes can be fixed—or even avoided—by riding forward



Pick up the canter and establish a good pace, counting out loud, "One, two, one, two," before aiming for the center of the first fence. Lexi's seat is a little lighter here than we like our students' seats to be. Because she is a strong professional rider with a more advanced position and balance, she can pull this off. She has the horse nicely balanced and looking forward to the upcoming jump.

and straight. Always think: Ride forward into the reins.

As you did in Exercise 1, instead of thinking of each jump as the "main event," focus on your rhythm, pace and track. As you get the hang of the cloverleaf, gradually bring the loops smaller so you have less time in between jumps. Jumper riders can challenge themselves by making the loops quite snug. Another more difficult, but fun variation is to do this exercise without stirrups.

Practice the cloverleaf in both directions several times. (Note: If you're using ramped oxers, be sure to adjust them when you change direction so the front rails are always lower than the back rails.) As with any exercises, if you ever have trouble, simplify. If you can't manage to complete the entire exercise on one lead, break it down to just two or three fences at a time. Always go back to something you and your horse can complete comfortably and successfully before calling it a day.

This exercise is excellent at forcing you to correct bad habits—both your horse's and your own. If he tends to drift right or left, you'll have to adjust constantly to stay on track. If your reins tend to get too long, you'll quickly learn to keep them short out of necessity. You may even discover issues that you didn't know you had. For example, maybe your horse isn't accepting the outside rein, which makes controlling the size of the loops challenging. As good as the cloverleaf exercise is at





2

This brings her to an ideal takeoff. In the air, she looks ahead to the next fence and, at this point, can actually “see” how the six strides will ride and recognize any adjustments that need to be made. →

revealing such things, it’s equally good at fixing them. It naturally puts you in a position to self-correct without having to think about what you’re doing.

Once you get this sequence down, you can modify the exercise in future sessions. For example, instead of jumping the center of each fence, alternate jumping to the right or left of center every fence or two (still approaching each jump on a straight, perpendicular track). Whatever modifications you make, always visualize the exercise first so you know exactly where you’re going before you start.

### Exercise 3: Jump Two Fences on A Curve

The above two exercises are plenty for one day. Save this third exercise for another session. Again, use all the skills you learned in the previous exercises when you do this one.

Start by setting two small fences on the end of the arena, five or six strides apart and positioned at slight angles to one another so you can jump them both on a curve. Pick up the canter and establish a good pace before aiming for the center of the first fence, again counting out loud, “One, two, one, two.” As before, straighten for one horse length before and after the jump. After your horse lands, ride him forward into both reins and maintain your rhythm and pace while riding the curved track to the center of the second jump. Straighten him again for this fence’s takeoff and landing.

Make your turns before and after the jumps both smooth curves—not square turns—while maintaining the rhythm, pace and symmetry of the shape just as you did in the cloverleaf exer-

cise. Remember: Look, then turn.

Repeat this a few times, then incorporate the technique you learned in Exercise 1, adjusting your track slightly to correct for deep or long takeoffs at each jump. (If you like, you can mark chutes before and after each jump as you did in Exercise 1.)

You can also vary the number of strides between the jumps by changing your canter and/or track. For example, if your horse has a normal 12-foot canter stride, ask him to open it up to about 14 feet and ride the exercise in one less stride. If necessary, take some of the curve out of your track (fade slightly to the inside) to shorten the distance. Turn a little later in your approach to the first fence so you jump it on a very slight angle and land on a more direct track to the second jump. In the air over the first jump, give a longer release. When you land, add more leg—especially outside leg—and stay a bit lighter in your seat. This will help you subtract a stride comfortably.

Then try collecting him in the approach to the exercise to produce a 10-foot stride and add a stride between the jumps. Turn a little early to the first fence so you jump it on a very mild angle in the other direction, which will put you on a wider track with more curve in it. This will provide the extra distance you need to add a stride comfortably. Give a slightly shorter release in the air over the first fence. After you land, get a little deeper in your seat and put your leg on as you ask your horse to collect his stride between the jumps.

▶▶ TIP

Try to ride forward into the reins after each jump.



As she canters around the curve, she maintains her horse's balance, asking for the same steady canter all the way to the next fence. Lexi's strong position enables her to ride exercises like this in a half seat. If you find it more comfortable to lower your seat into the saddle at this point, that's perfectly acceptable.

As you practice riding this exercise in different numbers of strides, you'll develop a feel for the correct pace and stride length you need for each situation.

