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EXTRA

Sacroiliac Joint: The Key to a Horse's Motion

INGRID KLIMKE'S MASTERCLASS

AMY K. DRAGOO

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WITH MASTERCLASS

INGRID KLIMKE

This German Olympian's "freely forward" mentality is powered by her passion for the horse.

ARTICLE AND PHOTOS BY KIM F. MILLER

As a native German, U.S. Olympic silver medalist Sabine Schut-Kery was well versed in classical dressage principles before riding in Ingrid Klimke's Masterclass in Southern California late last year. However, hearing the German Olympian convey her passion for those principles and for the horses and riders striving to embody them never gets old.

◀ Olympian Ingrid Klimke works with rider Josephine Hinnemann and her 14-year-old Under 25 Grand Prix partner Copa Cabana.

"With everybody focusing so much today on the front legs and the neck being in the right place, I thought it was really a good reminder that the only way we get those parts correct is if the horse is ridden properly, with connection through the whole body and starting with the hind end," Schut-Kery said.

The reality that every correct movement starts with hind-end engagement and propulsion was a recurring theme throughout the two-day clinic, held at Galway Downs Equestrian in Southern California's Temecula. It's true for everything from a well-executed walk, corner or halt in a First Level test to a Grand Prix pirouette. And it's true for successfully navigating any course question or obstacle that comes up on cross-country or stadium jumping.

Focusing on hind-end engagement is one of a few training basics that must be achieved, Klimke emphasized. "If you don't get the basics right, you get a horse that can do tricks but can't do a half-halt." And half-halts are one of Klimke's most often used tools.

A patient, individualized approach to those basics comes from her of love for the horse. "I love horses," Klimke said.

Klimke speaks with Caroline Hoffman's Small Tour partner, the 10-year-old PRE Bugei VDOS, who offered one-tempi changes when asked to do four-tempis.

"I love to work with them, to feel and listen to them tell me what they need. Sometimes I think I have a good plan, but the horse says, 'no.' Then you have to open your heart to feel and think what your horse needs today."

Freely Forward

Hind-end engagement is not addressed in isolation. The horse needs relaxation, suppleness, strength and responsiveness to the aids in order to connect that engagement through the whole body.

As a five-time Olympic eventer who also excels in international dressage, Klimke's resume reflects the value of classical training in all Olympic disciplines. During the Masterclass, she worked with six sessions of two dressage pairs—from young horses to those nearing Grand Prix—and one group of eventers.

Relaxation and suppleness were priorities for the horses. Riders were encouraged to be patient with their horses, clear in their aids and communication and precise in the timing of those aids.

Patient, however, did not mean letting a well-trained horse ignore aids they understood. Klimke dubbed young rider Josephine Hinnemann's 14-year-old Under 25 Grand Prix partner, Copa Cabana, "The Professor" because "he knows the good tricks to avoid doing what you want him to do."

"Tell him you mean it," Klimke insisted, coaching Hinnemann to correct a lack of response with progressively stronger aids. First a squeeze of the leg, then a whomping kick, then, if needed, a tap of the whip.

"Freely forward!" was a frequent Klimke encouragement. "You need a reaction from his hind leg into your hand, letting him grow up bigger in front of you." The image of hind-end engagement manifesting as the horse growing bigger in front of the rider was another recurring theme.

> ***"You need a reaction from his hind leg into your hand, letting him grow up bigger in front of you."*** —Ingrid Klimke

Hinnemann got that so well by Sunday's session, the crowd of over 700 spectators applauded. After achieving the beautiful, forward trot, Hinnemann should be able to "do nothing," Ingrid said. "Just let your leg breathe on his side."

Cavalletti work was core to each session, used in numerous configurations to achieve various goals rooted in building strength in the hindquarters and back. Ingrid inherited her

Cavalletti to Strengthen and Supple

Ingrid Klimke described cavalletti as part of every phase of her horsemanship education under her father. "As a kid, I saw these exercises from my father and they had a huge influence on the strength of our horse's hindquarter and back, and on keeping horses healthy and fit throughout their lives."

She has refined the work with successive editions of the book *Cavalletti for Dressage and Jumping, 4th Edition*. The evolution includes creating her own cavalletti. These were used in the clinic at three heights in a variety of gymnastic exercises to fulfill various strengthening, suppling and training objectives.

