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JUNE 2015
ISSUE 453

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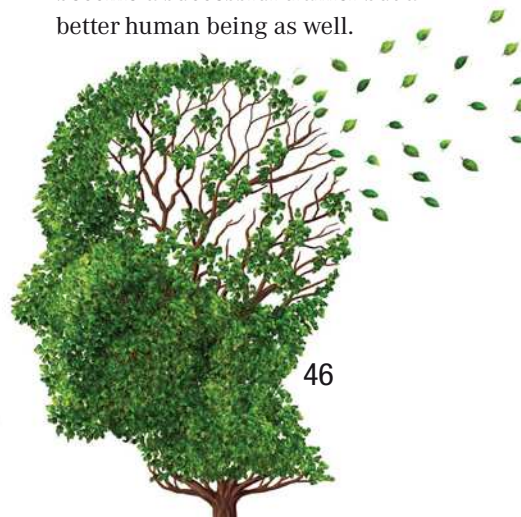
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GROUP PUBLISHER
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ADVERTISING

ASSOCIATE PUBLISHER
Robert C. Kliner
Supplements, Horse Health
(301) 977-3900, ext. 127; bob.kliner@EquiNetwork.com

ADVERTISING REPRESENTATIVES

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PRODUCTION

GROUP PRODUCTION DIRECTOR: Barb Van Sickle
(303)625-1624; bvansickle@aimmedia.com

PRODUCTION MANAGER: Hillary Kerrick
(303) 625-1660; hkerrick@aimmedia.com

PREPRESS MANAGER: Joy Kelley

PREPRESS SPECIALIST: Idania Mentana

EDITORIAL AND ADVERTISING OFFICES

656 Quince Orchard Road, Suite 600
Gaithersburg, MD 20878;
(301) 977-3900; Fax (301) 990-9015;
E-mail: EQletters@EquiNetwork.com

Subscription inquiries/address changes:

E-mail: Equus@emailcustomerservice.com; (800) 829-5910 (U.S. and Canada) or (386) 447-6332; P.O. Box 420235, Palm Coast, FL 32142

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Indication

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Contraindications

Do not use in horses with known hypersensitivity to tiludronate disodium or to mannitol. Do not use in horses with impaired renal function or with a history of renal disease. Bisphosphonates are excreted by the kidney; therefore, conditions causing renal impairment may increase plasma bisphosphonate concentrations resulting in an increased risk for adverse reactions.

Warnings

Do not use in horses intended for human consumption. **NSAIDs should not be used concurrently with TILDREN. Concurrent use of NSAIDs with TILDREN may increase the risk of renal toxicity and acute renal failure.** Appropriate wash-out periods should be observed between NSAID and TILDREN administration, and BUN and creatinine should be monitored. If treatment for discomfort is required after TILDREN administration, a non-NSAID treatment should be used.

Human Warnings

Not for human use. Keep this and all drugs out of the reach of children. Consult a physician in case of accidental human exposure.

Precautions

Approximately 30-45% of horses administered TILDREN will demonstrate transient signs consistent with abdominal pain (colic). Hand-walking the horse may improve or resolve the colic signs in many cases. If a horse requires medical therapy, non-NSAID treatments should be administered due to the risk for renal toxicity. Avoid NSAID use.

TILDREN should be administered slowly and evenly over 90 minutes to minimize the risk of adverse reactions.

Horses should be well hydrated prior to administration of TILDREN due to the potential nephrotoxic effects of TILDREN.

Concurrent administration of other potentially nephrotoxic drugs should be approached with caution, and if administered, renal function should be monitored.

Caution should be used when administering TILDREN to horses with conditions affecting mineral or electrolyte homeostasis (e.g. hyperkalemic periodic paralysis (HYPP), hypocalcemia, etc.) and conditions which may be exacerbated by hypocalcemia (e.g. cardiac disease). TILDREN should be used with caution in horses receiving concurrent administration of other drugs that may reduce serum calcium (such as tetracyclines) or whose toxicity may exacerbate a reduction in serum calcium (such as aminoglycosides).

Horses with HYPP (heterozygous or homozygous) may be at an increased risk for adverse reactions, including colic signs, hyperkalemic episodes, and death.

The safe use of TILDREN has not been evaluated in horses less than 4 years of age. The effect of bisphosphonates on the skeleton of growing horses has not been studied; however, bisphosphonates inhibit osteoclast activity which impacts bone turnover and may affect bone growth.

Bisphosphonates should not be used in pregnant or lactating mares, or mares intended for breeding. The safe use of TILDREN has not been evaluated in pregnant or lactating mares, or in breeding horses.

Increased bone fragility has been observed in laboratory animals treated with bisphosphonates at high doses or for long periods of time. Bisphosphonates inhibit bone resorption and decrease bone turnover which may lead to an inability to repair microdamage within the bone. In humans, atypical femur fractures have been reported in patients on long term bisphosphonate therapy; however, a causal relationship has not been established.

Adverse Reactions: The most common adverse reactions reported in the field efficacy and safety studies were clinical signs consistent with abdominal discomfort or colic. Other reported signs were frequent urination, muscle fasciculations, polyuria with or without polydipsia, and inappetence/anoxia.

For technical assistance or to report suspected adverse reactions, call 1-800-999-0297.

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EQ LETTERS

Temperature-taking tips

I really enjoyed “The Accuracy of Digital Thermometers Investigated” (Medical Front, EQUUS 451). I want to share something I’ve learned that’s not explicitly stated in the article. For best results, you must position your thermometer with the tip downward to ensure contact with the rectal wall. It’s also a good idea to always use the same thermometer and get baseline readings in different situations (spring, summer, winter, post-exercise, before feeding, etc.) so you know what is truly normal for your horse in any situation.

I found it very interesting that the faster the digital thermometers record a temperature, the more likely it is that they would be off. This has something to say about what to purchase. Although we would all like to avoid putting our horses through this procedure, it’s better to take their temperatures efficiently, even if it takes a little more time.

*Hannah Donahue
Bethalto, Illinois*

From the neck up

“Head shy” means the horse won’t allow you to touch his head (“Overcoming Head Shyness,” Conversations, EQUUS 451). Therefore, you need to work up to rubbing the horse on the forehead. It is better to start lower, as far away as the withers, and work up toward the head. The most important thing is to keep your hand on the horse, no matter how much he tries to get away from you. It helps if the handler is tall and the horse is short, as in the photographs, but that usually is not the case.

*Barbara Kinsey
Prince George, British Columbia*

Better late than never

The first article I turned to when I received my latest EQUUS was “Never Too Late” (Back Page, EQUUS 450). I, too, had wanted a horse my whole life. I never had riding lessons, and I rode



only a dozen times in trail-horses-for-rent situations. But five years ago, at the age of 55, I rescued an 18-month-old Percheron filly and started the most incredible journey of my life.

She is now 2,200 pounds of opinionated, dominant mare (see photo above). She has taught me to be the compassionate but undeniable leader. I have had to learn to keep my emotions out of it and to figure out what is in it for her and what motivates her. She is, as one trainer put it, a “one-person horse,” and fortunately, that person is me. We play at liberty, and I ride her, but mostly we just hang out and enjoy each other’s company. Though many think I rescued her, I know it’s the other way around.

*Beth Covert
Toledo, Ohio*

More on mealtime tantrums

I was very surprised by “Silencing Mealtime Tantrums” (Hands On, EQUUS 448), which suggested feeding the complainer first or isolating the horse so he can eat in private. Why cater to bad behavior when instead you can build a relationship of true partnership and respect with your horse?

I have eight horses on my property, and I used to feed at the same time every day, which I did as soon as I got to the barn. First one horse started banging and nipping at his neighbors, so I fed him first. The next day was worse. In time, all the horses were fussing, stomping and whinnying the minute they saw me.

I finally realized that they had me

trained when it should have been the other way around. Please note that these horses have hay in front of them all the time, and twice a day they get their pellets and supplements—the issue is not hunger; it's training.

I started showing up at the barn and then taking time to clean and fill water buckets until the horses calmed down and stood quietly. I never kept the same routine or timetable for my feeding, and I never fed the same horse first. Now when I come to the barn I get happy nickers and patient, calm horses welcoming me at mealtime.

Ruth Foster

Lake Havasu City, Arizona

Bye-bye birdie?

I honestly wish I could keep the birds out of my barn ("Going to the Birds?" Hands On, EQUUS 450). They carry a fungus/bacteria that, unfortunately, I'm allergic to—which I didn't know until recently. Grackles had taken over my barn and left a horrible mess. I power-washed all the hard surfaces, and unbeknownst to me, the dried-up droppings floated through the air I breathed, and I ended up with a double lung infection.

Now I must completely cover up and wear a mask just so I can get any items needed to feed my horses, even if it's 90 degrees! Cats, dogs, snakes, netting, removing nests, etc., have had no effect on them. I will not give up my horses to these flying vermin and will continue my quest to effectively remove them from my barn.

Jeanne Lueppen

Attica, Michigan 🐾

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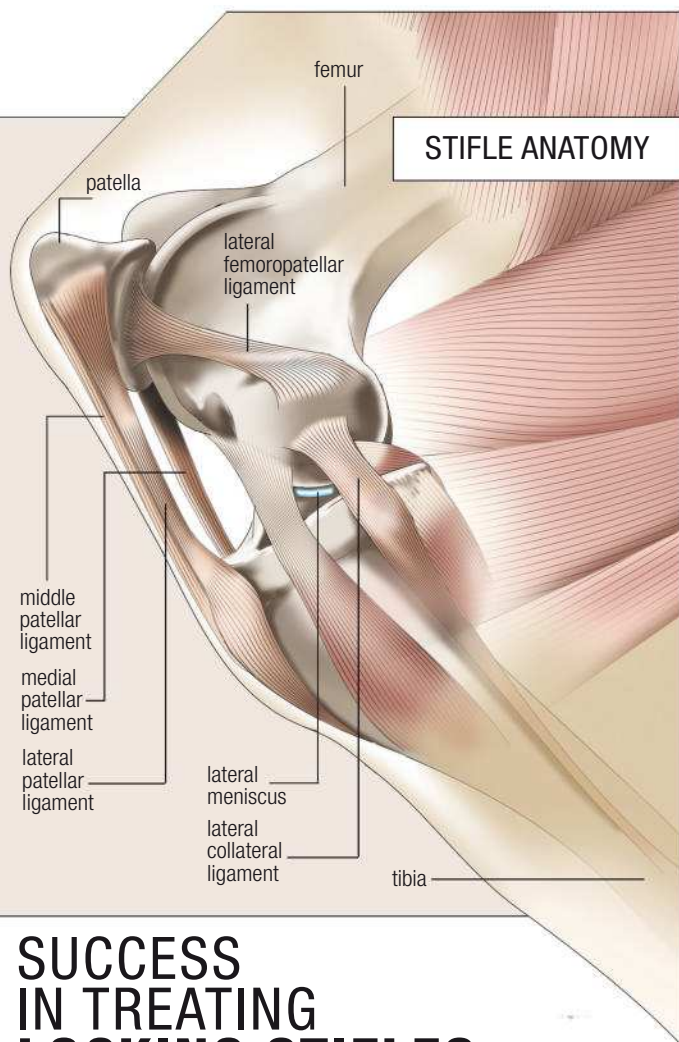
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STIFLE ANATOMY

SUCCESS IN TREATING LOCKING STIFLES

A new study shows that ligament-splitting surgery can be effective in fixing “sticky” stifles.

Upward fixation of the patella—also called sticking or locking stifles—occurs when the medial patellar ligament of the stifle becomes hooked on the end of the

femur. When this occurs, the horse cannot flex the joint or advance the limb. The leg usually becomes “unlocked” when the leg is flexed again, often with a jerky motion. Mildly affected horses may still be ridden, but in more severe cases they may not be able to perform.

Reference: “Outcome of medial patellar ligament desmoplasty for treatment of intermittent upward fixation of the patella in 24 horses (2005-2012),” *Canadian Veterinary Journal*, February 2015

Conditioning and corrective shoeing resolve some cases of sticking stifles, but surgical options are often considered for stubborn cases. In one surgical technique, called “splitting,” several small incisions are made in the medial patellar ligament. As these incisions heal, the ligament thickens with scar tissue, which makes it less likely to become stuck on the femur.

To determine the success rate of the procedure, researchers at Peterson and Smith Equine Hospital in Ocala, Florida, reviewed the records of 24 horses who had it done at the clinic from 2005 to 2012. Follow-up interviews with the owners, trainers and referring veterinarians were also conducted.

The data showed that 71 percent of the horses were able to return to their intended use, and 18 percent eventually performed at a higher level. Thirty-three percent of horses had a recurrence of upward fixation of the patella after surgery. Despite these statistics, only 50 percent of owners reported they were satisfied with the results of the procedure.

The researchers call for further study into both medical and surgical procedures to address locking stifles.

NATIONAL EQUINE STUDY LAUNCHES

A third national equine study by the U.S. Department of Agriculture’s (USDA) National Animal Health Monitoring System (NAHMS) gets underway this month.

Through surveys and interviews with the owners of horses, donkeys, mules and ponies, as well as other people associated with the equine industry, the NAHMS Equine 2015 study covers a wide variety of topics, ranging from the management of lameness and infectious diseases to trends in management to health-related costs of ownership. Previous NAHMS equine studies were conducted in 1998 and 2005.

“The data from previous NAHMS studies has been used in focusing of research on equine health topics,” explains Josie Traub-Dargatz, DVM, MS, DACVIM, an equine commodity specialist for USDA and professor at Colorado State University. “The studies also allow for comparison of what owners are actually doing related to equine health management with what guidelines, such as those from the American



The NAHMS Equine 2015 study will cover a variety of topics, ranging from the management of lameness and infectious diseases to trends in management to health-related costs of ownership.

People cannot volunteer to participate in the NAHMS study. Instead, they will be selected through a pre-defined process. “The equine operations are selected by the National Agricultural Statistics Service (NASS) from a list of places that qualify as a “farm”—those that have or could have sold 1,000 dollars of

agricultural products or own five or more equines and are not a commercial operation like a racetrack,” says Traub-Dargatz. “If selected by NASS for participation in the study, the operation will receive an introductory letter and an information sheet with details about the study. Then a NASS representative will contact the person by phone to set up a face-to-face interview to complete the questionnaire, which is phase 1 of the study. They will also determine if the person is willing to participate in the second phase of the study, which involves a site visit to their farm.”

There are some incentives for individual owners to participate in the study. For instance, those who participate in the second phase of the study can have up to six horses tested for internal

parasites to evaluate them for anthelmintic resistance.

“There is also an option to have up to 10 equids examined for ticks by a veterinary medical officer or animal health technician [VMO/AHT],” says Traub-Dargatz. If ticks are found they will be collected and sent to the National Veterinary Services Laboratories (NVSL) for identification of the type of tick(s) and a report will be provided to the equine operator. There is also an option to have the VMO/AHT perform a biosecurity assessment of the operation and a report of findings provided back to the equine operation.”

After the data are analyzed, the NAHMS 2015 study results will be shared through technical reports, information sheets and peer-reviewed scientific papers. “We make every effort to have the reports and info sheets available in a timely manner so that the results are in the hands of equine owners and others affiliated with the equine industry as quickly as possible after the data is collected, validated and interpretation of the findings written,” says Traub-Dargatz.

For more information on the NAHMS 2015 Equine study go to www.aphis.usda.gov/nahms.

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CASE OF WARBLOOD FRAGILE FOAL SYNDROME DOCUMENTED

Two years after a genetic test for warmblood fragile foal syndrome (WFFS) was introduced, researchers have used it to document a previously undiagnosed case of the condition.

WFFS, similar to hereditary equine regional dermal asthenia (HERDA), is characterized by severe defects of the skin and other collagen-containing tissues. “Both [conditions] are inherited diseases resulting in offspring with abnormally fragile skin,” says Chloé Monthoux, DVM, of the University of Zurich. In mild cases of HERDA, which may go undiagnosed for several years, the horse’s skin tears under pressure—from tack, for example—or is slow to heal. In WFFS, however, severely affected foals may be born with extensive skin lesions and defects in tendons, ligaments, blood vessels and other structures.

In the WFFS case documented by the Swiss researchers, a mare had been admitted to the university clinic because of a prolonged delivery. When the foal finally arrived, she had extensive

skin lesions and an 11-inch-long opening in her abdomen through which her intestines were protruding. Because of the poor prognosis, the filly was euthanized, and the clinicians collected tissue and blood samples for testing from her and her dam.

The researchers ran a genetic test for HERDA on the samples but it came up negative. A year later, however, the test for WFFS became available, so the dam was retested as were retained tissue samples from the foal. The results showed that the dam was heterozygous, meaning she carried one copy of the mutated gene responsible for WFFS, while the foal was homozygous, meaning she carried two copies of the defective gene—one inherited from each parent.

“To our knowledge, this is the first detailed case description of a homozygous WFFS-positive foal publicly available. Milder cases may [have been] suspected as well as non-observed cases

that ended in abortion,” says Monthoux, who adds that she hopes publicity of this case will increase disease awareness and testing practices among breeders.

To develop WFFS, a foal must inherit two copies of the mutated gene. This means that testing breeding stock for the mutation can completely eliminate the risk of having an affected foal. “It is important to notice that carriers (unaffected horses who have only one copy of the gene) do not necessarily need to be excluded from breeding,” says Monthoux. “To avoid affected offspring it is enough to ensure that carriers are not bred to carriers.” She adds that all warmblood horses are candidates for screening, as are any related breeds “with a history of abortion, stillbirth, skin lesions or malformations of the skin in neonates.”

For information on testing a horse for WFFS, go to www.animalgenetics.com.

Reference: “Skin malformations in a neonatal foal tested homozygous positive for warmblood fragile foal syndrome,” *BMC Veterinary Research*, January 2015

LAMINITIS PREVENTION TECHNIQUES COMPARED

Over the past decade, the rapid chilling of the hooves has proven to be an effective way of halting the progression of laminitis in its early stages. But new research suggests that some cooling techniques are more effective than others in preventing the potentially devastating inflammation of the soft laminae of the hoof.

Previous studies have determined that, for optimal preventive results, the hoof wall surface temperatures must be maintained at 5 to 10 degrees Celsius (41 to 50 degrees Fahrenheit) for 48 to 72 hours. To learn how best to achieve this goal, Andrew van Eps, BVSc, PhD, of the University of Queensland in Australia worked with James Orsini, DVM, of the University of Pennsylvania to evaluate seven methods of cooling hooves. Four of the methods were “dry,” meaning no water or ice came in contact with the hoof or leg. These were:

- a “coronet sleeve,” which was a rectal exam sleeve filled with crushed ice and held over the coronary band, heel and hoof wall with adhesive tape.



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- a commercial ice pack applied to the hoof wall only.
- two commercial cooling gel wraps applied to the hoof wall and extending over the fetlock and cannon bone.
- a prototype boot that uses a refrigeration system to recirculate a coolant kept at a consistent 1 degree Celsius (33.8 degrees Fahrenheit) over the hoof and lower limb.

The remaining three cooling methods were “wet,” meaning water or ice came into direct contact with the hoof or leg. These were:

- ice wraps that covered only the upper leg and were then filled with ice
- “wader-style” ice boots, which encompassed both the hoof and lower limb and were then filled with ice.
- a repurposed intravenous-fluid bag slipped over the hoof and pastern, filled with ice and then kept in place with adhesive tape.

For the study, each method was applied to the forelegs of four horses for eight hours, as sensors recorded the temperatures of their hoof walls. A sensor was also attached to the opposite forelimb to serve as a control. Researchers documented the ambient temperature hourly.

In general, the “wet” cooling methods performed better than the dry methods, and cooling the limb as well



In general, the “wet” cooling methods performed better than the dry methods, and cooling the limb as well as the foot was more effective than chilling the hoof alone.

as the foot was more effective than chilling the hoof alone. For instance, applying an ice pack to the hoof produced a median hoof wall surface temperature of 19.8 degrees Celsius (67 degrees Fahrenheit), while an ice-filled bag covering the hoof and pastern lowered the median to 5.2 degrees Celsius (41 degrees Fahrenheit).

The wet methods were more effective, says van Eps, because they undermined a body’s natural insulation. “The hair on a horse’s limb is designed to prevent the conduction of heat out of the

limb [which helps keep it warm] by trapping a layer of static air close to the skin,” he says. “When you wet the limb and particularly when you immerse it in liquid, you greatly increase heat conduction by reducing the insulating effect of the hair.”