More advanced riders can increase the difficulty by adding a jump halfway down each side of the ring on the quarterlines—at least six or seven strides from the end jumps. This way, you'll jump a fence on the quarterline, then jump the two fences on the curve, then finish with the fence on the other quarterline. Start simple, aiming for the center of each jump, focusing on riding forward into both hands and thinking of each jump as just another canter stride. Then challenge yourself by incorporating the above-described striding adjustments. You'll have to land from the first quarterline jump, then balance and work to get just the right canter to produce your desired number of strides

## Constantly Correct Your Position

Nobody keeps her position for more than three horse lengths without making an adjustment. Say your eyes dropped, your fingers opened on the reins, your heels came up or you sat back too far. Whether the change is dramatic or subtle, the sooner you make the correction, the better. Avoid trying to "hold" your position in place. That invariably leads to worse problems, like holding your breath and locking up your body, which will cause your horse to react negatively by doing the same thing.



Here's the payoff for all that careful planning. The six strides ride perfectly, bringing Lexi and her horse to an ideal takeoff spot. The result is a nice square jump.

between the end jumps, then organize and balance again to jump the last fence nicely.

When this is going well, depending on your experience level, you can modify the exercise in a number of ways. We like to turn the fences on the quarterlines into combinations with two-strides, one-strides, even bounces and triple combinations (if there's enough room in the arena). Be sure you still have at least six or seven strides between the two jumps on the ends of the ring and the combinations. As you go through the combinations, ride each stride. Close your legs and ride forward to the next fence, encouraging your horse to make a good jumping effort every time.

You can also change up the exercise occasionally by jumping the end fences and then turning across the diagonal to jump another fence along it. Then complete the diagonal and ride the exercise in the other direction. Or try the exercise without stirrups.

Another fun variation is to jump the end fences on the curve, then take both reins in your outside hand while putting your inside hand behind your back. Ride like this to the next jump or combination on the long side. This is a great way to correct habits of twisting or falling on your hands—or to test that you're not riding too much with your hands.

As we mentioned earlier, if you ever run into trouble, simplify! Lower the fence heights or remove jumps.

Above all else, remember to keep your eyes focused up. That will improve your straightness. Combine this with a constant awareness of your track and rhythm, and everything else will fall into place. 🐾

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Source: Survey conducted among equine veterinarians who recommended oral joint health supplements. Pellets not actual size. Color may vary.

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## NUTRITION REPORT:

# AMINO ACIDS

Is your horse getting the right amount and type of the body's building blocks to be healthy and perform his best?

By Elizabeth Iliff Prax

**A**mino acids are a hot topic in today's equine nutrition. They are the vital biological building blocks that link together in the horse's body to create proteins, which form everything from muscle tissue to organ tissue as well as enzymes, hormones and antibodies. "Aside from water, protein is the most abundant molecule in the body," says Middle Tennessee State University associate professor Holly Spooner, PhD. "All tissue is made from protein. But it is perhaps the most misunderstood essential nutrient."

Horse owners tend to focus on crude protein, which, she explains, is actually just an estimate of the amount of protein in a feed product based on how much nitrogen is present (since nitrogen is much more abundant in protein than in other nutrients). "But that doesn't exactly tell the whole story," Dr. Spooner says. Quality matters more than quantity when it comes to protein in your horse's diet—and quality is determined, in part, by which amino acids are present in his food.

All grasses, grains and hays have a certain amount of protein in them. When it arrives in your horse's stomach and small intestine, enzymes break protein down into its amino-acid components. His body then puts these building blocks together in new configurations to make whatever it needs at the moment—for example, new tissue for muscles or vital organs.

Horses, like all mammals, use only about 22 of the more than 500 amino acids that exist on earth. Their bodies manufacture 12 of those 22, so we need to provide the other 10 "essential" amino acids through food: lysine, methionine, arginine, histidine, phenylalanine, threonine, tryptophan, valine, leucine and isoleucine.

Each protein a horse's body makes has a unique code, a formula dictating how a specific sequence of amino acids should be strung together. Some proteins consist of just a few amino acids; others are chains of thousands. If one amino acid in a particular protein's formula isn't available, the body can't substitute it with a different amino acid, so that protein can't be made.

"It's like putting together Legos," Dr. Spooner says. "The individual blocks are like

amino acids. If your plan calls for six red Lego blocks and you don't have six red Legos, you can't keep building. It doesn't matter that you have 150 blue Legos or 200 green Legos."