Arranged in straight, circle and serpentine patterns and set in different distances and striding options, the cavalletti served many functions. They helped horses learn to sit into their hind quarters and develop the strength to articulate their knees, shoulders, stifles and hocks.

For upper-level horses, cavalletti can help establish the even rhythm needed for piaffe. An anxious, too-fast horse at any level can be slowed and relaxed by easy striding in a canter cavalletti. A short-strided horse can be encouraged to stretch and lengthen with longer distances.

Setting cavalletti on a curve or circle allowed horses or ponies of various stride lengths to do the same exercise. Ponies took the shorter distances on the inside track. Longer-strided mounts followed the longer distances on the outside track.

Circle and serpentine work over cavalletti helped riders prepare for turns—whether they occurred in a jump course or dressage arena. They taught suppleness and responsiveness to bend and to change that bend smoothly and on short notice. Stride extensions and collections were yet another area where Klimke's cavalletti exercises helped participants.

On Saturday, horses were introduced to the cavalletti on a loose rein at the walk, first just one or two cavalletti, then building to sets of four placed on straight lines, curves and circles. Regardless the configuration, Klimke told riders to use their aids to ride their horses to the exercise straight and in the right rhythm, but then let them figure their way through the exercise.

▲ A recurring theme of Klimke's, here with Marie Medosi and Favorite Songs PS, was that every correct movement starts with hind-end engagement and propulsion.

conviction to cavalletti from her Olympian father, Reiner Klimke. Their book *Cavalletti For Dressage and Jumping* is now in its fourth edition (see sidebar, at left).

Relaxation

After rhythm, relaxation is the second component of the classical Training Scale, and it was well emphasized in the Masterclass. However, there was no cookie-cutter approach to achieving relaxation in the horses. Instead, Klimke suggested techniques suited to each horse's personality.

A proper warm-up achieves relaxation and is critical to training

> *"You need to get your horse moving from behind, stretching over the back, loose, swinging and ready for anything."* —Ingrid Klimke

'It's OK to Have Mistakes'

Joey Emmert Evans rode her two 8-year-olds—a KWPN mare Khaleesi on Saturday and Fiderherz RTH, a Westphalian stallion, on Sunday. The Northern California professional dressage rider developed both horses herself. She knew it would be good for them and herself to ride in that "big" atmosphere of the Ingrid Klimke's Masterclass.

"There is some pressure to perform, and I generally love riding under pressure. I also realized it's OK to have mistakes—to look like a bit of a hot mess in this moment. It's valuable because even though it's a little bit of an ego hit to me, hopefully I helped the audience with their own riding. I know we all have moments where we're in this same boat."

Klimke complimented Evans' quiet position and aids, and she dubbed Khaleesi "the Dancing Queen" for the mare's fluid, forward gaits and overall elegance. "She's hot to begin with and anxious and this was her first trip off our property," Evans said.

Letting go to achieve relaxation was Klimke's idea that came to life for the rider. "The first day, my mare was really trying to hold it together. Ingrid could see that and encouraged me to allow her some freedom to move her body and take a breath. It was nice for me to trust the mare and myself, even knowing what we were doing didn't look perfect, it was an exercise to make the horse better."

Evans sensed that Klimke's eventing experience gave her a different definition of forward movement. "I think us dressage riders can get stuck in the precision and collection. We can 'nerd out' on a 20-meter circle.

"Ingrid had a looseness that was a nice difference. She had me get into a two-point and let her move. Khaleesi's gaits are big enough on their own, so it's a matter of getting her in the right place, relaxed and moving through her body."

▼ Joey Emmert Evans worked on relaxation with the KWPN mare Khaleesi to offset the effects of the Masterclass' big atmosphere.

and competition preparation at every level in any discipline. "You need to get your horse moving from behind, stretching over the back, loose, swinging and ready for anything. Picture in your mind the horse with its nose on the ground, in a forward trot with the hind leg stepping up and underneath himself."

Klimke encouraged riders to listen for their horse's breathing, in sync with the rhythm of their gait, as a sign of relaxation. Riders must breathe, too—literally and figuratively in the quiet position of their legs, seat and hands.