Immersing more than just the hoof is also important, van Eps says, because of equine anatomy. “The horse’s foot is rich in blood vessels, and is also rich in arteriovenous anastomoses—direct connections between arterial and venous blood

vessels—that allow rapid increases in net blood flow to the foot,” he explains. “These are typical of thermoregulatory organs, like the ears of an elephant; they help the animal maintain temperature. In the horse, they make cooling much harder, as the horse can rapidly and massively increase blood flow to the foot, replenishing the tissue with warm blood, warming the tissue. For this reason, it is important to cool the incoming blood, and this requires cooling further up the limb.”

The one dry application

that produced temperatures in the desired low range was the prototype boot. “It’s a variation of a commercially available system for limb cooling called Game Ready,” says van Eps. “The major difference was a gel interface to improve contact [with the limb] and a refrigeration unit and pump system with a very large cooling capacity. The big advantage of this device is that you can just place the boots, set the temperature, and there is no more work involved. The device is at the stage of development where a horse can walk around freely in the stable for days, with tightly controlled cooling of all four feet.”

In contrast, van Eps says, conventional water-and-ice methods require replenishment every two hours to maintain the low temperatures and applying them consistently in a horse who lies down due to pain can be difficult. This is more than just a hassle for handlers, he says, because intermittent cooling may be harmful: “There is some anecdotal evidence that this might be worse than not cooling at all in horses at risk of laminitis.” 🐾

Reference: “A comparison of seven methods for continuous therapeutic cooling of the equine digit,” *Equine Veterinary Journal*, November 2014



ANNOUNCING THE Champions of the Cause Award



PRASCEND and *EquiManagement* magazine proudly announce a new program to recognize the importance of veterinary technicians/assistants to our horses' well-being.

In cooperation with the American Association of Equine Veterinary Technicians and Assistants (AAEVT), two veterinary technicians/assistants will be selected as the 2015 Champions of the Cause. Winners will be recognized in *EquiManagement* magazine and on the EquiManagement.com website this year.

The Champions of the Cause will be honored in the fall and winter issues of *EquiManagement*, and also recognized at the annual AAEP (American Association of Equine Practitioners) Convention and AAEVT Convention.

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Your mare stands relaxed in the field, dozing in the summer sun and occasionally swishing her tail at flies. Your gelding, on the other hand, stomps, shakes and sometimes even works himself into a lather trying to evade insects. Why some horses are more bothered by insects than others isn't clear, but you'll want to provide extra protection for these sensitive sorts.

- **Fly sprays work well, but some are more effective than others on specific populations of insects.** Try a few brands and formulations to find the one that seems most effective in your situation. Also, be sure to apply the spray according to the label directions and on a relatively clean horse; spraying clods of mud that will fall off won't do your horse much good.

- **Ointments, such as Vaseline or those that contain fly repellents, create a thicker barrier against insects on sensitive skin.** These may be helpful around the eyes, inside the ears or in the udder/sheath area.

- **Fly sheets and wraps provide excellent physical barriers against insects.**

If they fit well, they tend to stay in place. Keep in mind, however, that even a thin layer of fabric can make a horse hotter in the steamy summer months. And you need to check a horse wearing summer sheets as often as you do one wearing a winter blanket—take it off and look the horse over daily.

- **Barn fans can deter mosquitoes and other weak fliers.** Horses quickly learn where to stand to make the most of this “no-fly zone.” You can mount a simple box fan to the front of a stall with bungee cords or install an agriculture-grade fan made specifically for livestock. In each case, closely monitor the condition of the cord and motor throughout the summer to prevent a fire.



POP QUIZ BEYOND BONE

Q A horse's skeleton is nearly 35 percent calcium, but this mineral does more than just build bones. Which of these is another important function of calcium?

- a. blood clotting
- b. sustaining normal heart rhythm
- c. activation of enzymes
- d. all of the above



For the answer, see page 21.

WHAT CAN AFFECT A “SKIN PINCH”

Most of us are familiar with the simple skin-pinch test to check a horse for dehydration: Pinch an area of skin and pull it away from the horse, then release the skin and count how long it takes for it to flatten again. Anything more than three seconds can indicate dehydration.

Less well known, however, are factors other than hydration that can affect the test results. For example, skin elasticity varies depending on the

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location on the body. The neck is a common site of a skin test, but the point of the shoulder may offer more accurate results because the skin there has a bit more “give” to it, making it easier to pinch and pull. In addition, age can affect skin elasticity. The skin of a horse over the age of 15 isn’t going to snap back as quickly as a yearling’s, even if the older horse is sufficiently hydrated.

Also remember to interpret the pinch test in context. If your horse isn’t looking colicky, ill or otherwise distressed by the heat, chances are he’s not significantly dehydrated even if his skin seems a bit less elastic than normal.

Just make sure he has clean, fresh water—perhaps tempt him to drink by mixing in a bit of apple juice—and keep a close eye on him. Call the veterinarian if you see anything else that makes you worry.



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BEWARE OF BRANCHES

Riding down an overgrown trail can mean encountering overhanging branches. Pushing past a branch isn't difficult, but if you're the lead rider of the group you'll want to keep it from snapping back and striking the horse (or rider) following you.

Here's how to do it: As you pass a branch that reaches out into the trail, put your reins in one hand to free up the other. Then, lift the branch straight up and over your head as you walk under it. Once you are past, do not hold the branch—let it go immediately, so it drops behind your horse's hindquarters as he continues down the trail. The goal is to move the branch up and down rather than forward and backward. If the rider behind you uses the same method, no horse will be subject to a flying branch to the face and everyone will have a nicer ride.

DUSTY PERIN

POP QUIZ *Answer*

d. all of the above. Calcium plays a role in all of these important functions of the horse's body. Grains aren't typically high in calcium, but many hays are—especially alfalfa. As important as calcium is, too much can be a bad thing. An overload of calcium can throw off the calcium-phosphorus ratio and lead to abnormal bone formation, known as epiphysitis. If you feed your horse a calcium-rich hay, consult with your veterinarian or an equine nutritionist to ensure the rest of his diet supplies enough phosphorus to balance it out.

A TEST FOR SUBTLE EYE SWELLING

A dramatically swollen equine eye is hard to overlook, but the earliest stages of ocular inflammation can be subtle. If you suspect your horse's eye is getting puffy or painful, try this simple trick.

With a helper to hold him still, stand directly in front of your horse's face so that you can see both of his eyes at once. Then focus on the eyelashes. Does one set point downward more than the other? That's a very early sign of trouble—it means the area around the eye is swollen just enough to alter the angle of the lashes, but not enough to be otherwise noticeable.

Call your veterinarian if you notice this change in your horse's lashes. Early treatment of eye problems can make a big difference in the outcomes. If your horse has a history of uveitis⁰ or other eye problems, your veterinarian may want to come out immediately to make a diagnosis and start treatment. On the other hand, if your horse has never had any eye trouble, and he isn't squinting or tearing, your veterinarian may ask you to monitor the situation and call back with updates. The problem may be nothing more than a minor irritation that will pass on its own. 🐾

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▶ PROUD FLESH

When your horse cuts himself, especially on the lower leg, take steps to ensure that healing proceeds smoothly.

When your horse shows up at the gate with yet another cut or scrape, it's wise to tend to it right away to head off infection, aid healing and prevent complications.

One complication you'll want to be especially careful to avoid is proud flesh. Also known as exuberant granulation tissue, proud flesh is the excessive growth of the connective tissue and blood vessels that begin to fill in a healing wound. In severe cases, the mounds of pink tissue can take on a cauliflower-like appearance and protrude beyond the surface of the skin. New skin is unable to grow over the tissue, and healing stalls. Proud flesh develops most frequently in wounds on the lower legs, but under the right circumstances it can appear anywhere on the body.

Several factors increase the risk for proud flesh, including the wound's severity, level of contamination and location—the potential for disruption of fragile healing tissue in wounds over joints and other mobile areas makes them more vulnerable. Also, some horses are simply more prone to developing proud flesh than others. Consult your veterinarian if your horse



PAULA DA SILVA/ARND BRONKHORST PHOTOGRAPHY



has a wound that “gapes” when he moves, affects a joint, tendon or bone, or contains embedded debris or other contamination. In some wounds, sutures may be the best option, and your veterinarian will want to address any other issues that might compromise healing.

In most cases, you can probably manage your horse’s minor injuries yourself. But if you have any doubts do not hesitate to call your veterinarian. It is far better to get healing on the right path from the outset than to try to compensate once complications have developed.

1. Rinse the wound well. Dirt and debris—including hair, rope fibers, fragments of metal or wood, or dead tissue—can create chronic inflammation and infection that inhibits proper healing and encourages

growth of proud flesh. Saline solution, which has the same salt concentrations as blood, is the safest way to flush impurities out of a wound without disrupting injured tissues. If you don’t have any saline at hand, water from a hose can do the job. In fact, the cool water has the added benefit of helping to reduce swelling and inflammation. Inspect the area closely to make sure it is completely clean.

2. Apply appropriate treatments. Flushing a clean wound with a dilute antiseptic wash, such as Betadine or Nolvasan, can



reduce the risk of infection even further. If you choose to apply a wound ointment, use a water-based gel during the earliest stages of healing—these help protect the tissues without inhibiting healing. At the outset, avoid heavy, greasy ointments such as ichthammol—these are more effective for protecting tissues during the later stages of healing. At any stage of healing, your best bet is to stick to products labeled for use on horses. Meat tenderizers, hemorrhoid creams and other home remedies may control inflammation, but they will also damage normal tissue and may inhibit healing.

3. Bandage, if appropriate. Apart from superficial scrapes, almost any wound on the lower leg will benefit from bandaging to keep it clean while it heals. You’ll want to first cover the exposed tissue with non-stick gauze

IN FOCUS:

Proud flesh (overgranulation)

► **Definition:** overgrowth of granulation tissue that rises over the edges of a wound, making healing impossible

► **Causes:** Proud flesh is more likely to develop in

wounds to the lower limbs, wounds that remain contaminated with foreign matter, and those in more mobile areas.

► **Signs:** The granulation tissue—which fills in the deeper portion of a wound that penetrates all the way through the skin—will take on a lumpy, reddish-yellow, rubbery appearance. If infection is pres-

ent, it may exude fluids and have a noxious odor.

► **Diagnosis:** X-rays or ultrasound may be used to look for damaged bone or embedded foreign matter. Testing may be necessary to distinguish proud flesh from sarcoids and various types of infections that can create similar-looking lesions in open wounds.

► **Treatment:** Surgical removal of the excess growth is the primary treatment for proud flesh. For more moderate cases, a topical corticosteroid may shrink the tissue enough to allow proper healing. The leg may be placed in a splint or case to keep it still while healing progresses. Skin grafts may be used for larger wounds.



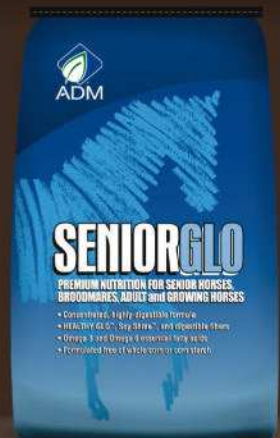
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or other wound dressings that won't adhere to the fragile healing tissues. Wounds above the level of the elbow or stifle can often be left open to heal; the relative immobility of the horse's torso means the healing tissues won't be disturbed as often, and these areas are likely to remain cleaner. You'll want to change the bandage at least daily while healing progresses; more frequent changes may be necessary if the gauze is getting soaked with exudates.

4. Keep your horse still. Too much motion in a healing wound pulls at the tissues and can prevent the skin from closing over it. Bandaging will help keep the limb still as your horse heals, and for larger wounds your veterinarian may recommend splinting. Keep your horse in his stall or in a small corral or round pen until the wound is stable.



5. Seek help quickly if healing stalls. Even with the best of care, some wounds may develop proud flesh. Call your veterinarian immediately if you start to detect rounded, bumpy tissue in a healing wound. In addition to curbing the growth of proud flesh, it's important to rule out similar-looking conditions, such as ulcerated sarcoids^o or various fungal, bacterial or parasitic infections.

Applying a bandage

Bandaging is an important part of wound care. Not only does it help keep the wound clean, it can hold topical medications in place. But it's important to do the job carefully. A bandage that is too loose or too tight can slow healing or even make a wound worse. If you're unsure of your technique, ask your veterinarian to help you improve your skills.

Before you start, you'll need to choose the best dressing for your horse's wound. For years, sterile gauze squares were the primary choice for covering the wound surface before applying the wraps to cover it—and these will still get the job done. However, a better option may be one of the newer products designed to keep the healing tissues moist, such as calcium alginate or foam pad dressings. Although it was once believed that the best way to promote healing was to let a wound dry out, recent

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research has shown that open wounds will close faster and with less risk of infection if the surface remains evenly moist. In addition, specialized dressings are now available that can help debride infected wounds or restore moisture to wound surfaces that dried out before the injury was discovered. If you're unsure of which type to use, ask your veterinarian for a recommendation. As with any product, read the labels carefully and follow the instructions.

Once you have wound dressing, you'll also need rolled gauze, padding such as a quilt or cotton sheet, self-adhesive bandage and elastic bandaging tape (Elastikon).

1. Wrap the rolled gauze just above the wound, pulling it just tightly



enough to remain in place but not so hard as to stretch out the weave. Make sure it lies smoothly and that each layer overlies the preceding layer by about 50 percent.

The highest risk of injury to healing tissues come from shifting or slippage of this gauze layer.

2. When you reach the level of the wound, place the gauze pad or other dressing over the exposed tissue, holding it carefully to ensure it lies flat with no wrinkles. Then continue with wrapping the gauze roll down the leg to cover the dressing and extend beyond its lower edge.

3. Wrap the cotton padding around the leg, taking care that it lies flat.

4. Apply an additional layer of rolled gauze to help hold the padding in place as you continue wrapping.

5. Start the self-adhesive wrap about a half-inch below the top of the padding and work downward, taking care to overlap it by about half with each turn and to prevent it from bunching up or wrinkling. Also leaving about a half-inch of padding exposed at the bottom, continue wrapping back up the leg for a total of two layers. You want to finish with a smooth, snug covering.

6. To help secure the bandage more firmly, apply two or three rounds of elastic bandaging tape at both the top and bottom, overlapping both the horse's leg and the bandaging material by two or three inches. 🐾

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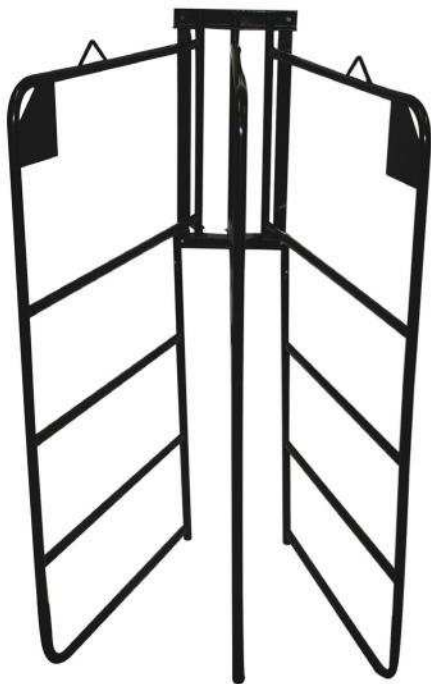
15- by 24-inch shelf, one 18-inch five-hook rail bar, one 12- by 12- by eight-inch basket, one saddle rack and one four-inch peg hook. The rack can also be hung with mounting brackets (sold separately) that are screwed onto a wall. The entire kit weighs approximately 26 pounds. Call 888-298-8628 or visit www.organizedbarn.com.



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Establishing personal space



To teach a horse to keep a respectful distance, you must control his feet, earn his trust and establish your leadership.

By Jonathan Field

Photos by Robin Duncan

Q: *I've been spending time with a friend's yearling at the barn where I board and ride. She's a friendly filly, and she spends the day turned out with a mix of young and older pasturemates. I have been helping out with some basic groundwork and longeing sessions. This filly leads well most of the time and she tries very hard to do what's asked of her. But she often crowds her handler, getting as close as possible, especially when there's a loud, scary noise or some other distraction, like another horse calling to her from the field. This can be dangerous, especially if she escalates to rearing or kicking. I've dealt with mature horses who don't respect personal space before, but I haven't experienced a young horse who gets too close when she feels uncertain or afraid. What can I do to help fix this problem?*

1. Meet Goldrush, a yearling Arabian colt who was raised for quite a while like a Labrador dog. That ended when he became dangerous and I got a desperate call for help from his owner. The following photos show some of the steps I took with Goldrush on a daily basis to change his thinking about people. It took him about two weeks to really accept me as the leader.



2. To teach Goldrush to respect personal space, I put pressure on his nose until he yields with one step backward. I avoid pushing or shoving him. Instead I squeeze with my thumb and fingers until I get one step and then I release. (On a side note: From my Pony Club days I know better than to coil the rope as shown in this picture. But my cowboy days made me accustomed to doing it. In other words, I'm calling myself out! Never coil a rope around your hand or fingers. Instead layer it back and forth in your palm.)

It sounds like this filly has a great life, and I'm really pleased to hear that she gets daily turnout with pasturemates, because it presents a huge learning opportunity. The interaction and socialization this youngster gets from the other horses in the herd teaches her so much. Another huge benefit is the physical and emotional release that horses turned out with a herd enjoy; it's much better for them than being kept alone in a box stall.

Also it sounds like this filly trusts people, so it is quite natural that she finds comfort being close to them when she is worried. She likely thinks, "You're my comfort—let me jump in your lap so you can save me!" This speaks to her good feeling about people.

Having said that, we obviously can't let this behavior continue. We need to teach her that she can be safe and connected to us but with some distance. This is important at this age but it will be critical when she grows to 1,000 pounds. The good news is that it's much easier to change now.

I advise you to start training in an area where the filly feels safe. You need to have a "brain to train," so select a location that is close enough to the herd for the filly to feel comfortable but far enough away for her to focus on her new lesson rather than her buddies. I'd start somewhere maybe 20 yards away from the herd.

After you get through the initial lessons, you can start taking the filly slightly farther away from the herd.

You'll want to do this by small increments: This progression is a lot like learning to swim in the shallow end of a pool and progressing to the deep end. Don't try to teach her to swim in the deep end, away from the comfort of the herd.

The end goal in any training I do with my horses is to teach them to feel safe because I'm there—not because their buddies are nearby or they are accustomed to the environment or the task. To accomplish this goal, I start where it's easy and progress to the point where the horse is prepared for all the unforeseen things that can happen. For this process to succeed there must be trust in our partnership with the horse from the beginning. Indeed, the beginning will have a large impact on the end. If I'm a trainer who constantly throws my horse in the deep part of the pool, I won't end up with that trust I want.

THE IMPORTANCE OF **BEING IN SYNC**

When I'm handling a horse from the ground or riding, I want him to focus on me. How do I get that? I teach him to move in sync with me. If I move, I want to see the same amount of movement in the horse on the end of the lead or underneath me. Just as he would react in the herd naturally.

Of course that can be easier said than done, especially when a horse is doing things like rearing, kicking



3. Here's another way to achieve personal space. Notice my body language. I'm focused and leaning forward as I ask Goldrush to back away from me. Horses communicate with body language, so you need to convey the correct intention in your body to be clear to your horse. I don't poke at Goldrush; I just use a steady pressure and am ready to release the moment he steps back.

5. After I establish personal space while standing still, I begin to ask Goldrush to lead at a distance. I keep my eyes on him and stop and back him up if he comes too close. I don't lead horses close to me until they have learned enough respect to be safe in close proximity.

About the author: Jonathan Field is a trainer and clinician from Abbotsford, British Columbia. His program, Jonathan Field Horsemanship: Inspired by Horses, teaches the skills necessary to build a relationship with horses. Field grew up riding both English and Western and worked as a cowboy on one of the largest cattle ranches in Canada. Field regularly does presentations at events like the Western States Horse Expo in Sacramento, California.



4. Here Goldrush tries to take control of my space. I hold my ground and ask him to step away from me. Remember that control of the feet is the foundation of this training process.



6. Asking for many different yields will be important for Goldrush's future. Here I ask for a turn on the forehand. I will also ask him to move over sideways and do a turn on the hindquarters.

7. When Goldrush is quiet and soft, we can share a nice moment. If I am going to ask for respect, I need to be respectful to him, too.



and escalating to a point that can be quite dangerous. And these are things a horse can do all at once and very quickly!