In this scenario, the red Lego represents what is known as a "limiting amino acid." How much you have of it limits how much protein you can build. In horses, scientists know that lysine is the most important limiting amino acid. They've estimated how much lysine horses need in their diets, but there is very little research about how much of each of the other amino acids they require. This is because horses are more labor-intensive to study and the benefits are harder to define than in other species, such as pigs or chickens.

While we wait for equine science to catch up, much of what we do know comes from human-nutrition research. For example, as with humans, although amino acids play many different roles in the horse's body, their primary purpose is to build protein. "Anything beyond that is going to be a relatively small portion of that amino acid," says University of Kentucky associate professor of equine science



**ABOVE:** Muscle proteins are constantly being broken down and remade, especially during exercise. Coupling your horse's training regimen with a good-quality protein source is the best way to help his body synthesize new protein, in turn creating more muscle.

**TOP RIGHT:** Though protein deficiency is uncommon, some signs that your horse might have this issue include weight loss and poor hair and hoof growth.

**LOWER RIGHT:** Lactating mares need more protein in their diets because they're supporting the protein needs of their growing foals as well as their own.

Kristine Urschel, PhD. "People get bogged down with some of the special uses for amino acids—such as tryptophan having a calming effect—when, first and foremost, amino acids are used to make protein."

## How to Make More Muscle

So let's focus on protein—more specifically, muscle protein. Muscle is about 70 percent water and 20 percent protein. The other 10 percent includes fat, vitamins, minerals and glycogen (the muscle's main energy source). The size of a muscle is largely determined by how much protein it contains. And this, it turns out, is a more fluid system than you might realize. Dr. Urschel explains, "It's not that a muscle protein gets made and then stays there forever. It's constantly in the process of being broken down and then remade, which allows the



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animal to be able to adapt to changing conditions." For example, if a horse has a chronic disease, he may need to repurpose some of his muscle protein for a different function in the immune system to battle the disease.

When a horse exercises, that exertion causes some of his muscle protein to break down. His body then replaces

and adds to that muscle by synthesizing new protein. But building bigger, better muscles isn't just a matter of feeding your horse plenty of amino acids, says Dr. Urschel. "That's like a human bodybuilder who thinks he can sit all day eating steak and get lots of big muscles. You're not going to get, say, the performance-level dressage horse topline if those muscles are never exercised to stimulate them." Building new muscle, she says, requires a combination of high-quality protein and a good exercise program, which stimulates protein synthesis at a cellular level. "Neither one can do it on its own."

## How Much is Enough?

Each individual horse's protein requirements depend on how much new protein his body needs to make. If he is growing, he'll obviously need plenty of protein to

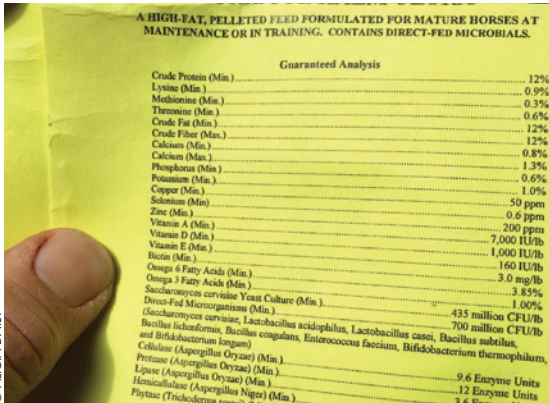
build new tissue throughout his body. If he is exercising strenuously, he'll need new protein to replace and add to the broken-down proteins in his muscles. He'll also need to replace the proteins and amino acids that he loses through sweat and will need extra protein to maintain the larger lean body mass that results from all this exercise.

The National Research Council's publication "Nutrient Requirements of Horses" lists the minimum amount of crude protein horses need at different

stages of life. It also recommends a minimum amount of lysine for each case. You can plug different body weights, ages and occupations (broodmare, working horse, etc.) into the NRC's handy online calculator to find your horse's exact requirements. For example, it says that a 1,100-pound adult horse in moderate work (exercising four to five hours a week) requires 768 grams of daily protein, 33 of which should be lysine. To learn how to translate these amounts into your horse's daily hay and grain rations, consult your local extension agent or check out the resources in the sidebar, "Where Can I Learn More?" on page 15.