In one example of helping an amped horse relax, Caroline Hoffman's Small Tour partner, the 10-year-old PRE Bugei VDOS, offered one-tempi changes when asked for four-tempis on a quarterline. Encouraging Hoffman to breathe deeply herself while asking him to wait for her lead-change cues, Klimke told her to let him do his one-tempis on the other side of the arena. "He really wants to show off and do what's interesting to him," she said. "Thank him for presenting that to us. If this was one of my horses, now would be the time for a long gallop in the woods."

Invisible and Effective Aids

"Try to ride with invisible aids," Klimke counseled during the clinic. "Spectators should not be able to see them, yet the horse can feel it." Maintaining shoulder, hip and heel alignment on a straight line is the position from which the rider can execute those invisible yet effective aids.

Several riders were asked to remove their stirrups, and Klimke applauded their courage in doing so. Gaining a better feel for their horse through a deeper seat and a well-positioned, quiet leg was the objective. It's a tactic Klimke uses frequently herself to sharpen communication with her horse. "I want you to sink into the saddle to create that positive seat aid," she said.

She taught a lower leg at or very near the girth with the heel down and solid weight in the stirrups. The toe should point in to enable pressure from the calf, not the spur.

She recommended saddles that have as little cushion for the riders as possible. Thigh and calf blocks that are too big can "pin you in."

Hand position and use was part of Klimke's emphasis on developing a horse that carries the weight of his own front end. "The weight of the reins" is the only load the rider's hands should carry.

Klimke wanted riders to hold the elbow just in front of the hip and to maintain a straight line from the hand to the horse's bit. "You should be able to rest a ruler

▲ An enthusiastic Klimke demonstrates correct bend on foot during her two-day Masterclass.

on that line," she said. A "rubber wrist" allows movement toward or away from that straight line to the bit, facilitating light, subtle communication with the horse's mouth.

If needed, a whip should be carried with the rider's thumb over top of the whip. Klimke discouraged holding some of the whip's length above the hand, saying it is as a great way to poke one's eye out if the horse moves unexpectedly. Holding the thumb over the top of the whip enables the rubber wrist.

When needed, the whip should be use behind the rider's leg, not on the horse's croup.

Klimke also encouraged riders to address their own fitness. She currently has six dressage and six eventing horses. In addition to riding most of them every day, she follows DressurFit®, a functional training for riders program advocated by fellow German dressage stars Jessica von Bredow-Werndl and her brother Benjamin Werndl.

Although Klimke didn't ride herself, she showed energy and enthusiasm from working with the first riders in the morning to interacting with fans waiting to chat or have an autograph and photo with her into the late evening. She trotted shoulder-ins and diagonal passes on foot to show the bend and body position in new exercises.

> ***"Try to ride with invisible aids. Spectators should not be able to see them, yet the horse can feel it."*** —Ingrid Klimke

The spectators reflected enthusiasm for her passionate approach to horsemanship. All left with notebooks full of training advice and the inspiration that, even at the very top of the sport, it's love for the horse that begins and ends every day.

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The Sacroiliac Joint in the Horse
THE KEY TO MOVEMENT

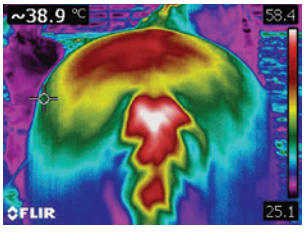
Knowing early signs of problems in this joint can help with a diagnosis and set a pathway back to health for your horse.

BY KENNETH L. MARCELLA, DVM

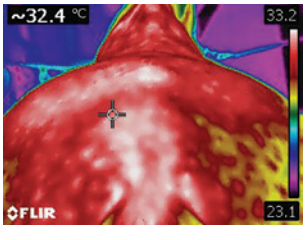
The sacroiliac joint is one of the most important parts of the horse's body—and perhaps one of the least understood. This joint, and its related structures, is the connection between the horse's pelvis and the spine. It functions to allow the transfer of energy from the horse's powerful hind legs to the pelvis and then to the spinal column. This results in the horse's all-important forward motion.

However, the SI joint is different from other joints, such as the fetlocks or the hocks, in that it has relatively little actual motion itself, has no specific joint capsule, has very little associated joint fluid and is composed of two different types of cartilage. Stability of the SI joint is achieved by a complex ligamentous structure and associated muscles.