To get a horse in sync with you, you must first make sure you are in control of your feet. Yep, I said *your*



feet. To understand why your control of your own feet is important, consider herd dynamics. There's a simple way to tell which horse is the leader by watching herd members interact: The lead horse can move any one of the other horses but no one can move the lead horse's feet. The lead horse has control of his or her own feet!

Next, consider this question: Where do all the other horses look for direction? You got it, the lead horse. Other herd members use their eyes and "radar antenna" ears to help them keep track of and stay in sync with that horse. And, of course, if they don't, they could experience some pressure from that horse or other dominant horses in the herd.

In short, each horse subtly begins to sync with the herd leader. This is horse language at its most basic level. And this is what we need to use when training our horses. Through movement and control of space, we begin to earn the trust and respect of the horse, and we build means of communicating that he can understand. This leads to acceptance of a human as a herdmate and confidence in that person as a leader. When I play with horses, I like to keep in mind the picture of the herd lessons I've learned. 🐾



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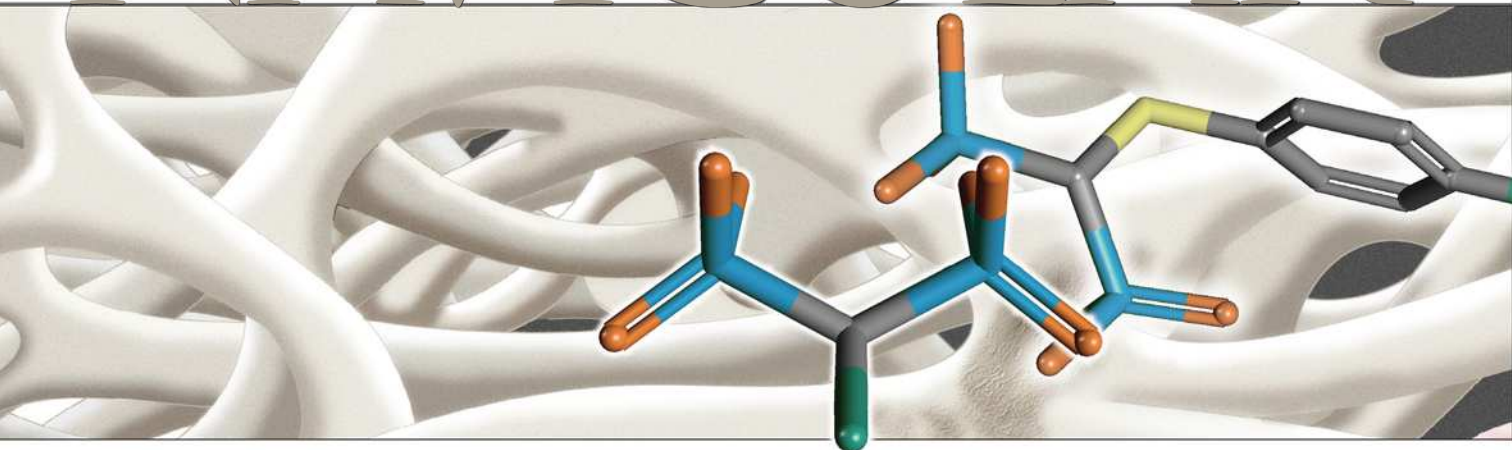


The recent approval of two new drugs that target the bone changes associated with navicular syndrome offers hope in some of the most frustrating cases.



NEW OPTIONS FOR

NAVICULAR





By Christine Barakat

Just a few short years ago, owners of horses diagnosed with navicular syndrome had very few options. An infuriatingly vague diagnosis, the term “navicular” was often applied to cases of otherwise unexplained heel pain. Therapeutic trimming and shoeing could help preserve soundness for a few years, as could non-steroidal anti-inflammatory drugs (NSAIDs), but there was no way to head off the inevitable: early retirement for the horse and heartache for the owner.

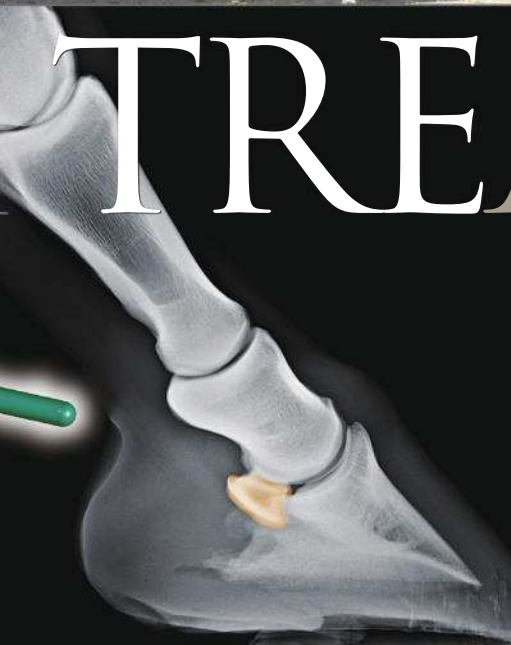
Then the navicular landscape shifted dramatically. Advances in MRI technology led to more precise identification of injuries and abnormalities in the heel area. A case that may have been chalked up to “navicular” even five years ago might now be revealed as an impar ligament strain that is manageable by specific, focused treatments. The ability to see all structures in the back of the hoof transformed the veterinary profession’s understanding of what navicular

sound. The relevance of “abnormal” looking navicular bones is still unclear. And treatments to address navicular lameness related to bone changes were still limited to corrective shoeing and anti-inflammatory medications. That is, until very recently.

In the summer of 2014, the navicular landscape made a sudden shift again. That’s when the Food and Drug Administration (FDA) approved two new medications for the treatment of navicular syndrome, specifically targeting bony changes seen in many cases. Both drugs, sold under the names Tildren and Osphos, belong to a medication class known as bisphosphonates. Both have similar action, and both are prescribed with the same intentions. But they aren’t identical. This means that horse owners coping with bone-based navicular problems have, for the first time in a long time, options.

Tildren and Osphos are available only by prescription, and a veterinarian will need to determine if one or the other may help treat a particular bone

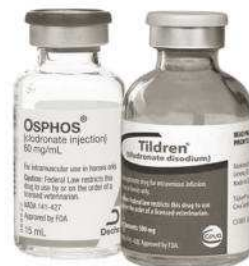
TREATMENT



was and wasn’t. With better diagnostics, options for treatments to manage heel pain, especially when caused by soft-tissue changes, suddenly multiplied.

But mysteries and frustrations remain. Horses who exhibit heel pain with no obvious soft tissue or cartilage damage are still tough cases. Lesions on the navicular bone, as well as bone edema (bruising), are often found in lame horses, but they are also seen in plenty of horses who are perfectly

problem. But if you’re caring for a horse with navicular syndrome, you’ll want to have a conversation with your veterinarian about the role bisphosphonates might play in your long-term management plan. Here’s what you need to know to start that discussion.





A BALANCING ACT

Bisphosphonates were first synthesized in 1897 by chemists in Germany for industrial applications. Named for the two phosphate groups they contain, bisphosphonates were used to prevent calcium carbonate scaling on machinery and plumbing. It wasn't until nearly a century later that the chemicals were considered for clinical applications in human medicine based on their effects on bone remodeling.

The continuous breakdown and repair of bone tissue, remodeling helps bone adapt to stresses, becoming stronger and/or repairing damage. "Bone remodeling is why you can break your arm and it heals," says Kyle Creech, DVM, equine veterinary services manager for Ceva Animal Health, the makers of Tildren. The remodeling processes is a marvel of biology, but it can be explained fairly simply:

Cells called osteoclasts continually

roam bone surface, resorbing old or damaged bone. In their wake, different cells known as osteoblasts arrive to lay down new bone. At times of bone stress, such as during extreme physical activity or after a traumatic injury, this process is accelerated, with osteoclasts working faster to tear down the damaged bone. Generally, osteoblasts can keep up the increased pace, laying down new, stronger bone quickly, but the process isn't instantaneous.

"There can be a lag," says Jill Stohs, DVM, technical services veterinarian with Dechra Veterinary Products, the makers of Osphos. "In normal bone remodeling, generally it takes about three weeks for osteoclasts to finish their job of removing the damaged and stressed bone. Once the osteoclasts have completed their job, they signal and recruit osteoblasts to the area of removed bone. Osteoblasts may take up to three months to complete their process of adding new bone. By that time, though, the

underlying stress has been relieved, so osteoclasts have slowed down their efforts and the osteoblasts can catch up to them." In cases of navicular syndrome, however, the stress on the navicular bone is continual, meaning osteoclasts are continually working to remove stressed bone tissue and osteoblasts do not have a chance to catch up, and degradation of the bone occurs. This, say Creech and Stohs, is where bisphosphonates can help.

Bisphosphonates restore balance to the bone remodeling process by inhibiting the resorption of bone. Bisphosphonates become attached to calcium in the bone. Then they are ingested by osteoclasts and disrupt the metabolic process of the bone-eating cells, which causes them to die. With fewer osteoclasts at work tearing down bone, the osteoblasts can then keep up with the job of laying down new bone, leading to fewer lesions. "It's all about re-establishing that balance between the osteoclasts

BONE REMODELING

navicular bone

Remodeling is a continuous process of breakdown and repair that helps bone tissue heal and adapt to stress.

Osteoclasts roam bone surfaces, resorbing old or damaged tissue. This process is accelerated when bone is stressed or injured. When osteoclasts have completed their job, they summon osteoblasts to the area.

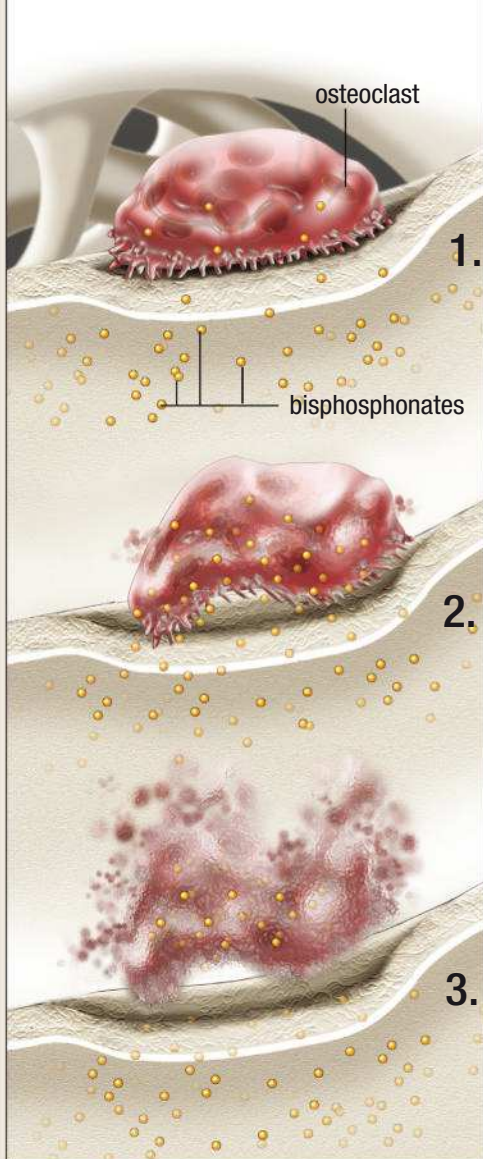
osteoclasts

HOW BISPHOSPHONATES WORK

Bisphosphonates restore balance to the bone remodeling process by limiting the action of osteoclasts, slowing the resorption of bone.

After administration, bisphosphonates bind to calcium in the bone, where they are ingested by osteoclasts.

Once ingested, bisphosphonates disrupt metabolic processes of the osteoclasts, leading to apoptosis (cell death). With fewer osteoclasts resorbing bone, osteoblasts can lay down enough new bone to replace what has been lost.



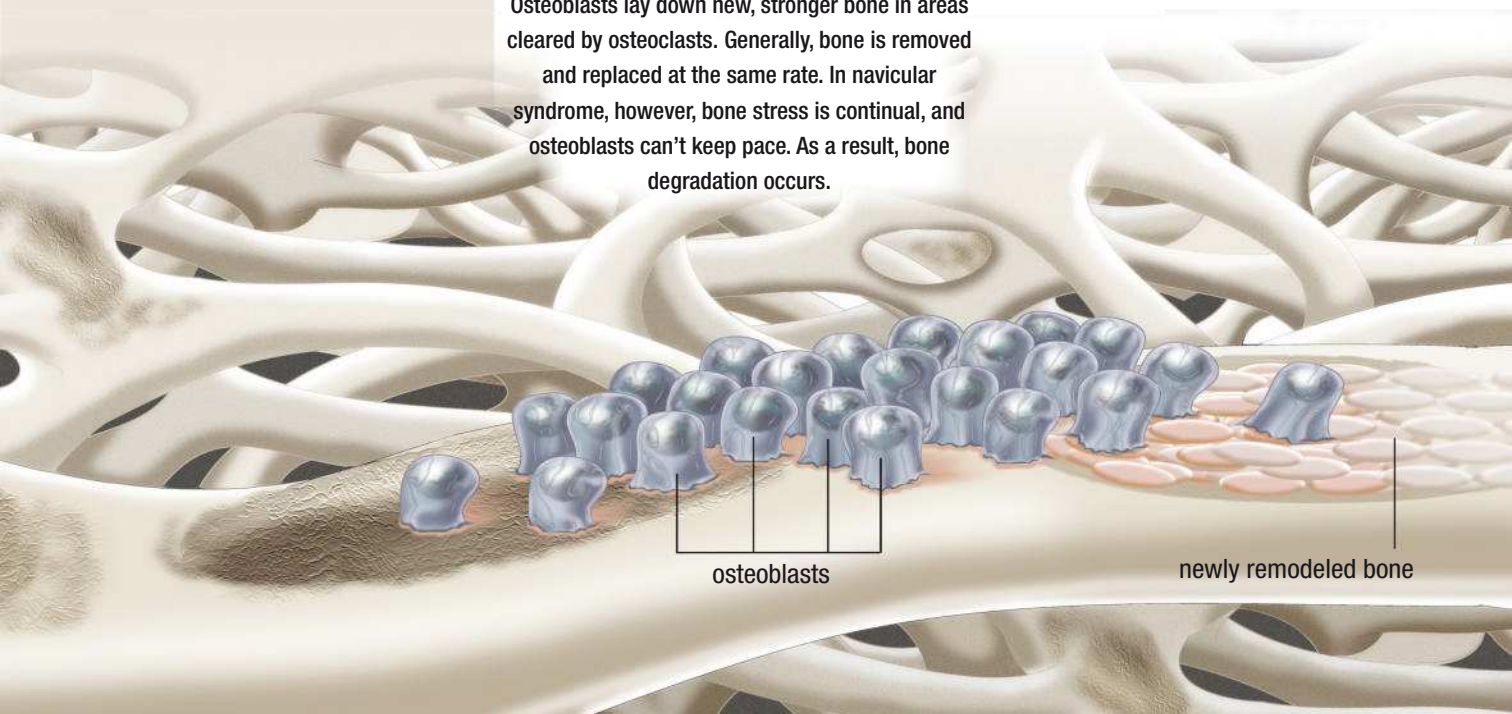
Osteoblasts lay down new, stronger bone in areas cleared by osteoclasts. Generally, bone is removed and replaced at the same rate. In navicular syndrome, however, bone stress is continual, and osteoblasts can't keep pace. As a result, bone degradation occurs.

and the osteoblasts,” says Stohs.

With the discovery of this mechanism in the late 1960s, bisphosphonates were put to use treating human bone disorders, such as osteoporosis (the rapid breakdown of bone throughout the body) and Paget’s disease (disorganized bone remodeling in specific locations such as the femur). Fosamax, Boniva, Reclast and other bisphosphonates quickly became the most prescribed treatment for osteoporosis.

As often happens when a new human drug comes onto market, equine health researchers began looking for potential applications of bisphosphonates in horses. Horses, however, don’t get osteoporosis. Or Paget’s disease, for that matter. So researchers began considering which equine conditions might have similar physiological processes.

Eventually European researchers hit upon the idea of using the drugs to treat bone^o spavin, navicular disease, kissing^o spines, pedal^o osteitis and other



conditions affecting bone. Scientific papers began to emerge as early as 2001, and soon after that the bisphosphonate tiludronate disodium (Tildren) was marketed in Europe for use in horses.

Ceva worked with the FDA to create a path through which veterinarians could import Tildren into the United States, a process that required several steps. However, once a veterinarian had the drug, things weren't always simple, especially if he hadn't used it before. "The directions weren't in English," says Creech. "So veterinarians had to rely on protocols they had heard of from others or at conferences." For more than a decade, this was the only bisphosphonate available for equine therapy in the United States.

The two companies, however, began working toward Food and Drug Administration (FDA) approval of bisphosphonate medications specifically for the U.S. equine market. The FDA approved Tildren in February 2014 and Osphos two months later.

COMPARE AND CONTRAST

Given their shared drug class and history, it's no surprise that Osphos and Tildren have many similarities. For starters, despite their many applications in Europe, both are approved by the FDA only for the control of clinical signs associated with navicular syndrome in horses. Any other use by individual veterinarians in this country is considered "off-label." While that practice is not illegal, those uses have not been studied by either the manufacturers or the FDA.

Both drugs are also labeled specifically for use in horses over the age of 4, when the bone remodeling process naturally slows down a bit. "Young horses are turning over bone at an incredibly

high rate," says Creech. "That's necessary for their bones to become adapted to the type of work they are going to be doing. It's a critical process that we don't want to interfere with at all." Similarly, neither drug is approved for use in pregnant or lactating mares or those intended for breeding. Bisphosphonates have been shown to cause abnormal fetal development in other species and may be excreted in milk to be ingested by nursing animals.

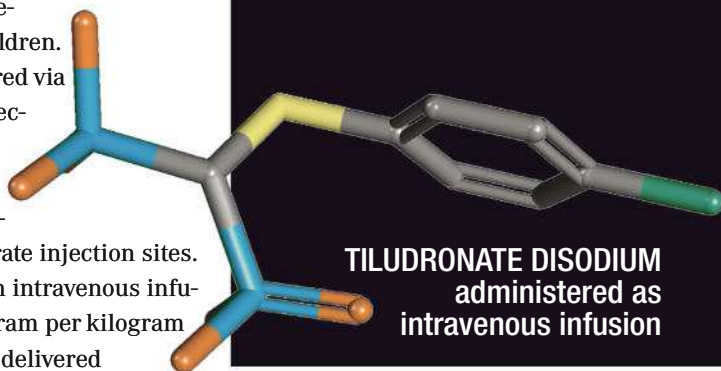
The route of administration is a primary difference between Osphos and Tildren. Osphos is administered via an intramuscular injection; 1.8 milligrams per kilogram of body weight divided equally among three separate injection sites. Tildren is given as an intravenous infusion, with one milligram per kilogram of body weight being delivered slowly over 90 minutes.

The difference in administration routes, says Stohs, is partially due to the chemical makeup and specific formulation of each drug. "If you go back to organic chemistry, you can remember enough to realize that while tiludronate disodium and clodronate disodium are in the same family and subclass of chemicals, their actual molecular structure is different, which affects the way each molecule acts and can influence how each product can be administered. They are in the same fruit basket, so to speak, but you aren't comparing oranges to oranges and, more specifically, identical drugs when you talk about the two."

Another influence is simply how the drug was developed. "In Europe, Tildren was always given intravenously," says Creech. "That's what veterinarians had the most experience with, so that's the



CLODRONATE DISODIUM
administered as
intramuscular injection



TILUDRONATE DISODIUM
administered as
intravenous infusion

path we continued on through development and the approval process."

As part of the FDA approval process, both Dechra and Ceva had to demonstrate efficacy and safety of their drugs for the specific labeled use. While the end goal was the same, the companies took slightly different approaches.

The Dechra efficacy study was based on 146 horses between the ages of 4 and 22. All had forelimb lameness that was scored at least a grade 2 (out of 5) on the American Association of Equine Practitioners' lameness scale. The horses moved sound when their heels were numbed and had radiographic evidence of degenerative changes of the navicular bone. Investigators treated the horses with an intramuscular injection of either Osphos or the control saline and then evaluated them for treatment success at days 28, 56 and 180 post-administration. "Success" was



The difference in protocols is partially due to the chemical makeup and specific formulation of each drug. Their molecular structures are different, which affects how the molecules act and can influence how each product is best administered.