What happens if your horse *doesn't* get all the amino acids he needs? Common signs include weight loss, poor hair and hoof growth, retarded growth in youngsters and lost fetuses and decreased milk production in broodmares. "But these conditions are rather uncommon in a horse with a normal weight receiving adequate feed intake," says Dr. Spooner. "In the U.S., we more commonly see protein being fed in excess than we see protein deficiencies, except maybe in the case of young, growing horses." In fact, she says, most adult horses on a maintenance regimen (doing minimal or no exercise) get all the protein they need from forage—grass and hay—alone.

The horses who need the most extra



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Even if you see common free forms of amino acids, such as L-lysine, L-threonine and DL-methionine, on a grain bag label's guaranteed analysis, it doesn't mean they were added in as separate ingredients.

protein are lactating mares, who are helping their babies grow new tissue while supporting their own bodies' protein needs. The next protein-needy horses are weanlings, yearlings and horses in heavy exercise. However, even horses in intense training, like racehorses and upper-level three-day event horses, need far less protein than lactating mares. In fact, because their diets are generally so calorie-dense to meet their higher energy needs, performance horses typically get more protein than necessary.

## How to Interpret Feed Labels

In general, both our experts agree that most horses get all the protein they need from a combination of good-quality forage and a suitable amount of concentrate designed for their age and lifestyle. However, says Dr. Spooner, the crude protein percentage you see on a feed label "really isn't what we should be focusing our attention on. All proteins are not created equal. If we're meeting the horse's protein requirement with poor-quality protein in terms of the amino-acid profile, we could still have a horse who is unable to build the protein that he needs."

So what is good-quality protein? In forage, it usually means immature, leafy hay rather than old, stemmy hay. Grass hays are generally between about 6 and 10 percent protein, whereas legume hays,

like alfalfa and clover, can be 15 percent or higher. Whatever hay you're feeding, Dr. Spooner highly recommends having samples of it tested "because it can be very deceiving. For instance, we have a relatively immature prairie-grass hay here at the university that often comes in with a protein level of 4 to 6 percent, which is pretty low compared to what most people might expect."

To further complicate things, researchers have learned that horses' bodies

can't actually access all the protein they receive in forage. That's because the plants' thick cell walls—the fiber—can't be broken down until the forage arrives in the large intestine, also known as the hindgut. But the enzymes in charge of breaking proteins down into amino acids are located in the foregut: the stomach and small intestine. So, theoretically, by the time the protein from forage is accessible, it may be too late for the body to actually use it. Concentrates, on the other hand, have less fiber, so are more easily digested in the foregut.

"This is another area of research that is super exciting," says Dr. Urschel. "There's still a ton that we need to know about it. We know that wild horses have been able to survive and reproduce on almost exclusive forage-type diets. So it's a bit of a conundrum. I think horses can get at least some amino acids from a good-quality forage, but the lower the fiber in the food, the more digestible in the foregut the protein is." Having said that, though, she is quick to add, "I still strongly believe that forage should be the backbone of most diets."

The protein quality in concentrates also depends on the source. For example, cereal grains, such as oats and corn, tend to be low in lysine, whereas legumes and oil seeds, such as soybean meal, have higher lysine levels. Commercial feed companies often add purified forms of amino acids

directly to their products to ensure that they reach adequate levels. These are more digestible because they're already in free amino-acid form. However, Dr. Urschel says, read feed labels carefully. "If you see, say, leucine included in the guaranteed analysis, but not in the ingredient list, all they've essentially told you is that leucine was contained in the grains. They haven't added any additional leucine to it. If it's in free form, it will be listed separately as an ingredient."

The four most common free forms of amino acids that you'll see in an ingredient list are L-lysine, L-threonine, L-tryptophan and DL-methionine. Unfortunately, until more research is conducted, scientists still don't know what horses' exact requirements are for each of these amino acids. They do believe, however, that these free forms are the easiest for horses' bodies to access in their digestive tracts.

Another way to make the amino acids in your horse's diet more bioavailable is to limit the size of his meals. "Horses often have greater digestibilities when a more reasonable amount of concentrate is fed at any given time," says Dr. Spooner. She recommends keeping concentrate meals at or below about 0.5 percent of your horse's body weight (so about 5½ pounds of food for a 1,100-pound horse per meal).

## Too Much of a Good Thing

Until we know exactly how much our horses need of each amino acid, why don't we just give them lots of each? Because the body can't store amino acids to use later the way it stores carbohydrates and fat. "The body doesn't store extra protein as muscle," says Dr. Urschel. Instead, she explains, the liver converts the amino acids that aren't used immediately into a compound called urea, which is then passed on to the kidneys where it's filtered and excreted in the urine.