Unfortunately, this important and intricate joint is very difficult to evaluate. Due to its location deep in the pelvis and its protection by thick muscles and fat, the equine SI joint is not possible to see or easily palpate (physically touch or manipulate). The size and density of that part of the horse's body make it hard to obtain conventional radiographs, and ultrasound imaging can also be challenging. The clinical complaints and signs of potential SI problems can also be caused by any number of other issues and conditions in the horse. Consequently,



1. This thermography scan shows a hind view of a horse with SI pain. The horse's head is pointed away from the thermographer. The thermography scan scale is on the far right and shows a gradient of color from black (cold) to white (hot). As the colors become closer to the top of the scale, the temperature is greatest. Temperature is a product of blood flow, muscle activity, inflammation and so forth. In this scan, the tail head in the center of the image is hot (white). This is normal because of the heat from the rectum under the tail area. This horse also shows increased heat over the left SI and gluteal area. In the scan of a normal horse, the



2. This is a thermography scan of the SI area of the same horse in Photo 1 after exercise. The left gluteal area and SI area show increased heat compared to the pre-exercise scan (Photo 1). The rest of the horse shows increased heat as well due to increased blood flow and muscle activity from exercise, but the SI and left gluteal area changes are more dramatic. This "kinetic" thermography (comparison of pre- and post-exercise scans) allows the clinician to have greater confidence that this horse's problems are actively related to his sacroiliac joint area.

PHOTOS COURTESY KENNETH MARCELLA, DVM

AMY K. DRAGOO

A 2010 review of 74 horses with diagnosed SI pain showed that dressage and show-jumping horses appeared to be at greater risk for SI problems than horses used in other disciplines. Older horses, larger horses and heavier horses were also more highly represented, suggesting that "wear and tear" due to long-term use and the demands on the body from a large, heavy frame resulted in more SI problems.

identifying and accurately diagnosing equine SI problems is a significant challenge for horse owners and their veterinarians.

But understanding how important the SI joint is to the horse's basic motion and knowing the early signs of problems

> *All the motions that we ask performance horses to do require a functioning SI joint.*

are the first steps to getting a diagnosis and establishing a pathway back to health.

Signs of Potential SI Issues

All the motions that we ask performance horses to do require a functioning SI joint. These include running at speed, quick stops and tight turns, jumping, lead changes and gymnastic movements. Problems or issues with the SI joint can result in any number of vague motion-related problems. Often riders report feeling or sensing problems that are not visible as a true "lameness" when the horse's motion is observed. These can include:

- A recent and progressive unwillingness to work with a loss of normal forward motion or impulsion.
- Resistance to collection or rounding through the back.
- Tightness and stiffness, especially in transitions.

Additionally, affected horses may begin to have trouble with lead changes, refuse jumps or even begin to buck and kick out.

Other observations include:

- A mild dragging of one or both hind limbs.
- Asymmetry of the hind end or uneven pelvic motion and muscle development in more long-standing cases.
- Abnormal tail carriage or unequal tracking of the hind legs

COURTESY KENNETH L. MARECELLA, DVM

ABOUT KENNETH L. MARCELLA, DVM

***Kenneth L. Marcella**, DVM, is a graduate of the New York State College of Veterinary Medicine at Cornell University. For more than 30 years, he has treated sporthorses of all disciplines and levels, including international competitors. Dr. Marcella has served as a veterinary official at many events around the world, including national championships, world championships and Olympic competitions. He is board-certified in thermal imaging and is currently a member of the board of directors of the American Academy of Thermology. With an undergraduate degree in English from Dartmouth College, Dr. Marcella has also written articles for numerous publications.*

especially on a circle.
- Alterations of a fluid, rhythmic canter.
- A "bunny-hopping" motion of the hind legs.

It also is always advisable to ask the farrier whether there have been any subtle changes in the horse's behavior while being shod. Occasionally, very early SI changes are noted by the farrier as the horse may not move over easily when cross-tied and asked to step laterally. Or the horse may have more trouble balancing on one hind leg when the opposite hind leg is lifted and manipulated by the farrier.

Since SI issues can be subtle and hard to definitively diagnose, all these seemingly small complaints should be treated with importance. If any of these signs are noted, then a diagnosis of a potential SI problem is justified. But because these signs can also be caused by a number of other conditions, it is important that a complete clinical examination and history be performed on affected horses.