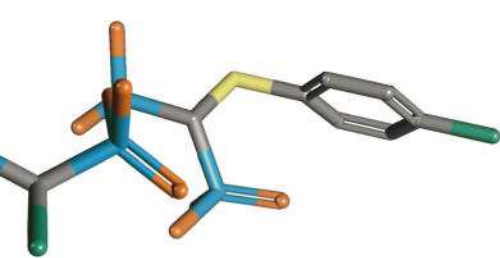
defined by an improvement of at least one lameness grade. When the horses were evaluated 28 days after initial injection, 67.4 percent of Osphos-treated horses were considered successes, compared to 20.7 percent in the saline-treated group.

An evaluation at day 56 showed that 74.7 percent of the treated horses had improved; only 3.3 percent of the control horses showed improvement. Seventy-eight successfully treated horses were available for a 180-day follow-up and, of those, 65.4 percent were still considered treatment successes.

The Tildren efficacy study used 208 horses, ages ranging from 4 to 20, that had been diagnosed with navicular syndrome based on clinical exams, nerve blocks and evidence of bone edema on MRI with no soft tissue involvement. The horses had a grade 2 lameness or greater when trotting on a 10-meter circle, with the lamest limb on the inside of the circle. The horses were treated with either a single infusion of Tildren or an inert sucrose solution that served as a control. The veterinarians reexamined the horses two weeks, one month and again two months after treatment. The treatment was considered a success if the horses improved one lameness grade at the two-month evaluation while trotting on the same size circle with no increase in lameness in the opposite limb. Sixty-four percent of the treated horses were deemed successfully treated, while 48 percent of control horses were considered improved.

Both Creech and Stohs stress that regular corrective shoeing is critical to the success of the treatment. “No drug is going to offset the damage done by a foot that’s out of balance and not maintained properly,” says Stohs.

The FDA approval process also requires proof of safety. Studies toward

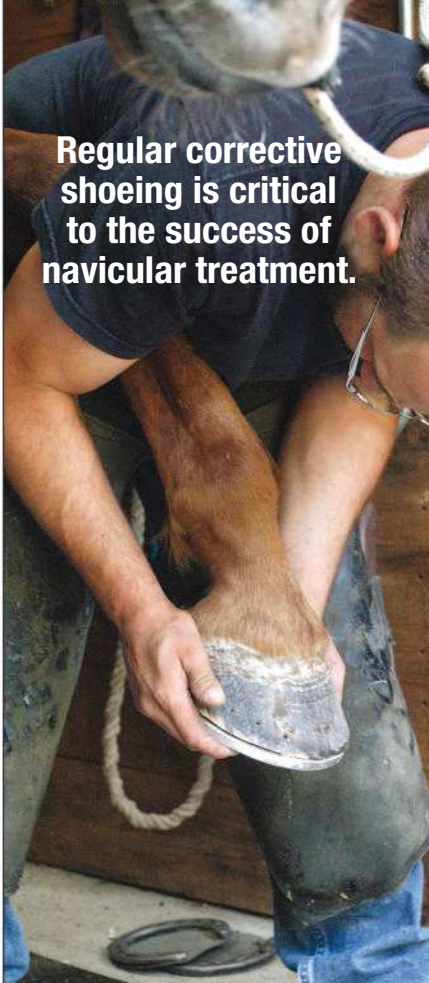


this end showed that Tildren and Osphos share a potential adverse reaction: Both can cause mild colic-like gastrointestinal pain. Early in the Tildren study, when the infusions were given over a 30-minute period, 41 percent of treated horses showed colic pain during treatment, compared to 10 percent of placebo-treated horses. The infusion time was expanded to 60 minutes, and the adverse reaction rate dropped to 28 percent. (Eventually, the approved Tildren label would specify a 90-minute infusion period.) In the Osphos research, 9 percent of horses showed signs of transient colic. Almost all of the cases of colic were mild and subsided with hand-walking—less than 1 percent required treatment with a dose of flunixin^o meglumine. “What’s interesting is these are similar to the side effects seen in humans,” says Creech. “People also report a mild discomfort. Is it visceral pain? Is it kidney pain? We aren’t quite sure. What we do know is that it’s not serious colic, like an obstruction or other surgical case. The majority of horses in our study responded quickly without additional signs or need for additional treatment.”

The cause of this side effect isn’t fully understood, Stohs says: “Bisphosphonates work by binding calcium, and we do see some transient changes in electrolyte and mineral levels after administration. Are we seeing signs of discomfort because of that calcium binding? We don’t know, but it’s potentially what’s going on. It’s something we will continue to research because if we can identify the problem, we can possibly take steps to prevent it.”

Beyond colic, there are a few other potential adverse effects veterinarians using bisphosphonates will be mindful of: These drugs are excreted by the

Regular corrective shoeing is critical to the success of navicular treatment.



horse’s kidneys, so caution should be used when administering it to horses with renal problems. The labels of both Tildren and Osphos carry warnings about concurrent administration of other renal-toxic drugs, such as NSAIDs. Both labels also carry a warning about use in horses who have conditions that may affect mineral or electrolyte^o balances, such as hyperkalemic^o periodic paralysis (HYPP). Bone fragility is an observed side effect in long-term bisphosphonate use in humans, so both of the equine product labels warn of the potential to inhibit repair of microfractures in horses.

Both Ceva and Dechra stay in close contact with every prescribing veterinarian to collect their impressions on efficacy and reports of any adverse reactions. “As with any new drug that enters a market, we will learn more from the field veterinarians now,” says Stohs. “They are using it every day, and their observations will be incredibly useful to everyone, including the manufacturers.”

THE UNKNOWN

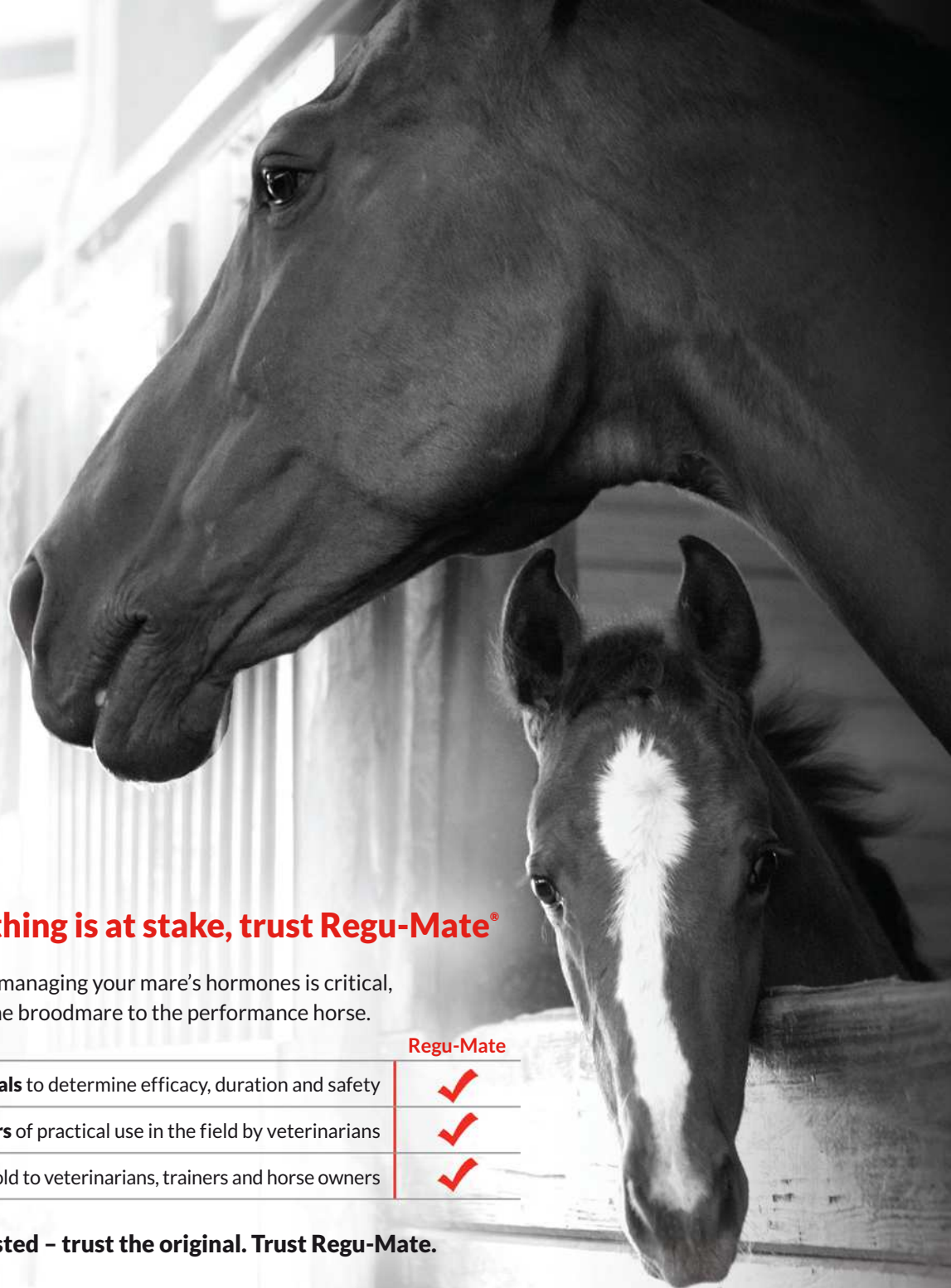
Even while studies produce statistics and facts and veterinarians report their impressions, one big question about the bisphosphonates will remain unanswered for the foreseeable future: How exactly are these drugs relieving the discomfort of navicular syndrome?

Not by repairing damage to the bone that has already been done. “This is important to remember,” says Stohs. “These drugs aren’t reversing old, existing lesions. Those lesions are there for good, which is why it’s very important to start giving bisphosphonates soon after a diagnosis. You can’t make up for lost ground; you can only rebalance the remodeling process from the time of treatment on.”

Creech concurs: “These drugs aren’t a last-ditch effort. You can’t wait until things are very bad and expect them to turn around. You start the drugs in an effort to maintain where you’re at.”

So why, then, do some horses return to soundness after being lame from presumed navicular pain? Nobody really knows. “It’s possible that an overactive remodeling process itself is painful,” says Stohs, “or it’s possible that the overactive remodeling causes bone edema, which leads to soreness. I say ‘possible’ because we didn’t prove any of this at a cellular level; all our studies were designed to do was prove the horses were less lame after being given the drug, which they are. We don’t know why yet, but there’s a lot about navicular that we still don’t know.”

Also unknown is exactly how long the relief lasts. Horses who respond to Osphos, says Stohs, can be given another treatment three to six months later if they begin to show signs of soreness again. “This is not licensed as a preventative drug,” she says, “so we



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Regu-Mate®
(altrenogest)

We're for the Horse™

Talk to your veterinarian about proper use and safe handling of Regu-Mate. Avoid skin contact. Always wear protective gloves when administering Regu-Mate. This product is contraindicated for use in mares with a previous or current history of uterine inflammation. Pregnant women, or women who suspect they are pregnant, should not handle this product. For complete product information, see accompanying product insert.

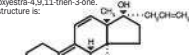
REPORTS FROM THE

Regu-Mate® (altrenogest)

Solution 0.22% (2.2 mg/mL)

CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

DESCRIPTION: Regu-Mate® (altrenogest) Solution 0.22% contains the active synthetic progestin, altrenogest. The chemical name is 17 α -[11-(4-phenylbut-1-en-3-one)-17 α -pregnen-20-one]. The CAS Registry Number is 850-52-2. The chemical structure is:



Each mL of Regu-Mate® (altrenogest) Solution 0.22% contains 2.2 mg of altrenogest in an oil solution.

ACTIONS: Regu-Mate® (altrenogest) Solution 0.22% produces a progestational effect in mares.

INDICATIONS: Regu-Mate® (altrenogest) Solution 0.22% is indicated to suppress estrus in mares. Suppression of estrus allows for a predictable occurrence of estrus following drug withdrawal. This facilitates the attainment of regular cyclicity during the transition from winter anestrus to the physiological breeding season. Suppression of estrus will also facilitate management of prolonged estrus conditions. Suppression of estrus may be used to facilitate scheduled breeding during the physiological breeding season.

CONTRAINDICATIONS: Regu-Mate® (altrenogest) Solution 0.22% is contraindicated for use in mares having a previous or current history of uterine inflammation (i.e., acute, subacute, or chronic endometritis). Natural or synthetic gestagen therapy may exacerbate existing low-grade or "smoldering" uterine inflammation into a fulminating uterine infection in some instances.

PRECAUTIONS: Various synthetic progestins, including altrenogest, when administered to rats during the embryonic stage of pregnancy at doses manyfold greater than the recommended equine dose caused fetal anomalies, specifically masculinization of the female genitalia.

DOSE AND ADMINISTRATION: While wearing protective gloves, remove shipping cap and seal; replace with enclosed plastic dispensing cap. Remove cover from bottle dispensing tip and connect last lock syringe (without needle). Draw out appropriate volume of Regu-Mate solution. (Note: Do not remove syringe while bottle is inverted as spillage may result.) Detach syringe and administer solution orally at the rate of 1 mL per 110 pounds body weight (0.044 mg/kg) once daily for 15 consecutive days. Administer solution directly on the base of the mare's tongue or on the mare's usual grain ration. Replace cover on bottle dispensing tip to prevent leakage. Excessive use of a syringe may cause the syringe to stick; therefore, replace syringe as necessary.

WHICH MARES WILL RESPOND TO REGU-MATE® (altrenogest) SOLUTION 0.22%? Extensive clinical trials have demonstrated that estrus will be suppressed in approximately 95% of the mares within three days; however, the post-treatment response depended on the level of ovarian activity when treatment was initiated. Estrus in mares with inactive ovaries (follicles greater than 20 mm in diameter) will be suppressed during the transition period; however, mares with active ovaries (follicles greater than 20 mm in diameter) frequently respond with regular post-treatment estrus cycles. Response in mares in the transition phase between winter anestrus and the summer breeding season depended on the degree of ovarian activity. Mares with inactive ovaries (follicles failed to respond with normal cycles post-treatment, whereas a higher proportion of mares with ovarian follicles 20 mm or greater in diameter inhibited normal estrus cycles post-treatment. Regu-Mate® (altrenogest) Solution 0.22% was very effective for suppressing the prolonged estrus behavior frequently observed in mares during the transition period (February, March and April). In addition, a high proportion of these mares responded to post-treatment.

SPECIFIC USES FOR REGU-MATE® (altrenogest) SOLUTION 0.22%:

SUPPRESSION OF ESTRUS TO:

1. Facilitate attainment of regular cycles during the transition period from winter anestrus to the physiological breeding season. To facilitate attainment of regular cycles during the transition phase, mares should be examined to determine the degree of ovarian activity. Estrus in mares with inactive ovaries (no follicles greater than 20 mm in diameter) will be suppressed but these mares may not begin regular cycles following treatment. However, mares with active ovaries (follicles greater than 20 mm in diameter) frequently respond with regular post-treatment estrus cycles.
2. Facilitate management of the mare exhibiting prolonged estrus during the transition period. Estrus will be suppressed in mares exhibiting prolonged estrus (estrus occurring at intervals of 10 to 15 days) or late during the transition period. Again, the post-treatment response depends on the level of ovarian activity. The mares with greater ovarian activity (estrus occurring earlier and conceive sooner than the inactive mares, Regu-Mate® (altrenogest) Solution 0.22% may be used to suppress estrus during the transition period to suppress estrus in mares with inactive ovaries to aid in the management of these mares or to mares later in the transition period with active ovaries to suppress and schedule the mare for breeding.
3. Permit scheduled breeding of mares during the physiological breeding season. To permit scheduled breeding, mares which are regularly cycling or which have active ovarian function should be given Regu-Mate® (altrenogest) Solution 0.22% daily for 15 consecutive days beginning 20 days before the date of the planned estrus. Oestrus will occur 5 to 7 days following the onset of estrus as expected for untreated mares. The usual procedures for mares in estrus. Mares may be regulated and scheduled either individually or in groups.

DOSE CHART:

Approximate Weight in Pounds	Dose in mL
770	7
880	8
990	9
1100	10
1210	11
1320	12

ADDITIONAL INFORMATION: A 3-year well controlled reproductive safety study was conducted in 27 pregnant mares, and compared with 24 untreated control mares. Treated mares received 2 mL Regu-Mate® (altrenogest) Solution (0.22%) (1.10 mg/kg body weight) (2x dosage recommended for estrus suppression) from day 20 to day 325 of gestation. This study provided the following data:

1. In fully offspring (all ages) of treated mares, litteral size was increased.
2. Filly offspring from treated mares had shorter intervals from Feb. 1 to first ovulation than fillies from their untreated mare counterparts.
3. There were no significant differences in reproductive performance between treated and untreated animals (mares & their respective offspring) measuring the following parameters:
 - interval from Feb. 1 to first ovulation, in mares only.
 - mean interval from first to second cycle and second to third cycle, mares only.
 - follicle size, mares only.
 - at 50 days gestation, pregnancy rate in treated mares was 81.8% (9/11) and untreated mares was 100% (4/4).
 - after 3 cycles, 11/12 treated mares were pregnant (91.7%) and 4/4 untreated mares were pregnant (100%).
 - coat offspring of treated and control mares reached puberty at approximately the same age (82 & 84 weeks respectively).
 - stallion offspring from treated and control mares showed no differences in seminal volume, spermatozoal concentration, spermatozoal motility, and total sperm per ejaculate.
 - stallion offspring from treated and control mares showed no difference in sexual behavior.
 - testicular characteristics (scrotal circumference, testicular weight, epididymal weight and height, testicular height, width & length) were the same between stallion offspring of treated and control mares.

REFERENCES: Schoenaker, C.F., E.L. Squires, and R.K. Shidler. 1989 Safety of Altrenogest in Pregnant Mares and on Health and Development of Offspring. Eq. Vet. Sci. (9): No. 2: 69-72. Squires, E.L., R.K. Shidler, and O. Kokkinn. 1989 Reproductive Performance of Offspring from Mares Administered Altrenogest During Gestation. Eq. Vet. Sci. (9): No. 2: 73-76.

WARNING: Do not use in horses intended for food.

HUMAN WARNINGS: Skin contact must be avoided as Regu-Mate® (altrenogest) Solution 0.22% is readily absorbed through unbroken skin. Protective gloves must be worn by all persons handling this product. Pregnant women or women who suspect they are pregnant should not handle Regu-Mate® (altrenogest) Solution 0.22%. Women of child bearing age should exercise extreme caution when handling this product. Accidental absorption could lead to a disruption of the menstrual cycle or prolongation of pregnancy. Direct contact with the skin should therefore be avoided. Accidental spillage on the skin should be washed off immediately with soap and water.

INFORMATION FOR HANDLERS:

WARNING: Regu-Mate® (altrenogest) Solution 0.22% is readily absorbed by the skin. Skin contact must be avoided; protective gloves must be worn when handling this product.

Effects of Overexposure: There has been no human use of this specific product. The information contained in this section is extrapolated from data available on other products of the same pharmacological class that have been used in humans. Effects anticipated are due to the progestational activity of altrenogest. Acute effects after a single exposure are possible; however, continued daily exposure has the potential for more unwanted effects such as disruption of the menstrual cycle, uterine or abdominal cramping, increased or decreased uterine bleeding, prolongation of pregnancy and headaches. The oil base may also cause complications if swallowed. In addition, the list of people who should not handle this product (see below) is based upon the known effects of progestins used in humans on a chronic basis.

PEOPLE WHO SHOULD NOT HANDLE THIS PRODUCT:

1. Women who are or are suspected they are pregnant.
2. Anyone with thrombocytosis or thromboembolic disorders or with a history of these events.
3. Anyone with cerebral-vascular or coronary artery disease.
4. Women with known or suspected carcinoma of the breast.
5. People with known or suspected estrogen-dependent neoplasia.
6. Women with undiagnosed vaginal bleeding.
7. People with benign or malignant tumors which developed during the use of oral contraceptives or other estrogen-containing products.
8. Anyone with liver dysfunction or disease.

ACCIDENTAL EXPOSURE: Regu-Mate® is readily absorbed from contact with the skin. In addition, the oil based product can penetrate porous gloves. Altrenogest should not penetrate intact rubber or impervious gloves; however, if there is leakage (i.e., pinhole, spillage, etc.), the contaminated area covered by such occlusive materials may have increased absorption. The following measures are recommended in case of accidental exposure.