This process requires energy and other additional resources, such as water. The horse's body can use protein to produce energy as well, but, as Dr. Spooner says, this is "metabolically expensive. It's not the



Researchers have recently discovered that horses have a special protein in their sweat called latherin, which forms the white lather on their coats when they exercise strenuously. This keeps the sweat on the horse's hair, rather than dripping off, and allows him to cool more effectively.

easiest way for the horse to make energy." Because it's much easier to produce energy from carbohydrates and fats, excess protein usually goes unused and thus must be eliminated from the body. This forces the liver and kidneys to work harder as they have to break down and process the protein. "If you've ever known anyone who's done the [low-carb] Atkins Diet, what they're doing is utilizing protein (and fat) for energy. It's been known to make people grumpy and they don't feel well, especially if they try to exercise.

"Excess protein may also hinder performance in the horse," she continues. "It contributes to what we call acidosis—a lowering of the pH within the horse's body—which causes him to fatigue faster and not have as good a performance." Consequently, in recent years, equine nutritionists have begun recommending that performance horses be fed a lower percentage of dietary protein to avoid the protein excesses that often accompany the extra calories they consume.

The acidotic state caused by excess protein can also influence how much calcium is absorbed into the gut of young, growing horses. Researchers believe this might compromise bone growth.

Protein is one of the most expensive ingredients in horse feeds, so feeding your horse extra protein is an unnecessary drain on your budget. Because of its high nitrogen content, it's also a po-

tential environmental pollutant, not just to nearby land and water but to your horse's immediate surroundings. When horses excrete excess protein, it produces ammonia gas—the strong smell we all associate with dirty stalls—which, in large quantities, can impact your horse's respiratory system.

## Precision Feeding

So how can you provide the benefits of amino acids without risking these downsides? "There's a push toward what's called precision horse feeding, doing a better job of *just* meeting the requirements, as opposed to throwing the kitchen sink at them," says Dr. Spooner.

Although the NRC doesn't yet offer comprehensive amino-acid profiles in its feeding guidelines, researchers continue to study horses' specific dietary requirements. For example, a recent study found that the amino-acid concentrations in horses' sweat are different from those in their bloodstreams. They also have a special protein in their sweat that humans don't have, called latherin, which forms the white lather you see on their coats when they exercise strenuously. This plays an important role in keeping the sweat on the horse's hair, rather than dripping off his body, thus allowing it to most effectively cool him via evaporation.

The researchers of this study developed a feed supplement to address the unique amino-acid concentrations they had measured in horses' sweat. Their

results are still preliminary, but anecdotal evidence looks promising. Since horses lose significantly more amino acids through sweat than humans do, this is one area where equine-specific studies will be invaluable.

While the science evolves, both of our experts caution horse owners to be wary of commercial products' claims that aren't substantiated with widely published, impartially obtained data. For example, says Dr. Spooner, "There's a fairly common belief that horses that look poor in their topline can benefit from amino-acid supplements. But you have to go back and say, 'Well, what else is being done? Did you put that horse into work? Did you suddenly feed him more in general and maybe what he really needed was just more energy?' I think the jury's still out on that to some extent."

Until we have better science, our experts agree, there's no harm in experimenting with commercial amino-acid products, for example, with a horse who appears to be receiving an adequate number of calories and the correct type of training to build a good topline but still isn't doing so. If you decide to supplement your horse's diet with one of these top dressings, Dr. Urschel recommends following the portion guidelines closely and giving it at least a two-month trial. If you don't notice an obvious change after two months, your horse was likely already receiving all the amino acids he needed in his regular diet. 🐾

## Where can I learn more?

To learn more about how amino acids function in your horse's body and how you can develop the most precise feeding program possible for him, check out these links:

- National Research Council 2007 online nutrition calculator – [nrc88.nas.edu/nrh/](http://nrc88.nas.edu/nrh/)
- The Cooperative Extension System – [extension.org/horses](http://extension.org/horses)
- "Protein Requirements for Horses" webinar by Dr. Holly Spooner – [youtube.com/watch?v=i-G\\_W9zHAbg](http://youtube.com/watch?v=i-G_W9zHAbg)
- My Horse University Equine Nutrition Course – [myhorseuniversity.com/online\\_courses/premier\\_courses/nutrition](http://myhorseuniversity.com/online_courses/premier_courses/nutrition)