AMY K. DRAGOO

▲ SI issues can be subtle and hard to definitively diagnose. Signs can also be caused by a number of other conditions, so it's important that a complete clinical examination and history be performed on horses suspected of having SI pain.

Diagnosing SI Issues

One category of SI problems can be considered acute. Acute or very recent development of SI-related clinical signs is likely to be trauma-related. Slipping on wet or uneven footing, falling while engaged in "pasture play" or in competition, kicking out or other forceful movements can all cause damage to the ligaments and muscles supporting the SI joint. If the trauma is severe enough, then the joint surface itself can be affected. A thorough history, paying attention to the condition's timeline, will often reveal a likely underlying traumatic event.

Another category of SI problems involves a chronic, more subtle, slowly progressing version. Dr. Sue Dyson of the Center of Equine Studies, Animal Health Trust, New Market, United Kingdom, published a review in the Equine Veterinary Journal in 2010 of 74 horses with diagnosed SI pain. Her finding showed that dressage and show-jumping horses appeared to be at greater risk for SI problems than horses used in other disciplines. Older horses, larger horses and heavier horses were also more highly represented, suggesting that "wear-and-tear" inflammation and stress on the SI joint due to long-term use and the demands on the body from a large, heavy frame resulted in more problems. Not surprisingly, warmbloods made up a higher proportion (51%) of affected horses compared to other breeds. Another important aspect of Dr. Dyson's study was the finding that SI joint pain was seen alone in only 47% of the horses in her study group. Many horses had other problems or issues in other locations that were believed to be contributing to their SI problems.

Weakness, unevenness or pain in other joints, muscles, ligaments or tendons will affect how the horse moves over time. Because of its location and purpose, the SI joint will be put under increased stress when the horse attempts to compensate for issues like these.

Dr. Randy Eggleston, clinical professor and surgeon in the Department of Large Animal Medicine, Surgery and Lameness Service of the University of Georgia College of Veterinary Medicine, agrees that many SI problems stem from other issues in the horse. "While the sacroiliac joint has begun to receive much more attention recently and has almost become a trendy 'popular' diagnosis, the majority of suspected SI cases seen in our hospital have problems in other areas," said Dr. Eggleston.

Careful clinical evaluation of all these potential problems must be done first, according to Dr. Eggleston, and attention to and resolution of these issues often results in the elimination of SI pain. (See sidebar, "Underlying Conditions Contributing to Sacroiliac Issues," page 12.)

Diagnosing Primary SI Issues

If no other physical problems are found on clinical examination, then a potential diagnosis of a primary SI condition should be considered and other specific diagnostic tests need to be done. **Ultrasound** examination of the SI joint is the most commonly used diagnostic procedure

Underlying Conditions Contributing to SI Issues

Because of its location and purpose, the SI joint will be put under increased stress when the horse attempts to compensate for other issues. A detailed history in cases of horses with suspected SI pain will help identify known risk factors. Additionally, a complete physical examination will help rule out joint inflammation, foot balance issues, back conditions and other possible contributing factors.

Horses with suspected SI problems should be carefully evaluated for the following conditions:

- **Hock arthritis** can make horses reluctant to switch gaits and round through their backs and may inhibit forward motion.
- **High suspensory ligament desmitis** (inflammation of the ligament fibers near the top of the cannon bone that can be from mild to severe), especially in the hind legs, can produce similar signs as hock arthritis.
- **Overriding dorsal spinous processes**, or kissing spines, can make horses back sore, inhibit forward motion and may manifest as behavioral responses ranging from a subtle reluctance to work, all the way to flat out refusal to go forward under saddle and kicking out.
- **Negative palmar foot angle** is relatively common in warmbloods. The pedal bone, or PIII, is the bone inside a horse's hoof. It is generally thought that the bottom surface of this bone should be at two to seven degrees relative to the ground surface. This creates a slightly toe downward angle and provides the horse with optimal balance and push off the feet, especially the hind legs. Horses with flat to negative palmar foot angles have a PIII bone that is elevated at the cranial edge (toe) and lower at the caudal edge (heel). These horses are essentially standing and moving from a "rocked-back" position, which places additional stress on the hind leg (high suspensory ligaments, hamstrings and gluteal muscles) and on the SI joint area.