Skin Exposure: Wash immediately with soap and water.
Eye Exposure: Immediately flush with plenty of water for 15 minutes. Get medical attention.
If Swallowed: Do not induce vomiting. Regu-Mate® (altrenogest) Solution 0.22% contains an oil. Call a physician. Vomiting should be supervised by a physician because of possible pulmonary damage via aspiration of the oil base. If possible, bring the container and labeling to the physician.

CAUTION: For oral use in horses only. Keep this and all medication out of the reach of children.

Store at or below 25°C (77°F).

NADA# 131-310, Approved by FDA.

HOW SUPPLIED:

Regu-Mate® (altrenogest) Solution 0.22% (2.2 mg/mL). Each mL contains 2.2 mg altrenogest in an oil solution. Available in 1000 mL plastic bottles.

* US Patents 3,453,267; 3,478,067; 3,484,462

Manufactured by: DPT Laboratories, San Antonio, TX 78215

Distributed by: Intervet Inc., Millsboro, DE 19966



Although the Food and Drug Administration approval process ensures that a new drug meets efficacy and safety standards, “real world” usage often reveals even more about its most useful applications. Although the bisphosphonates have been widely available in this country for only a short time, veterinarians are already integrating these medications into their treatment plans.

“Tildren is what I have the most experience with,” says Courtney Wittich, DVM, of Hagyard Equine Medical Institute in Lexington, Kentucky. “I started using it when it had to be imported.”

Wittich, like many veterinarians, often uses Tildren in an “off-label” way not described in the product literature. “I’ll give it to horses with axial skeletal issues, like back and neck bone-related pain,” she says. “And when I’m using it for navicular, I’ll typically give it as part of a regional limb perfusion.” A technique that delivers a high concentration of a medication through an intravenous injection below the level of a tourniquet, regional limb perfusion is also commonly used for targeting antibiotic treatments.

Whether Tildren is administered systemically or locally, Wittich and her

clients have been satisfied with the results. “It’s not going to help every horse,” she says, “and I make it clear there are no guarantees, but for some horses, it does make a significant difference within a few weeks.” She estimates she’s given about 50 systemic doses and 20 regional doses.

Wittich attributes part of that success to careful selection of cases; she doesn’t turn to bisphosphonates unless she sees an indication of bone remodeling on a horse’s radiographs or bone scans. “There are lots of reasons a horse can have a sore back or be lame,” she says. “Bone pain is just one. You need to consider and rule out the rest.”

But when bone pain is suspected, she says, her clients are usually willing to give Tildren a try despite a price tag that can top \$1,000: “In both navicular and axial skeletal issues, there aren’t that many other options,” says Wittich. “And I make it clear to people that this isn’t a treatment to wait on. It won’t undo damage that’s been done, so the earlier you can start, the better. The ‘wait and see’ approach doesn’t work for you here.”

As far as side effects go, Wittich says she hasn’t seen many cases of colic but has heard of more from other veterinarians. “The biggest factors for colic are individual

reaction to the drug, how quickly it is administered, and the dose or concentration given. So we give it slowly, make sure it is the correct dose and concentration, and hope the individual horse has an appropriate response.” She repeats treatment when horses show signs of returning soreness but never more than twice a year.

Sean Bowman, DVM, of The Piedmont Equine Practice in The Plains, Virginia, has experience with both Tildren and Osphos. “We have used imported Tildren for years,”



Although bisphosphonates have been widely available in this country for only a short time, veterinarians are already integrating these medications into their treatment plans.

FIELD

he says, “and since its approval last summer, our practice has given about 75 doses of Osphos.”

Which bisphosphonate Bowman chooses in each case depends on several factors. “Convenience for myself and the client is a big one,” he says. “When it comes to systemic administration, giving an intramuscular injection is usually much easier than an intravenous drip, so I tend to use Osphos for the entire-body treatments. For a treatment of a very isolated location, though, I might go with a regional limb perfusion of Tildren instead.”

In addition, Bowman administers Osphos off-label for a variety of conditions: “We will use it for navicular, but also severe degenerative joint disease of the hocks, kissing spines and, occasionally, horses with evidence of subchondral bone injury that isn’t responding to rest and more conservative therapy.”

Osphos isn’t a first-line treatment for any of these, however, says Bowman. “I like to base it on evidence of bone involvement, like x-rays or a bone scan, and then only when other more typical therapies haven’t produced results.” Overall, however, he and his clients have been satisfied with the results. “I can tell you anecdotally that I think horses are responding well. We’ve had success in all four of those scenarios—navicular, hock disease, kissing spines and subchondral bone injury.”

Bowman informs all clients prior to treatment—which he says costs “in the hundreds” of dollars—that “some horses don’t respond at all. Otherwise, it would be magic, and we wouldn’t need any other drugs. As nice as that might be with any treatment, that’s just not the case.”

The only side effect Bowman says he’s observed with Osphos is localized irritation at the injection sites although others in his practice have seen mild colics. “We tell the client it’s a possibility and to have Banamine ready,” he says.

recommend giving it only when necessary and with the reoccurrence of clinical signs of navicular syndrome.”

Creech gives similar guidelines for Tildren repeat treatments: “The frequency of treatment will depend on communication between the veterinarian and a rider who knows the horse well. Oftentimes, they are the first to be able to tell that the horse is off again. We recommend twice a year if necessary, possibly three times at a maximum. We know the drug stays in the bone up to six months, but the concentration then will be much less than it was at, say, three months. What’s the tipping point to keeping the horse comfortable? We don’t know that yet.”

A final unknown is an even more fundamental question: Which horses will respond to either, if any, bisphosphonate drug? “We know that not every drug in a particular class will work the same on every horse,” says Stohs. “So it shouldn’t be surprising to find out horses may have very individualized responses to this new class of drug as well.” For instance, says Creech, a horse who doesn’t improve after a dose of Tildren is a candidate for one more infusion, “but if that also produces no response, it’s not the right drug for that particular horse and continued treatments aren’t likely to be effective.”

If your veterinarian decides your horse might benefit from a bisphosphonate, the specific one he chooses will be a matter of personal preference and professional comfort level. “Veterinarians are constantly making treatment decisions based on many factors,” says Stohs. “From their own experiences to each horse’s and owner’s particular situation, there are a lot of variables to consider in every case. In the situation like we have now, with two options in a new class of drugs, veterinarians have choices they’ve never had before. In the end, though, they are basing their decisions on what is best for that particular horse, and that’s the most important consideration.”

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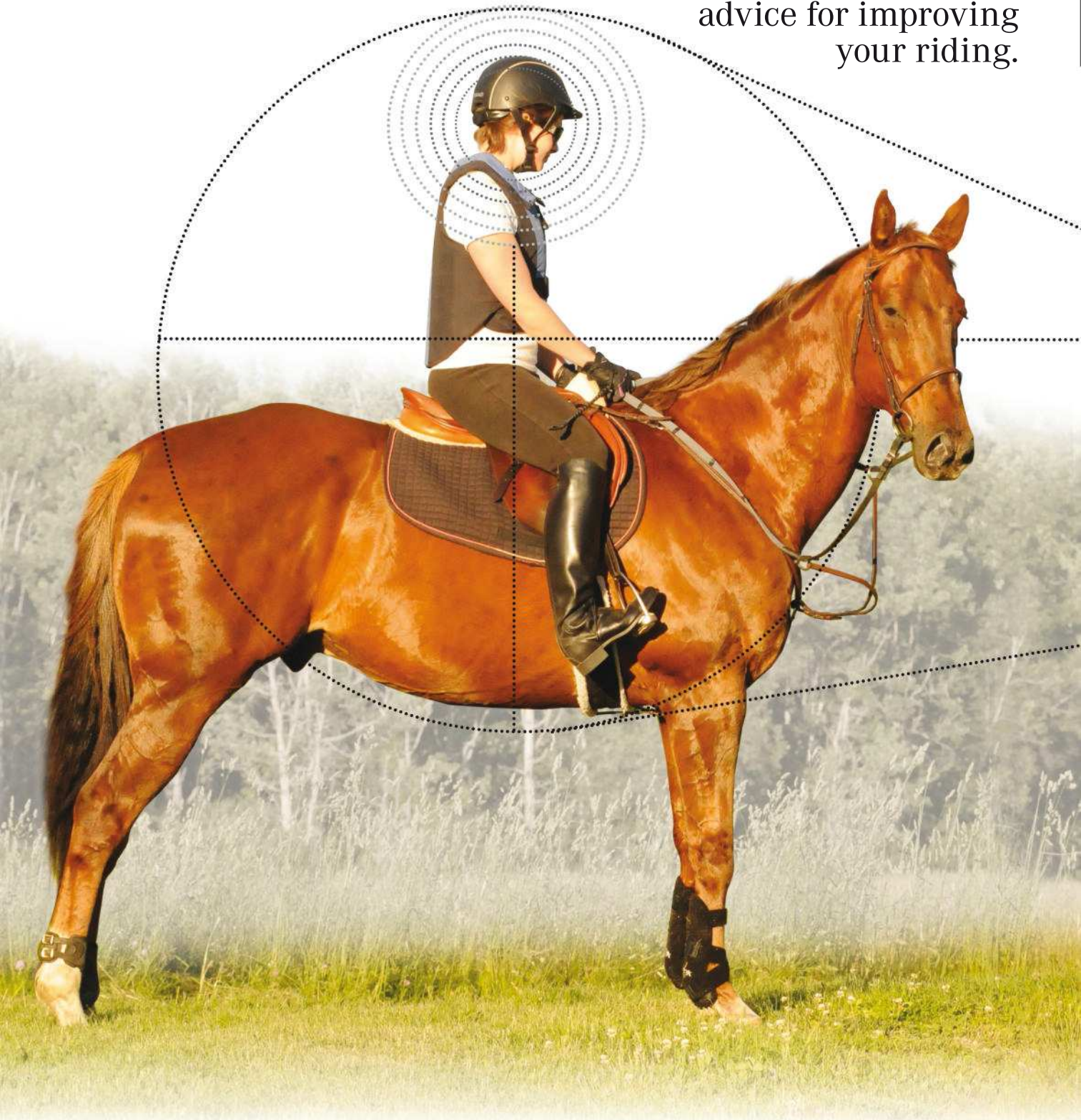
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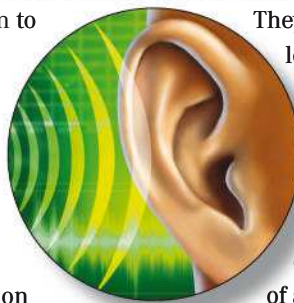
By Janet L. Jones, PhD



From greenhorn to grand prix, all riders need feedback. We just don't always know it. Many equestrians prefer to work under a trainer's supervision most of the time. Others like a knowledgeable observer to take a gander now and then. In addition to improving our horsemanship, quality feedback builds confidence, self-esteem and resilience—traits that spell success on both sides of the arena fence.

Instructors, trainers, judges and event organizers who follow the principles of feedback can improve education and evaluation to truly benefit both horses and riders. In addition, riders and parents who understand the basics of quality feedback tend to select the best advisors.

We might think that most people take up sports to build fitness, win competitions or have fun. But we'd be wrong. According to a 2014 study, the top three reasons that American youth sweat their way into a lifelong sport are to experience good sportsmanship, to apply effort to a worthwhile goal and to receive positive coaching.



They leave a sport when they no longer enjoy the activity, but they don't pursue it strictly for pleasure.

Positive coaching applied to equine sports is a method of educating and encouraging equestrians of all skill levels to perform at their best, both on and off the horse. And cognitive science offers many ways to improve coaching. It doesn't matter whether you strive to win the Tevis Cup or relax along an easy trail; the issue is simply whether you wish to improve. Let's look at the brain science behind basic principles of feedback—the ones we take for granted and too often ignore.

FACTOR 1: DESIRE

To gain from quality feedback, riders must want it. Some don't. They might not realize they need to learn more. Or they feel the coach in question is not the right person. Maybe there's a personality clash, a doubt regarding the trainer's competence or concerns over the cost of lessons. Good trainers can kindle motivation only if there is a spark to ignite, a fundamental willingness to accept the guidance of a more experienced individual.

A positive coach begins by asking



SHUTTERSTOCK

new students why they want to ride and what they wish to learn. You can ask these questions of yourself as well. What are your goals? Do you ride for pleasure, for fitness, for competition, for mastery? Can your horse meet your goals? What is your current skill level? What are your strengths and weaknesses as a rider? Which problems do you experience? How much time and effort do you wish to invest in riding? These are questions that every rider will want to ponder once in a while, whether seeking a trainer or not. The answers reset your brain for enhanced learning, fine-tuning the mindset that allows you to acquire skill and knowledge.

FACTOR 2: TIMING

Most of us know that feedback is most effective during or immediately after a performance. The reasons are less obvious. They include the processes of motor memory, the effects of decay and interference on memory, and the delay between initiation and display of a problem.

People often assume that all memory works the same way, so that remembering the

words of a song, the smell of a rose, the square root of 16 or the movement required to sit a trot are all functionally similar. But that's not true. Memory for motor performance (procedural memory) uses different structures and pathways in the brain than does memory for facts or events (declarative memory).

Declarative memories form quickly, but they're fleeting. Remember how studying hard for a few days before a final exam could earn you an A or B, but after the test the knowledge just floated away? Motor skills, on the other hand, are retained for decades once they have been learned. You can leave horses for many years—although I can't

People often assume that all memory works the same way, so that remembering the words of a song, the smell of a rose, the square root of 16 or the movement required to sit a trot are all functionally similar. But that's not true.

imagine why you would—then hop on and still remember how to ride. Your muscles will need toning, of course, but your brain will not have forgotten how to direct your body to control a lovely animal.

People who suffer amnesia almost always retain their ability to perform the physical skills they learned prior to injury. So, with a hard knock on the head, you might not remember your name, address or experiences with horses. But if you are plunked in a saddle, you'll still know how to ride. And without declarative memory for the events that developed that ability, the skill will surprise you.

Most of us express our memories of facts and events in words, talking about a historical era or the effect of a rubber donut in a side rein. Procedural memory is much more difficult to express verbally. The motor skills themselves are preserved, but our ability to convey them in language is ephemeral. So, the sooner you discuss motor performance with your trainer, the better.

Let's say you've just completed a hunter round. You can still recall the fine points of the ride in verbal form.



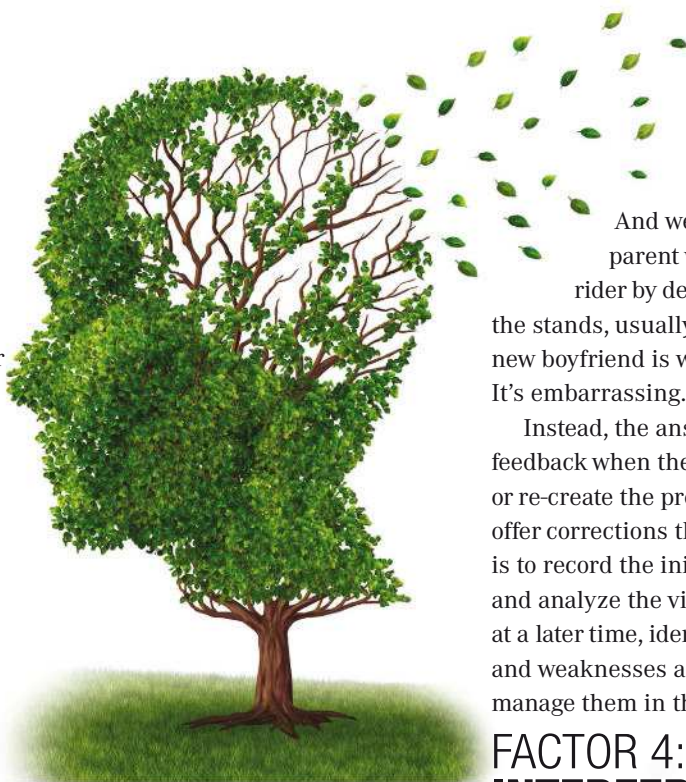
ARND BRONKHORST

But allow a little time to pass, even a few minutes in the mayhem of a horse show, and those declarative details are lost. When feedback is delivered late, you can't recall as clearly the particular detail to which a trainer is referring. "You've got to keep your upper body closer to the vertical to avoid that chip on the fourth fence," he says. Hmm, the fourth fence. Which one was that again? You're already trying to memorize a new course for the next round. Wasn't my body near vertical throughout that last round? You might be able to piece together the feedback, but it takes effort. And understanding feedback shouldn't be hard; hard is saved for applying feedback.

FACTOR 3: **DECAY**

Decay—or deterioration of a memory over time—muddles all declarative memories to some extent. People often say they wish they could remember everything. They forget that decay serves an important purpose. Suppose your recall was indelible for every moment of every day, like a digital recorder. Not only would you recall riding the gorgeous coal-black stallion at Perfection Ranch, you'd also remember the details of each step the horse took, how you responded to them, and how he responded to you in turn. With such extreme memory, you'd be confused, indecisive, nervous and overwhelmed within a week. You don't need to remember every step of a ride. You don't need to know where you parked the car yesterday or last year. You only need to know where you parked it today. Decay has a purpose—it frees brain cells for what's important and allows your brain to create meaningful categories instead of searching a million instances.

Run-of-the-mill memories deteriorate over time, so they're hazy when a



Run-of-the-mill memories deteriorate over time, so they're hazy when a trainer brings them up after the fact. But we don't often realize just how hazy those memories are.

trainer brings them up after the fact. But we don't often realize just how hazy those memories are. The human brain causes people to believe that even false memories are accurate: As Mark Twain put it, "It isn't so astonishing, the number of things that I can remember, as the number of things I can remember that aren't so." With mistimed feedback, you might be discussing an event that each person recalls very differently. And strong emotional memories, like the one where you are sailing through the air headfirst as your equine buddy slams on the brakes at the in-and-out, are filtered by adrenaline. To give and take feedback accurately, we need to be quick about it.

Immediate feedback isn't always possible. No one at a horse show wants instructions shouted across an arena while they're being judged.

And we've all cringed at the parent who "helps" a young rider by delivering advice from the stands, usually when a potential new boyfriend is within earshot. It's embarrassing.

Instead, the answer is to provide feedback when the rider exits the arena, or re-create the problem in practice and offer corrections then. A third option is to record the initial performance and analyze the video with the rider at a later time, identifying strengths and weaknesses and explaining how to manage them in the future.

FACTOR 4: **INTERFERENCE**

Quick feedback also reduces the effect of interference on memory. An error approaching the second fence in a hunter round is much more likely to be forgotten than the same error approaching the seventh fence. Why? Well, more time has passed for one thing—that's decay. But it's also easily forgotten because the second fence is followed by at least six more. Each event shakes the memory of the ones before it. By the time you reach the end of the hunter round—or speed race or trail competition—your memory of the earlier parts is weakened by interference. As those memories fade, feedback about a specific moment of riding becomes very difficult to use. By the end of a show day, you might have ridden six or eight different patterns, and remembering each one separately will be nearly impossible.

With interference, the neural network holding a memory is diluted by other similar events. Suppose fence two is represented in your brain by 170,549 neurons that fire together in a connected network when you recall that experience. (The average human brain contains somewhere around 100 billion



neurons, so this number I've pulled from the sky is very small.) Some of those neurons represent general aspects of jumping—your position as your horse leaves the ground, the folding of your hip angle in the air, the thrust of your horse's bascule⁰. Others represent specific details of that particular fence—your view of the red stripe on the top pole, the unusual tilt of your horse's nose to the left, the extra tension in your hand on the last stride of approach, the fact that your hip closed a second too soon as your mount left the ground.

Good feedback addresses those details. But suppose that your hand also tensed on fence four. The same neurons that represent hand tension will fire for your memory of both fence two and fence four. That's where interference begins. The original network is smeared by the same neurons firing for different fences, and you begin to lose precision in the recollection. After jumping eight fences in rapid succession, the memories represented in neural networks are likely to be mixed up like cake batter.

Hunter classes are among the worst for magnifying interference effects. Often, three to four classes are held in a division before results are announced. This means that a rider might have ridden four different courses—35 or 40 fences!—before receiving any knowledge of results. She can't correct problems between one class and the next if she isn't

sure what they are. With last-minute-add policies, that same rider might suddenly have to wait hours to hear her results after all division competitors finish their rounds. That adds decay to the interference.