This is a lateral radiograph of a normal hind foot showing the normal pedal bone, or PIII, angle. PIII is the third phalanx and the main bone within the hoof. The green arrows show the angle that this bone should have. The tip is slightly lower than the heel. This provides a good balanced stance and the ability to drive off the toe during forward motion.

This is a lateral radiograph of a horse's hind foot with a negative palmar angle. The tip of PIII is higher than the back of the bone. This is shown by the differing height of the red arrows. Rather than the two- to seven-degree normal angle, this configuration creates a negative angle. This horse is not balanced and has more weight on his heels. That posture translates into increased stress and strain on numerous structures, from the hind suspensory ligaments to the hamstrings to the SI and lower back. This condition is often seen in warmbloods, and those breeds have a higher incidence of SI issues as well.

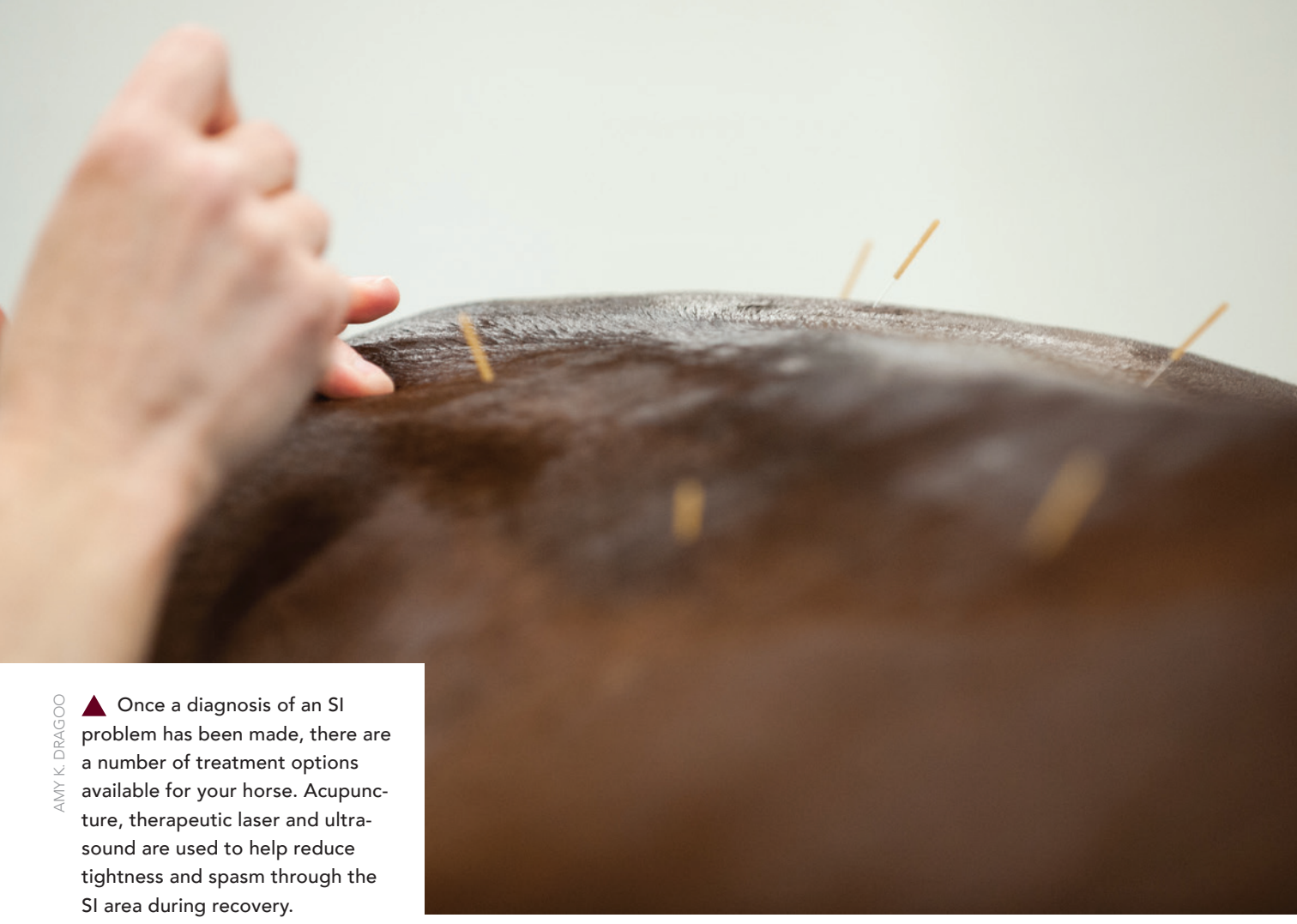
PHOTOS COURTESY KENNETH MARCELLA, DVM

and can show evidence of degenerative disease (arthritis) of the joint or can indicate scarring and damage of the supporting soft-tissue structures. Large, heavily muscled horses can be difficult to scan due to the thickness of this area.

Transrectal ultrasound, where the ultrasound probe is inserted rectally, just as when a mare is scanned for pregnancy, may provide an additional "look" at the ventral (bottom) surface of the SI joint and can occasionally provide additional information.

Radiography of the horse's pelvis and SI is especially problematic due to both the size and thickness of that area. Conventional X-rays of the pelvis must be taken with the horse anesthetized and lying on his back. This positioning can sometimes allow a film to be taken, which may provide some useful information, but it is not always productive due to the horse's challenging pelvic anatomy. Many veterinarians are sometimes reluctant to try radiography on these cases because of the stress of anesthesia induction and recovery. This stress can be especially difficult on horses that may already have pelvic instability and problems with their SI joints.

Thermography, or infrared imaging, can be useful in identifying areas of inflammation or overuse in the SI region. Scanning the horse, then working the horse and rescanning, is especially helpful. This kinetic thermography can show a "before-and-after" change in blood flow and heat to a specific SI area and help confirm a diagnosis of SI injury. Dynamic diagnostic capabilities, or the modalities that can show the current physiological state of structures, are very important in confirming SI injuries because, as Dr. Eggleston explained, "We may see changes to the SI joint or surrounding structures with



AMY K. DRAGOO