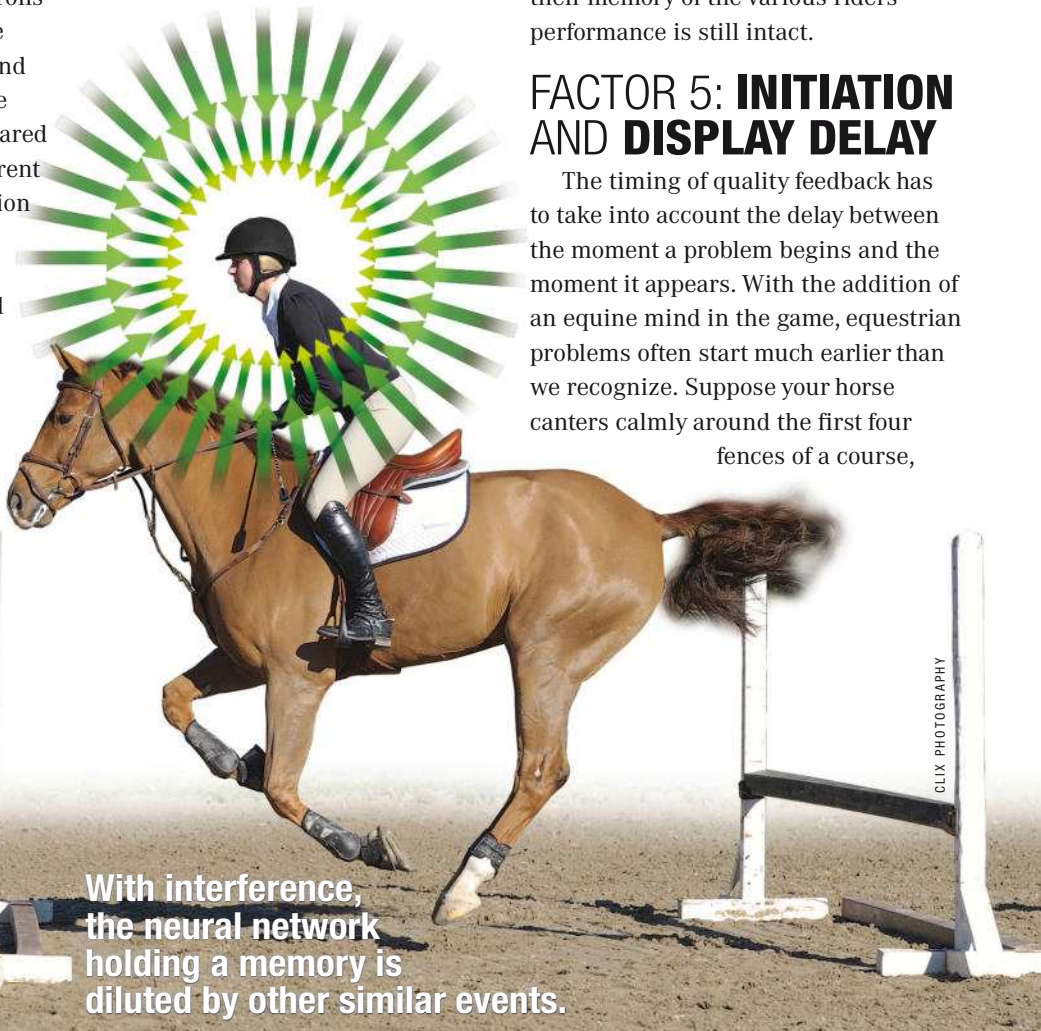
The problem is exacerbated when results for multiple rounds are announced in one shotgun blast of eight or 10 placings for every class in a given division. The rider is snowed under in the flurry of results. She's left thinking, "Let's see, I came in fourth for the second round, but didn't place in the third round. Which round was it that my mare seemed a little too fast? It must have been the third. Or was it the first?"

It's like the old Abbott and Costello comedy routine, "Who's on First?"

The practice of announcing results for multiple classes simultaneously also diminishes spectator interest. In today's economy, the horse industry needs to draw spectators rather than deter them. If Uncle Henry stops by to watch a competition, he wants to know how the participants placed at the end of each class. This knowledge makes the event more interesting and more educational. Uncle Henry, like all of us, can learn a lot by watching a class closely and guessing at the results. When the final placements are announced, observers acquire useful feedback while their memory of the various riders' performance is still intact.

FACTOR 5: INITIATION AND DISPLAY DELAY

The timing of quality feedback has to take into account the delay between the moment a problem begins and the moment it appears. With the addition of an equine mind in the game, equestrian problems often start much earlier than we recognize. Suppose your horse canters calmly around the first four fences of a course,



With interference, the neural network holding a memory is diluted by other similar events.



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Olympic Dressage Rider
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then rushes the fifth. The problem occurred at the fifth fence, right? Not necessarily. Ole Speedy might have been rarin' to go all along, stiffening her back and neck imperceptibly as she went, but her attitude didn't materialize until she reached fence five. Good feedback needs to address the root of the problem, not the point at which it is eventually displayed.

The best trainers sense problems before they occur. Horse training is made up of many characteristics, but one of the most important is prevention. Rather than solve every problem a 1,200-pound animal can present, we want to prevent those problems from occurring. Seek the horse's attitude and correct it with proper groundwork, exercise, conditioning and instruction, and you won't have to solve so many 1,200-pound problems.

FACTOR 6: VOICE

Clearly, timing is important. But to apply feedback, you've got to be able to hear it. This principle is so simple that it is rarely given the consideration it deserves. Decades ago, adult equestrians tended to be relatively young. But by 2010, more than 60 percent of adult American riders were over the age of 44. Sad to say, middle-agers just don't have the super-ears of their teenaged counterparts.

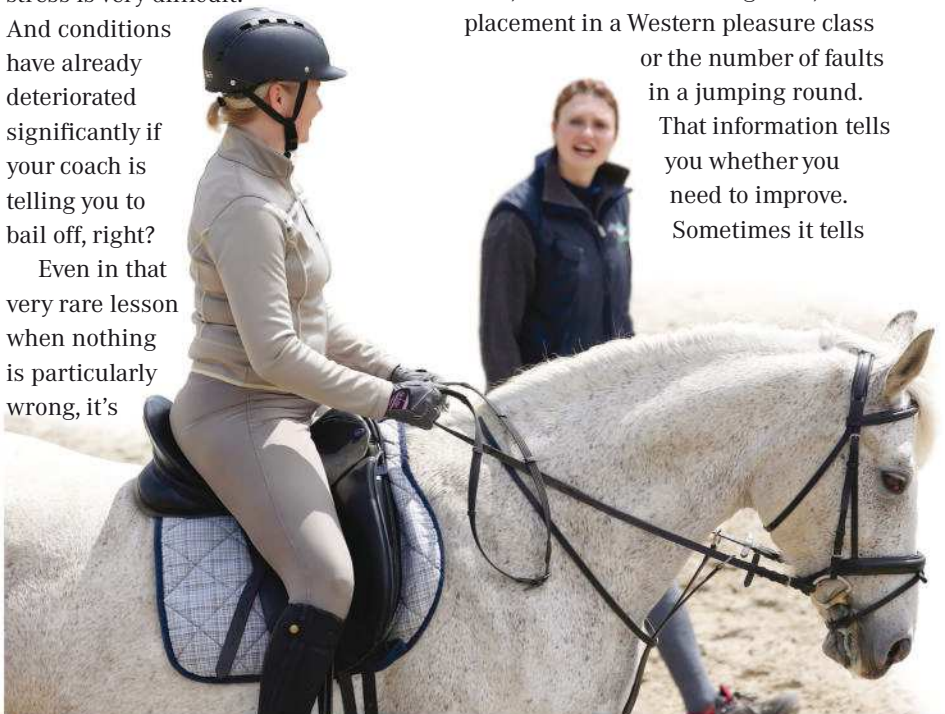
Even under the best conditions—no rock concerts or construction noise—normal human hearing declines daily after the ripe old age of 20. In quiet settings, mild hearing problems don't affect us much. But push some wind in our ears at the canter, add the hum of observers chatting on a deck and a distraction like that filly bucking on the longe line 20 feet away, and ... Houston? We have a problem.

Speech sounds are the first to deteriorate. That's why old coots think

everybody mumbles. An emergency command like "Bail off!" becomes "Payov!" and the instruction to use a "left opening rein" as your horse runs sideways is "lev oab nun ray." Trying to decipher such mumbo-jumbo under stress is very difficult.

And conditions have already deteriorated significantly if your coach is telling you to bail off, right?

Even in that very rare lesson when nothing is particularly wrong, it's



Brains have limited attention for incoming stimulation. Straining to hear speech uses some of that attention, leaving less to focus on handling the horse.

hard to ride well with your head canted forward and cocked to the side trying to decipher soft-spoken words. Brains have limited attention for incoming stimulation. Straining to hear speech uses some of that attention, leaving less to focus on handling the horse. Able instructors project their voices across large arenas, or they use transmitting devices to communicate clearly. Either way, they are always easy to hear.

FACTOR 7: RESULTS OR PERFORMANCE

Feedback can be delivered in terms of results or performance. Knowledge of results includes the speed of a barrel race, the score of a dressage test, one's placement in a Western pleasure class

or the number of faults in a jumping round.

That information tells you whether you need to improve.

Sometimes it tells

you where improvement is needed—for example, you might be able to infer from class placements whether your hand gallop was fast enough, your sliding stop long enough, your free walk free enough.

Knowledge of performance describes exact movements that are needed to improve results. Perhaps your barrel race is slow because your inside hip is not low enough coming into the first turn. Maybe you're riding Western pleasure with contact instead of a draped rein. Possibly your weight drifts back too early in the air over a fence, causing your horse to rub the top rail with his hind ankles. Knowledge of performance tells us what to do differently to get better results next time out.



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CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian. For client-friendly information on navicular syndrome and lameness exams please refer to www.equinelameness.com. As with all drugs, side effects may occur. In field studies, the most common side effects reported were signs of discomfort or nervousness, cramping, pawing, and/or colic within 2 hours post-treatment. Oosphos should not be used in pregnant or lactating mares, or mares intended for breeding. Use of Oosphos in patients with conditions affecting renal function or mineral or electrolyte homeostasis is not recommended. Refer to the prescribing information for complete details or visit www.dechra-us.com.

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DESCRIPTION: Clodronate disodium is a non-amino, chloro-containing bisphosphonate. Chemically, clodronate disodium is (dichloromethylene) diphosphonic acid disodium salt and is manufactured from the tetrahydrate form.

INDICATION: For the control of clinical signs associated with navicular syndrome in horses.

CONTRAINDICATIONS: Horses with hypersensitivity to clodronate disodium should not receive OSPPOS.

WARNINGS: Do not use in horses intended for human consumption.

HUMAN WARNINGS: Not for human use. Keep this and all drugs out of the reach of children. Consult a physician in case of accidental human exposure.

PRECAUTIONS: As a class, bisphosphonates may be associated with gastrointestinal and renal toxicity. Sensitivity to drug associated adverse reactions varies with the individual patient. Renal and gastrointestinal adverse reactions may be associated with plasma concentrations of the drug. Bisphosphonates are excreted by the kidney; therefore, conditions causing renal impairment may increase plasma bisphosphonate concentrations resulting in an increased risk for adverse reactions. Concurrent administration of other potentially nephrotoxic drugs should be approached with caution and renal function should be monitored. Use of bisphosphonates in patients with conditions or diseases affecting renal function is not recommended. Administration of bisphosphonates has been associated with abdominal pain (colic), discomfort, and agitation in horses. Clinical signs usually occur shortly after drug administration and may be associated with alterations in intestinal motility. In horses treated with OSPPOS these clinical signs usually began within 2 hours of treatment. Horses should be monitored for at least 2 hours following administration of OSPPOS.

Bisphosphonates affect plasma concentrations of some minerals and electrolytes such as calcium, magnesium and potassium, immediately post-treatment, with effects lasting up to several hours. Caution should be used when administering bisphosphonates to horses with conditions affecting mineral or electrolyte homeostasis (e.g. hyperkalemic periodic paralysis, hypocalcemia, etc.).

The safe use of OSPPOS has not been evaluated in horses less than 4 years of age. The effect of bisphosphonates on the skeleton of growing horses has not been studied; however, bisphosphonates inhibit osteoclast activity which impacts bone turnover and may affect bone growth.

Bisphosphonates should not be used in pregnant or lactating mares, or mares intended for breeding. The safe use of OSPPOS has not been evaluated in breeding horses or pregnant or lactating mares. Bisphosphonates are incorporated into the bone matrix, from where they are gradually released over periods of months to years. The extent of bisphosphonate incorporation into adult bone, and hence, the amount available for release back into the systemic circulation, is directly related to the total dose and duration of bisphosphonate use. Bisphosphonates have been shown to cause fetal developmental abnormalities in laboratory animals. The uptake of bisphosphonates into fetal bone may be greater than into maternal bone creating a possible risk for skeletal or other abnormalities in the fetus. Many drugs, including bisphosphonates, may be excreted in milk and may be absorbed by nursing animals.

Increased bone fragility has been observed in animals treated with bisphosphonates at high doses or for long periods of time. Bisphosphonates inhibit bone resorption and decrease bone turnover which may lead to an inability to repair micro damage within the bone. In humans, atypical femur fractures have been reported in patients on long term bisphosphonate therapy; however, a causal relationship has not been established.

ADVERSE REACTIONS: The most common adverse reactions reported in the field study were clinical signs of discomfort or nervousness, colic and/or pawing. Other signs reported were lip licking, yawning, head shaking, injection site swelling, and hives/pruritus.



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A competent trainer offers knowledge of performance. When you gallop down the arena and slide to a stop with your horse's hind legs deep underneath him, she doesn't simply say, "That was good." She tells you why it was good, what you did to make it good, and exactly what you can do in the future to make it better. Quality feedback is specific.

Event organizers often have a misplaced notion of how the brain uses knowledge of results and performance. They try to avoid "ribbon collectors"—people who enter horse shows just to build the trophy case—at the expense of feedback that teaches equestrian mastery. There's nothing wrong with ranking riders at a horse show. We need not hide the rankings by announcing them only at the in-gate and keeping them a secret from interested spectators. Everybody knows it's a competition. And all participants, child and adult, can learn a lot from the good sportsmanship that accompanies healthy competition.

Dressage tests often supply better feedback than most other equine competitions do. Soon after each performance, a dressage rider typically receives a score as well as a standardized evaluation that assesses every movement in a pattern, plus collective marks concerning gait, impulsion, submission, riding position, use of aids and harmony between horse and rider. The purpose of each test is stated clearly, along with the maximum possible points and acceptable variations in the way the test is ridden. They have their share of other problems, but when it comes to quality feedback, dressage tests have got it nailed. Maybe

that's one reason participation in clinics and dressage tests is up, while horse show attendance is down. People want meaningful feedback so they can learn at home and at competitions.

Seek out quality feedback, and you'll improve your horsemanship rapidly. You might choose a daily trainer, a weekly lesson, or a now-and-then clinic.

Many advanced riders will offer a word of advice for free. Just ask. And event organizers? Give us a leg up here, by designing competitions that encourage horses and riders to learn. 🐾



CLIX PHOTOGRAPHY

About the author: *Janet L. Jones earned her PhD in cognitive science, the study of the human mind and brain. She won UCLA's dissertation award for her research on brain processes. Now professor emerita, she has taught the psychology and neuroscience of memory, language, perception and thought for 23 years and is the author of three books. Jones began riding at age 7. She has competed in Western, English, reining, halter, hunter and jumper classes in five states and uses the principles of dressage with every horse. As a junior rider, Jones medal-qualified for the United States Equestrian Team program. She schooled and showed green hunters and jumpers at a large training stable for many years. Jones currently owns a 17.1-hand off-the-track Thoroughbred who makes every day interesting. She trains horses and riders at Riversong Ranch in Durango, Colorado. Readers can reach her at ridewithyourbrain@gmail.com.*

Manes and Tails

THE LONG AND SHORT OF IT



**For a well-groomed horse,
begin with the basics on both ends.**

The following is excerpted/adapted from “World-Class Grooming for Horses: The English Rider’s Complete Guide to Daily Care and Competition” by Cat Hill and Emma Ford, with photographs by Jessica Dailey and forewords by Phillip Dutton and Silva Martin. A new release from Trafalgar Square Books (www.horseandriderbooks.com), it comes in a handy spiral-bound format and features over 1,200 photos with step-by-step instructions on the art of equine grooming from two of the industry’s top professionals. In this section, the focus is on the care and grooming of the mane and tail, basics that apply to nearly any breed and discipline.

Daily Mane Care

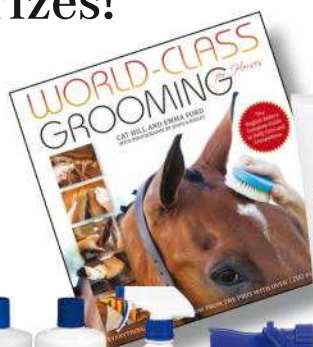
Whenever you groom your horse, the mane should be combed or brushed out to keep it free of tangles. After bathing, always comb down the wet mane to encourage it to stay on the same side. For the most part, a mane is “trained” to the right side of the horse; however, breeds with manes naturally to the

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Readers will be invited to **vote on their favorites** between July 5 to July 20.



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left—Friesians, Andalusians, Lusitanos, Morgans and Arabians, as well as any dressage horse—are allowed to leave the manes where they are.

‘Training’ the Mane

There are a couple of ways to train a mane to stay on the right side of the neck and to lie flat. In the long run you may never fix issues like manes that stand up or lie on two sides of the neck, but getting it to lie down correctly for a couple of days will allow you to pull, thin, or trim it evenly.

Banding

Wet the mane and comb smoothly on the right side of the neck. Section off a 2- to 4-inch piece of mane and wrap a braiding band around it until it is snug. Repeat this all the way down the neck.

Braiding Down to Train

Depending on how “wild” the mane is, you might need to braid it down. Wet the mane and comb it smoothly on the right side of the neck. Section off a 2- to 4-inch piece of mane and start a loose braid. Make sure you do not pull the side pieces in tightly since this can cause irritation, as well as damage the mane. Braid only 3 or 4 “crosses,” then rubber band the end. Leave these braids in for as long as the horse is comfortable; when he starts to rub his neck, they need to be taken out. Some horses will take offense and start to rub them out immediately so always be on the lookout for this.

Shortening the Mane

There are three ways to maintain the kept look of a pulled mane: either the mane is pulled in the traditional manner; or it is trimmed with scissors or a special tool; or a combination of the two.

Some horses fall asleep while you are doing the job; however, a horse might object by shaking his head, dancing around, or even biting or kicking. If the misbehavior is mild, try to move with him to keep pulling. If you pull, and he shakes his head and you stop, he has now learned that misbehaving gets a reward (the pulling stopped!). Oftentimes, a horse will shake his head or dance for a minute when you start, but settle down if you just quietly continue pulling. If he gets dangerous, however, it is best to ask a professional to pull it or use one of the alternative methods.



To train a “wild” mane, braid it down using 3 or 4 “crosses,” as shown.



The traditional way to shorten a mane involves use of your fingers and a pulling comb.



Razor combing is a good alternative for a sparse mane that needs shortening but not thinning.



A completed, pulled mane at a length appropriate for an event horse

Pulling

The “old-fashioned” way of shortening the mane is with your fingers and a pulling comb. Take a small section of mane at a time, approx one-half inch, and back comb the mane—base to crest. This will separate the long hairs from the short hairs. Grasp a small number of long hairs and wrap them around the comb and pull sharply toward yourself. The hair comes out easier if you pull outward rather than downward. Slowly work

through the mane, remembering to take small sections at a time. You can avoid stressing the horse by spreading the procedure over two or three days.

Cutting with Scissors

You will see some manes that have obviously been cut straight across the bottom. Although they are sometimes seen on show jumpers, we do not approve of the “banged” mane look! If you or your horse dislikes the pulling process, you can use scissors, and there is a

method that leaves more of a pulled look as opposed to a cut one.

Take a section of mane, comb it with a regular (not pulling) mane comb. Take the scissors at a 45-degree angle to the bottom of the mane and cut vertically into the mane. Remember to start low—you can always take more off if need be. Comb the mane out and repeat this step down the whole length of the mane until it is even. The effect is a natural, pulled look. If you cut straight across the mane, it will leave a straight line, which is not what we are aiming for!

Razor combing

Use a razor comb for a thin mane that needs to be shortened, but not thinned out. Comb the mane down with a regular comb. Starting about an inch from the bottom of the mane, sandwich the hair between the razor and your thumb. Your thumb will keep the hair pressed against the razor. Comb down the mane with the razor and the hair will cut in a natural shape.