▲ Once a diagnosis of an SI problem has been made, there are a number of treatment options available for your horse. Acupuncture, therapeutic laser and ultrasound are used to help reduce tightness and spasm through the SI area during recovery.

ultrasound and even radiography, but that doesn't prove that those changes are significant in that particular horse or that they are even contributing to the horse's pain and lameness." Many horses can show old, non-active injuries or other chronic changes that are not related to that horse's present condition.

Nuclear scintigraphy is another dynamic modality that can provide evidence that an SI joint is indeed currently inflamed and irritated. A nuclear-labeled product is injected into the horse. This substance circulates throughout the horse's body and it is picked up or concentrated only in areas where there has been damage and undergoing repair. A specialized scan of the body is done next, and the nuclear material that has been incorporated into these active areas shows up as "hot spots," or areas of concentration. This alerts the clinician to those active areas that are directly related to that horse's present problem.

Research is also currently underway to develop the capabilities to produce a full-body **CAT scan** in the standing, sedated horse. This technology would drastically improve the way that SI problems are diagnosed by allowing clinicians to image the SI joint and also evaluate its soft-tissue connections. These units have been produced and are actively being tested and refinded in clinical settings.

Treating SI Issues

Once a diagnosis of an SI problem has been made, there are a number of treatment options available. The joint can be injected with anti-inflammatory medication to reduce inflammation and pain. Injections can be coupled with muscle relaxers and other systemic anti-inflammatory medications designed to allow horses to move more easily and correctly. While most horses are rested from hard work while they recover from SI issues, controlled physiotherapy is still very important. Very specific exercises will promote mobility of the supporting structures of the SI area to help strengthen muscles that stabilize the joint. Acupuncture, pulsed wave electromagnetic energy, therapeutic laser and ultrasound are all also used to help reduce tightness and spasm through the SI area during recovery.

Research suggests that horses with primary SI injuries take longer to heal and often don't return to full athletic function. However, horses with a strained SI joint caused by other problems can do very well once the sore joint, strained ligament, imbalanced hoof or inappropriate riding stress is resolved. Learning about the SI joint and how it influences the horse's basic motion and knowing the early signs of problems are the important steps to getting a diagnosis and setting up a pathway back to a healthy SI joint.

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