Long Mane Care

A long mane can be more work than a short mane, so be prepared! First a long mane needs to be kept clean, well-conditioned and without tangles. Once you have shampooed, use an oil-based conditioner. A leave-in conditioner like those formulated for ethnic hair are best; you want it to restore oil to thick, dry hair. The silicone in [some products] creates a moisture barrier than can build up over time, so [these] are best avoided for daily use. Finally, add a leave-in detangler. Note: never comb a wet mane because you can cause breaking and other damage. Wait until it is dry.

The tangled long mane of a horse that lives out can be intimidating. Simply start at the bottom of the mane, as you would your own long hair, and gently comb through small sections of the mane, gradually moving up toward the crest until the entire mane is tangle free. If you have used a good detangler, it will be done with minimal headache!

The Tail: Routine Care

In any discipline, a good tail can make or break the look of a horse. While largely a cosmetic issue, there are a few practical details to note when it comes to tails. Remember that a very

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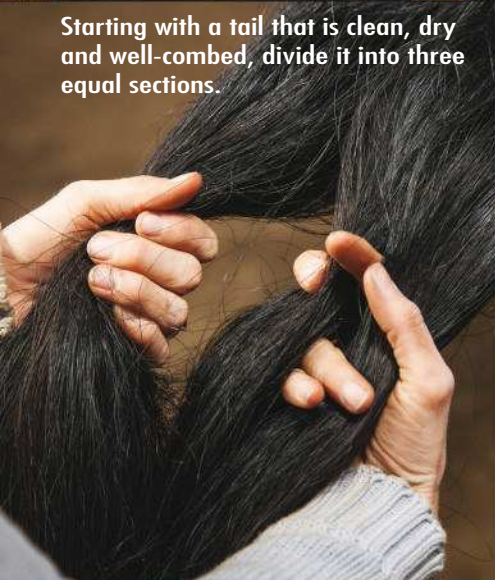
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Braiding a tail helps keep it from getting caught and broken.



Starting with a tail that is clean, dry and well-combed, divide it into three equal sections.



Start braiding 6 to 8 inches below the dock, but don't make the braid too tight.

long tail can be stepped on when performing the rein-back, so care should be taken to make sure that the length is appropriate for each discipline.

For the average length of tail, routine care is very similar no matter the discipline. Your goal is to avoid breakage by preventing knots and not over-grooming; have the tail look decent by staying tangle-free and clean; and promote healthy hair growth through proper nutrition and conditioning. On bath days, make sure you scrub the dock really well, getting

your fingernails into it, to help remove the dead skin and gunk that can build up close to the roots. Never comb a wet tail!

A gentle conditioning shampoo ensures that the tail is clean without becoming dry. A deep-treating conditioner helps prevent weak hairs, and a non-silicone-based detangler makes sure the tail stays free of tangles.

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there are a few routine steps that are necessary to ensure a healthy tail. The tail should be protected from damage by being kept off the ground. There are three ways to do this: First, by simply *braiding* it; second, by “*bagging*” it in a tail bag; and third, *wrapping* it in [self-adhesive veterinary wrap] tape. Each method has its advantages so pick the one that works the best for you and your horse’s lifestyle.

Braiding

Braiding a tail helps to prevent it from getting caught and broken. This method is the simplest to do, but since it does not protect the tail from the outside environment, it is best suited for the horse that spends most of his time inside and protected from the weather.

The tail should be clean, dry, and well combed. Use a leave-in conditioner to lightly coat the tail. Divide the tail into three equal sections. Start braiding 6 to 8 inches below the dock. If you braid too tightly, the horse will itch and end up pulling out all the hair, negating all your hard work!

You want a braid with medium tightness, just snug enough to hold into place. Near the end of the braid add a piece of

yarn. Braid with the yarn for a few more crosses. Then wrap the yarn around the braid. Tie a knot in the yarn and cut the ends.

‘Bagging’

Bagging a tail refers to using a cloth bag to cover a braided tail. It has all the advantages of a braided tail with added protection from the elements. It also helps to prevent the tail from snagging and breaking off. A bag is easy to apply and can be reused over and over; however, the tail should be taken down, washed, conditioned and put back up at least once every week to 10 days. Mares often need to be done more frequently due to urine getting into the bags.

You can purchase a nylon tail bag from most tack shops. Look for one about 30 inches long with either a top with a snap, or four ties. Avoid Velcro closures since they often come undone and break the tail.

First, shampoo and condition the tail. Allow to dry and apply a leave-in detangler. Braid the tail as described above. Take the tail bag, turn it inside out, and slide your hand inside. Hold the end of

A bagged tail has all the advantages of a braided tail with added protection from the elements.



the braid with your hand inside the tail bag. Slide the bag up the braid. At the top of the braid, thread one of the bag's ties through the loose hair at the base of the dock. Tie the right side. Thread another bag tie through the loose hair at the base of the dock. Tie the left side.

‘Wrapping’

A wrapped tail can be kept completely out of mud and muck since it is

JESSICA DAILEY

THERE'S A
REASON
it's called
ULTRA
SHIELD®





Tail wraps can be left in place over the winter, which is especially useful for horses that live in cold climates.

rolled up high away from the ground and completely wrapped in [self-adhesive veterinary wrap]. When the tail is well-conditioned and dry, this wrap can be left in place for the entire winter, which is especially useful for horses that live in cold climates where washing and conditioning the tail in January is not an attractive

option. However, during the show season, wrapping is not as practical as bagging because it is more time-consuming and wasteful since the wrap can only be used once.

First, wash, condition, and dry the tail thoroughly. Apply a leave-in detangler, and braid the tail as described. Create a

hole in the tail between the dock and the start of the braid.

Take the tail of the braid and thread it through the hole. Pull the tail through gently then thread the tail through again. Continue rolling like this until the entire tail is in a ball. Take a roll of [self-adhesive veterinary wrap] and begin at the top of the rolled braid. Roll all the way around the braid and back through the parted hair. Next go across the braid from side to side. Again, go back through the parted hair and wrap side to side from the other direction. Continue this pattern, up and down, right to left, left to right, until you are at the end of the [veterinary wrap]. You should have a neat, tight ball that sits well above the hocks. Take a strand of electrical tape and tape over the end of the [veterinary wrap] to prevent unraveling. Your tail should stay secure like this for the winter months if necessary.

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JESSICA DAILEY



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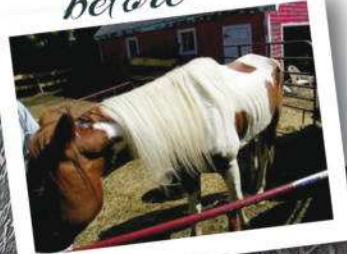


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POWDER FOR HORSES

(TRIMETHOPRIM/SULFADIAZINE)

DESCRIPTION: UNIPRIM Powder contains 67 mg trimethoprim and 333 mg sulfadiazine per gram.

UNIPRIM Powder is a combination of trimethoprim and sulfadiazine in the ratio of 1 part to 5 parts by weight, which provides effective antibacterial activity against a wide range of bacterial infections in animals.

Trimethoprim is 2,4-diamino-5-(3,4,5-trimethoxybenzyl) pyrimidine.

ACTIONS: Microbiology: Trimethoprim blocks bacterial production of tetrahydrofolic acid from dihydrofolic acid by binding to and reversibly inhibiting the enzyme dihydrofolate reductase.

Sulfadiazine, in common with other sulfonamides, inhibits bacterial synthesis of dihydrofolic acid by competing with para-aminobenzoic acid.

Trimethoprim/sulfadiazine thus imposes a sequential double blockade on bacterial metabolism. This deprives bacteria of nucleic acids and proteins essential for survival and multiplication, and produces a high level of antibacterial activity which is usually bactericidal.

Although both sulfadiazine and trimethoprim are antifolate, neither affects the folate metabolism of animals. The reasons are: animals do not synthesize folic acid and cannot, therefore, be directly affected by sulfadiazine; and although animals must reduce their dietary folic acid to tetrahydrofolic acid, trimethoprim does not affect this reduction because its affinity for dihydrofolate reductase of mammals is significantly less than for the corresponding bacterial enzyme.

Trimethoprim/sulfadiazine is active against a wide spectrum of bacterial pathogens, both gram-negative and gram-positive. The following in vitro data are available, but their clinical significance is unknown. In general, species of the following genera are sensitive to trimethoprim/sulfadiazine:

Very Sensitive	Sensitive	Moderately Sensitive	Not Sensitive
<i>Escherichia</i>	<i>Staphylococcus</i>	<i>Mycobacteria</i>	<i>Mycobacterium</i>
<i>Streptococcus</i>	<i>Neisseria</i>	<i>Novcardia</i>	<i>Leptospira</i>
<i>Proteus</i>	<i>Klebsiella</i>	<i>Bruceella</i>	<i>Pseudomonas</i>
<i>Salmonella</i>	<i>Fusiformis</i>		<i>Erysipelothrix</i>
<i>Pasteurella</i>	<i>Corynebacterium</i>		
<i>Shigella</i>	<i>Clostridium</i>		
<i>Haemophilus</i>	<i>Bordetella</i>		

INDICATIONS AND USAGE: Trimethoprim/sulfadiazine is indicated in horses where potent systemic antibacterial action against sensitive organisms is required. Trimethoprim/sulfadiazine is indicated where control of bacterial infections is required during treatment of:

- Acute Strangles
- Respiratory Tract Infections
- Acute Urogenital Infections
- Wound Infections and Abscesses

Trimethoprim/sulfadiazine is well tolerated by foals.

CONTRAINDICATIONS: Trimethoprim/sulfadiazine should not be used in horses showing marked liver parenchymal damage, blood dyscrasias, or in those with history of sulfonamide sensitivity.

ADVERSE REACTIONS: During clinical trials, one case of anorexia and one case of loose feces following treatment with the drug were reported.

Individual animal hypersensitivity may result in local or generalized reactions, sometimes fatal. Anaphylactoid reactions, although rare, may also occur. **Antidote:** Epinephrine.

Post Approval Experience: Horses have developed diarrhea during trimethoprim/sulfadiazine treatment, which could be fatal. If fecal consistency changes during trimethoprim/sulfadiazine therapy, discontinue treatment immediately and contact your veterinarian.

PRECAUTION: Water should be readily available to horses receiving sulfonamide therapy.

ANIMAL SAFETY: Toxicity is low. The acute toxicity (LD50) of trimethoprim/sulfadiazine is more than 5 g/kg orally in rats and mice. No significant changes were recorded in rats given doses of 600 mg/kg per day for 90 days.

Horses treated intravenously with trimethoprim/sulfadiazine 48% injection have tolerated up to five times the recommended daily dose for 7 days or on the recommended daily dose for 21 consecutive days without clinical effects or histopathological changes.

Lengthening of clotting time was seen in some of the horses on high or prolonged dosing in one of two trials. The effect, which may have been related to a resolving infection, was not seen in a second similar trial.

Slight to moderate reductions in hemostatic activity following high, prolonged dosage in several species have been recorded. This is usually reversible by folic acid (leucovorin) administration or by stopping the drug. During long-term treatment of horses, periodic platelet counts and white and red blood cell counts are advisable.

TERATOLOGY: The effect of trimethoprim/sulfadiazine on pregnancy has not been determined. Studies to date show there is no detrimental effect on stallion spermatogenesis with or following the recommended dose of trimethoprim/sulfadiazine.

DOSAGE AND ADMINISTRATION: The recommended dose is 3.75 g UNIPRIM Powder per 110 lbs (50 kg) body weight per day. Administer UNIPRIM Powder orally once a day in a small amount of palatable feed.

Dose Instructions: One 37.5 g packet is sufficient to treat 1100 lbs (500 kg) of body weight. For the 1125 g packets and 12 kg boxes, a level, loose-filled, 67 cc scoop contains 37.5 g, sufficient to treat 1100 lbs (500 kg) of body weight. For the 200 g, 400 g, and 1200g jars, and 2000 g pail, two level, loose-filled, 32 cc scoops contain 37.5 g, sufficient to treat 1100 lbs (500 kg) of body weight. Since product may settle, gentle agitation during scooping is recommended.

The usual course of treatment is a single, daily dose for 5 to 7 days.

Continue acute infection therapy for 2 or 3 days after clinical signs have subsided.

STORAGE: Store at or below 25°C (77°F).

HOW SUPPLIED: UNIPRIM Powder is available in 37.5 g packets, 1125 g packets, 200 g jars, 400 g jars, 1200 g jars, 2000 g pails and 12 kg boxes. Apple Flavored UNIPRIM Powder is available in 37.5 g packets, 1125 g packets, 200 g jars, 400 g jars, 1200 g jars and 2000 g pails.

CAUTION: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.

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PROMOTING THE CLASSIC THOROUGHBRED

What does the future hold for the Thoroughbred? Many have asked this question, though usually not from the broad perspectives offered by the principles of population biology, which I have employed throughout this series. Population biology teaches us to consider not only results from modern genetic studies but the selective conditions by which athletic horses are being identified.

Looking at the high number of “repeats” in many modern Thoroughbred pedigrees, some experts have predicted a kind of genetic implosion due to inbreeding, for it is a known fact that inbreeding “doubles up” not only on assets such as speed but on weaknesses like chronic unsoundness. Recent genetic studies have proven an exceptionally high degree of inbreeding among Thoroughbreds, and many Thoroughbred enthusiasts now fear that sound horses may become so rare that a flat-track racer’s whole “career” may consist of only one or two outings—in great contrast to times past, when a horse of average durability would log 25 to 40 career starts, and an outstanding one might have more than 100.

In the last several

Fundamental changes in how racehorses are bred and trained could not only improve their soundness and longevity but might go a long way toward solving many of racing’s long-term problems.

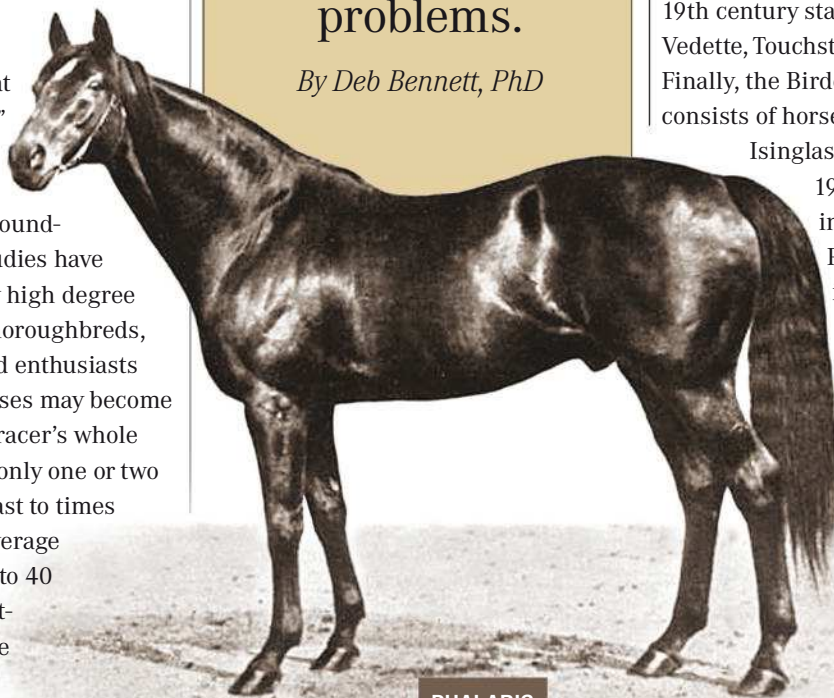
By Deb Bennett, PhD

installments, we have analyzed the Thoroughbred family by family, first highlighting horses that descend from the foundation sires Matchem and Herod; such horses rarely make an appearance in upper-echelon flat-track racing today. Then we turned to the descendants of the foundation sire Eclipse, whose name turns out to be prophetic—for his descendants have indeed “eclipsed” all others.

The Eclipse family is so large that, to get a handle on it, it is necessary to break it down into sub-families—horses descending from Eclipse through the 19th century stallions Bonnie Scotland, Vedette, Touchstone and Birdcatcher. Finally, the Birdcatcher family itself consists of horses descended from

Isinglass 1890 and Teddy

1913 (covered in the last installment) and the Phalaris family (covered in this one). Phalaris 1913 merits title coverage because no horse at any time now or in the past has so completely dominated the breed in all the ways that matter: winner’s circle appearances, money earned, and the production of stakes winners.



PHALARIS

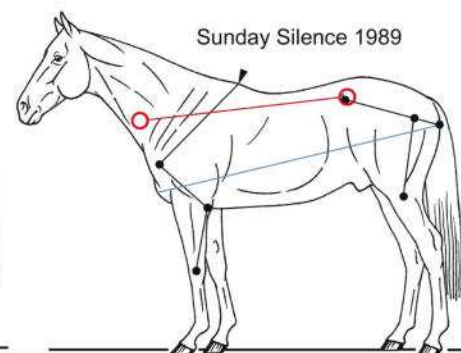
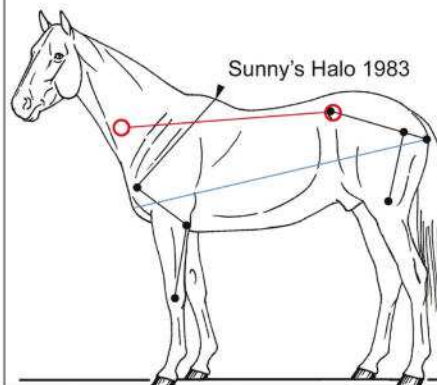
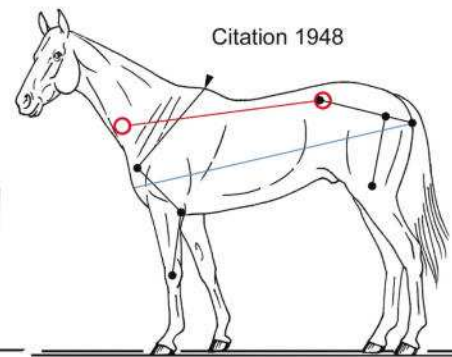
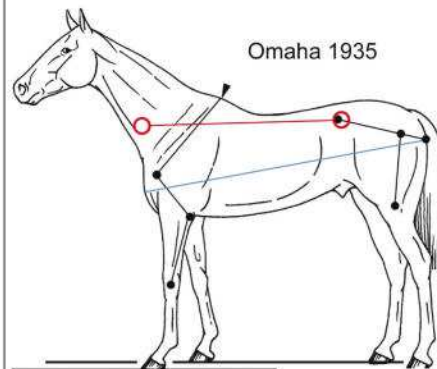
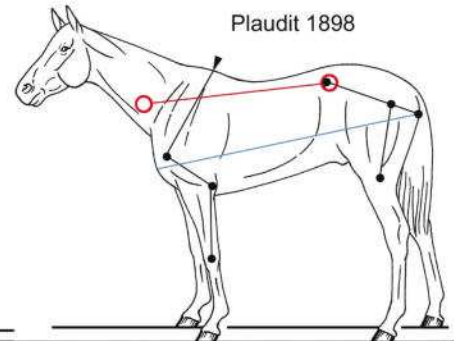
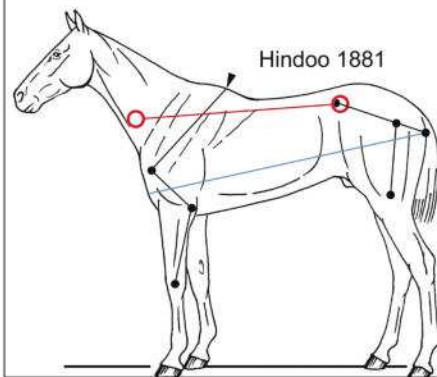
PRESERVING THOROUGHBRED BLOODLINES INTO THE FUTURE

Happily, there are still plenty of Thoroughbred stallions and mares who descend from Matchem, Herod and non-Phalaris Eclipse bloodlines: They are to be found primarily among champion steeplechasers, point-to-point and hunt-cup horses, as well as on the hunter-jumper and sporthorse circuits. Names such as Marco, My Prince, Battleship, Furioso, Melbourne, Gran Kan, Sloop, Ambiorix, King Tom, Princequillo, The Tetrarch, Ben Brush, Cottage Son, Kingdom, Blenheim, Lexington, Voltigeur and Orange Peel should be given great weight when they appear in a pedigree, because they are proven sources of stamina and soundness.

Breed observer Ellen Parker suggests that breeders can keep their speedy, highly inbred stallions if they would try harder to find strong female partners with pedigrees “saturated with soundness.” Pedigree expert Anne Peters echoes this when she advises breeders to “keep up the quality of the broodmare band and breed to the best stallions available. This also requires culling of unsatisfactory stock, animals with major undesirable faults, proven failures, and individuals that fall short of the average already existing in the herd. Never go backward by using poor individuals merely because they have working reproductive systems!”

Speaking from the perspective of a biologist, I would add that we also need to rethink the “selective conditions” for racing, particularly the practice of racing horses—at any distance—as 2-year-olds. Many a Phalaris-line horse who

CHANGE IN



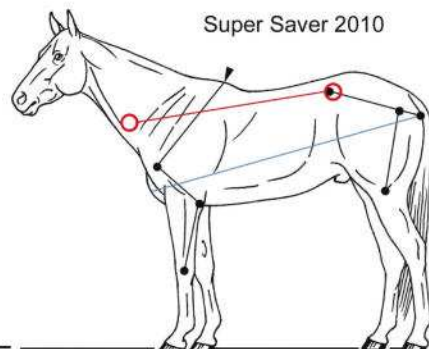
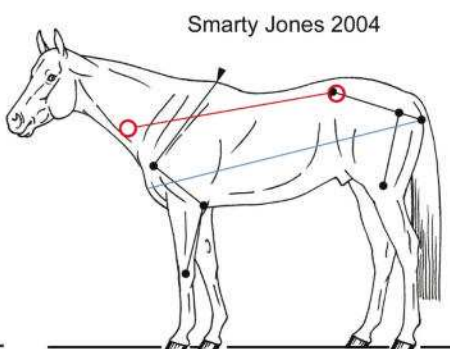
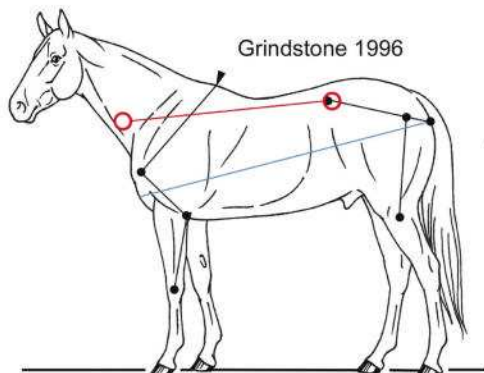
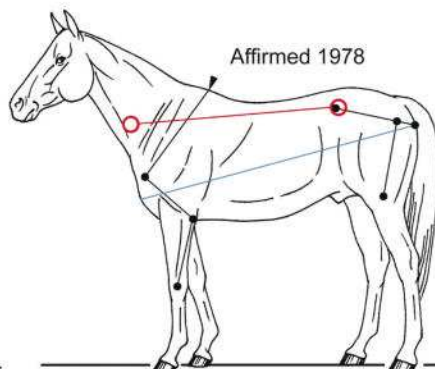
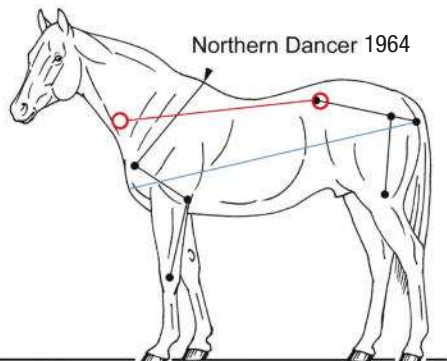
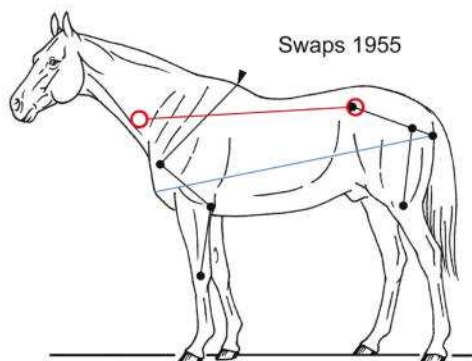
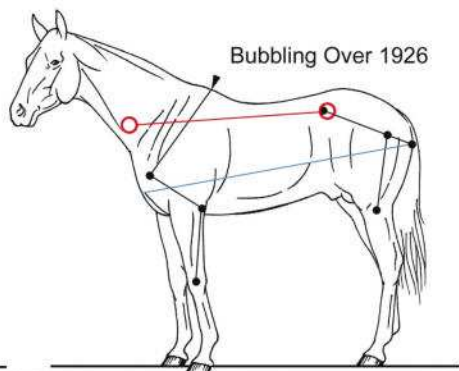
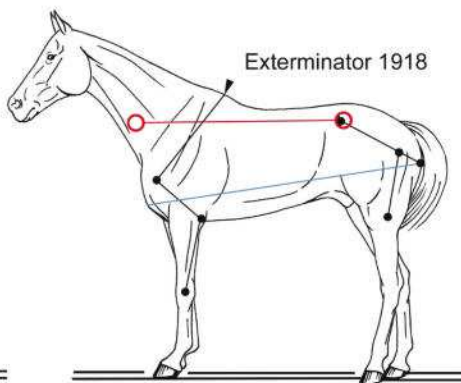
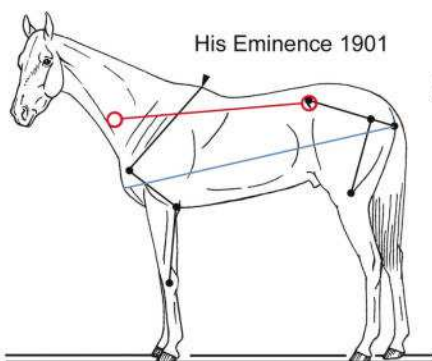
A major point made throughout this series on the history of the Thoroughbred is that Eclipse did not look like Herod or Matchem. Eclipse and his descendants exemplify

sprinter conformation, while Herod and Matchem tend to produce taller, narrower-bodied horses with high, knifelike withers and long shoulders and forearms, with a generally more

level aft-to-fore body balance. The series of outline drawings presented here samples Kentucky Derby winners beginning with Hindoo in 1881. Hindoo is the only horse in this series from

CONFORMATION OVER TIME

(Dates indicate year of Kentucky Derby wins.)



a non-Eclipse sire line. In the 20th century there have been a number of non-Eclipse Derby winners, but in order to find one, we would have to go back to War Admiral, a son of Man o' War, who won in 1937. By contrast, 17 non-

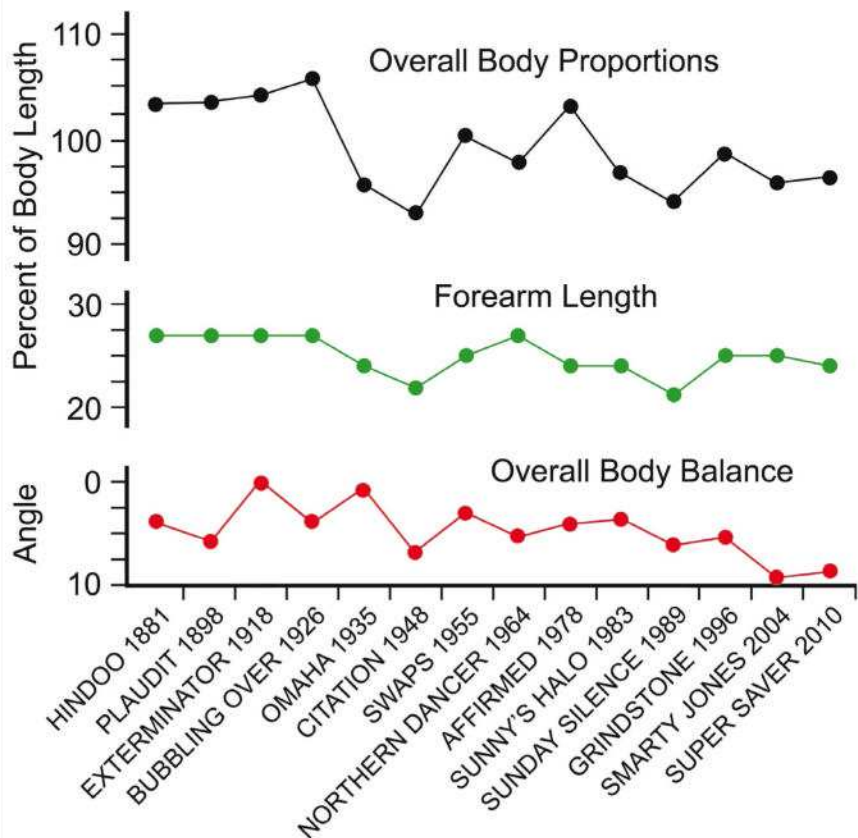
Eclipse horses, or 27 percent, won between the Derby's inception in 1875 and 1936. Forty-six, or an astonishing 81 percent of Derby winners, have been descendants of Phalaris, from California Chrome in 2014 back to the

first horse of that breeding to win, Tim Tam in 1958.

To appreciate change in conformation over time, simply run your eye over the sequence of tracings, which have been rendered from photographs and

carefully leveled. The blue line in these drawings measures body length, while the red line shows overall body balance. Black lines demarcate important body parts including shoulder, arm, forearm, pelvis and thigh.

CONFORMATION TRENDS OVER TIME



This chart tracks three crucial measures of conformation change. The black line compares withers height to body length, and shows that Kentucky Derby winners have become proportionally longer-bodied (or you can say, shorter on the leg) through time. A long forearm predicts long

stride length, shortness and stoutness of the cannon bone, and a more level overall body balance; the green line shows that forearm length has decreased over time. Coordinate with this, the red line shows that the overall body balance of the horses has come to tilt more downhill over

time—in other words, Kentucky Derby winners are today built higher in the rear quarters, so that they are more heavily weighted on the forehand than in times past. These are all measures of the fact that Thoroughbred and Quarter Horse phenotypes have converged over time.

might have suffered breakdown if raced as a 2-year-old has been able to make a profitable career for smart owners who were willing to let him win his first race at age 3 or even 4. This raises another consideration: We also need to raise the age for “breaking maiden” from 4 to 6, to allow Thoroughbreds of all bloodlines time to mature—and time to come out and show us the superior speed and racing form that only the mature horse can display. In a survey of champions from 1935 to the present that included horses who were raced at 2, 3, 4 or older, 80 percent of the animals showed greater speed (miles per hour) averaged

In a survey of champions from 1935 to the present that included horses who were raced at 2, 3, 4 or older, 80 percent of the animals showed greater speed (miles per hour) averaged per race than they had as 2-year-olds.

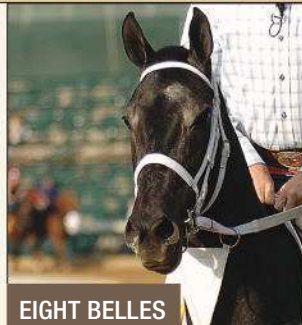
per race than they had as 2-year-olds. This highlights the business side of the track—handicappers and bettors are not particularly interested in speed. Instead, they are interested merely in contest—in determining who comes in a nose or a neck in front of the other horse. This was the only way to identify the best horse in Charles II’s time, in the 17th century when Thoroughbred racing first began, an era when accurate timing devices did not exist. It is not the best way now!

Over the years I have shocked many an audience filled with owners of Thoroughbred racehorses by informing them that a 2-year-old horse is not only not physically mature, it is four years away from maturity. This relates not

EIGHT BELLES AND INBREEDING

At the finish of the 2008 Kentucky Derby, in which she placed second, the filly Eight Belles sustained catastrophic fractures of both front cannon bones and was immediately euthanized. Many Thoroughbred pedigree experts cite inbreeding and the resultant “congenital unsoundness” as the root cause for the increasing

frequency of “early retirement” of racehorses, who often are retired from racing long before they reach physical maturity. That this, in addition to physical immaturity, is likely to be a factor can easily be demonstrated by examining the pedigree of horses who have broken sound after logging a large

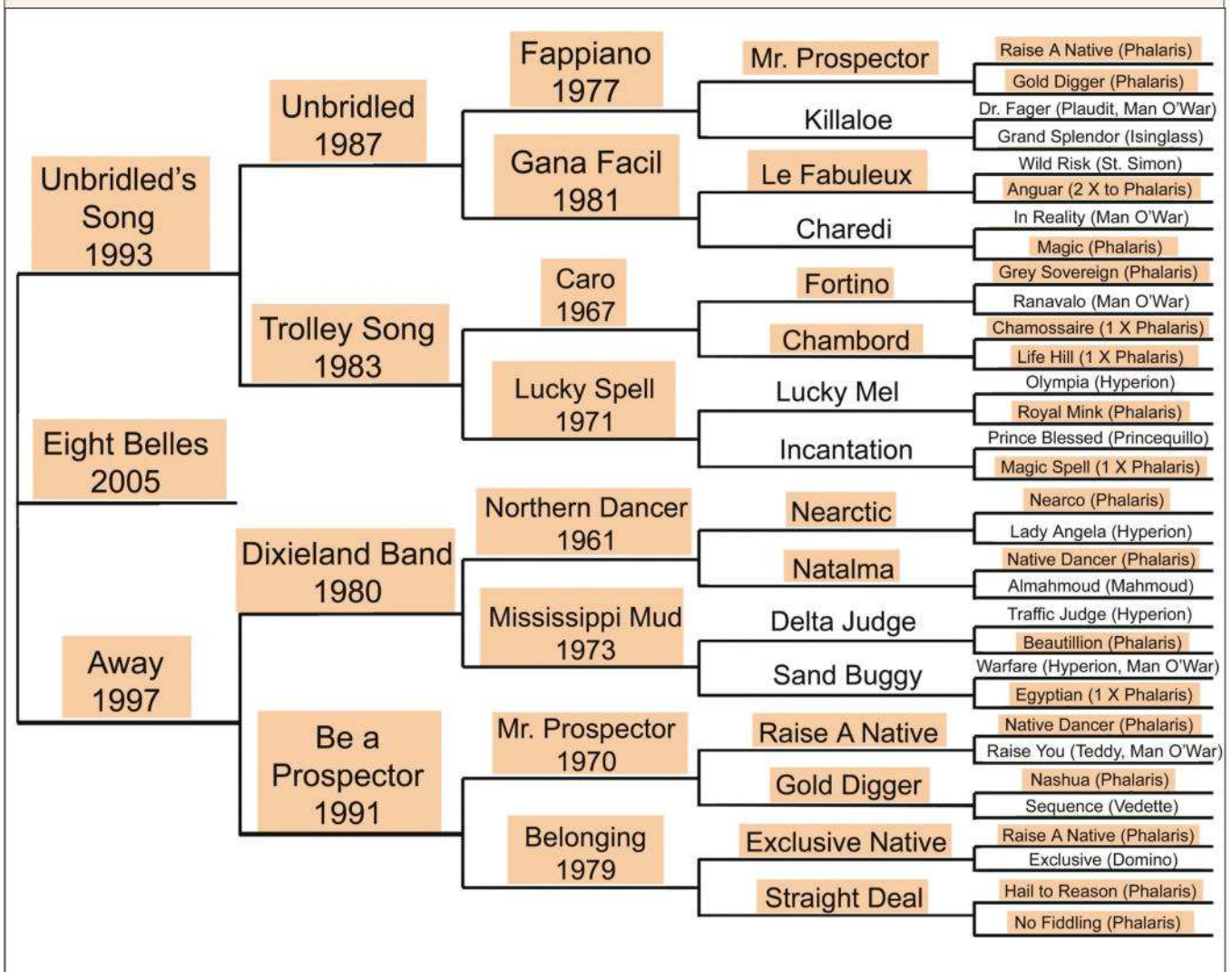


EIGHT BELLES

number of career starts. I have annotated Eight Belles’ pedigree with orange color to highlight all horses

who are either sire-line descendants of Phalaris or who trace more than once to Phalaris on either side of the pedigree. You can look up the similarly inbred pedigree of Drosselmeyer, the 2010 Belmont winner (see page 83); contrast with the pedigrees of Man o’ War, Bay Ronald or even Alydar, which can be looked up online.

JOE SCHNEID: WIKIPEDIA



GENETIC MEASURES OF INBREEDING

Over the years I have shocked many an audience filled with owners of Thoroughbred racehorses by informing them that a 2-year-old horse is four years away from maturity.

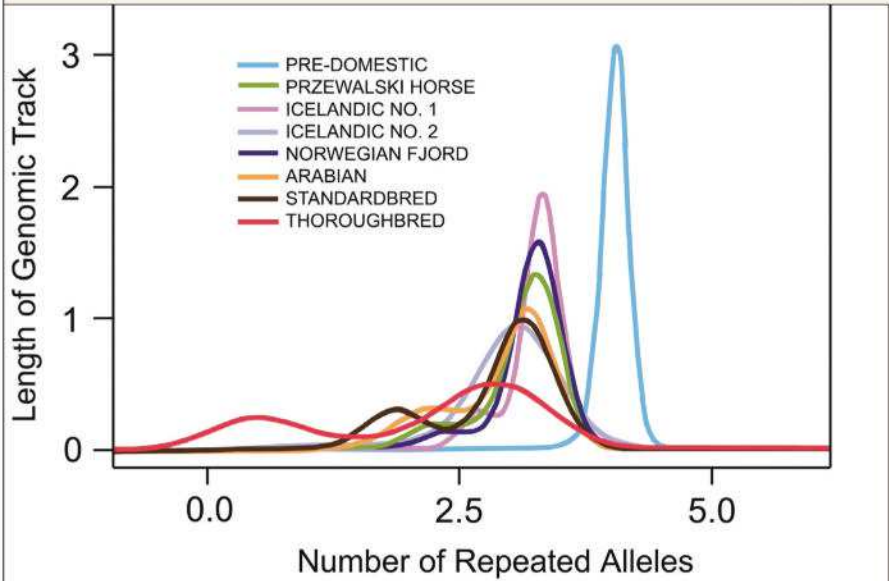
only to the fusion of “growth plates” in the lower joints of the limbs, but to the overall spongy quality of juvenile bone—and to the fact that no conditioning process whatsoever can speed up the overall process of bone maturation. While I have heard experienced track veterinarians lament the fact that “we are breeding the legs and feet right off these horses,” I would submit that 90 percent of performance-enhancing drug use at the track—both licit and illicit—would disappear if 2-year-olds could not race.

There is, moreover, an urgent need for more longer races, which tend to attract older horses and those possessed of greater stamina and soundness. Track facilities that can accommodate such races may have to be built, and purses need to be hefty enough—in the \$5 million range—to

The Thoroughbred genome has recently been mapped in its entirety, the sample DNA coming from a mare named Twilight. Obviously, her genetic complement is a

reflection of her own breeding: She is by Silver Charm, a Buckpasser horse out of Daydream, a mare tracing multiple times to Phalaris. We should thus be surprised if analysis of her genome did not reveal

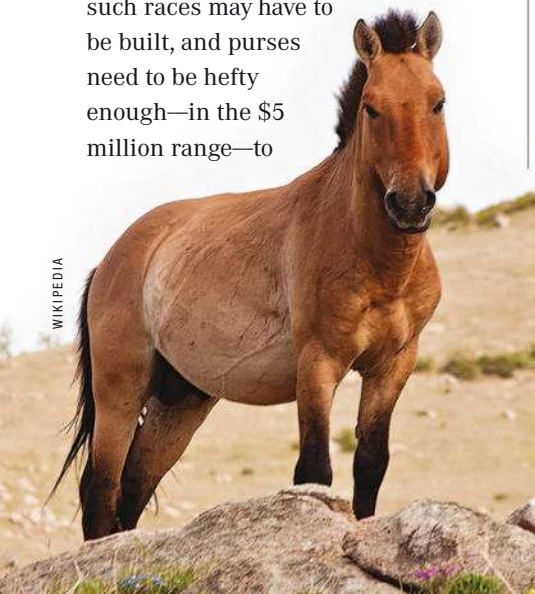
considerable inbreeding. Various genetic studies have taken different approaches to quantifying the degree of inbreeding in various breeds of horse, and I present three here:



The chart above plots the length of the “genomic track” (think of this as a string of related alleles) against the number of repeated alleles. Curves with but a single sharp peak indicate individuals with little or no inbreeding, whereas lower curves having more than one upward “bump” indicate high levels of inbreeding. This study, by Mikkel Schubert of the Centre for GeoGenetics at the University of Copenhagen in Denmark and his research team, surveyed the individual genomes

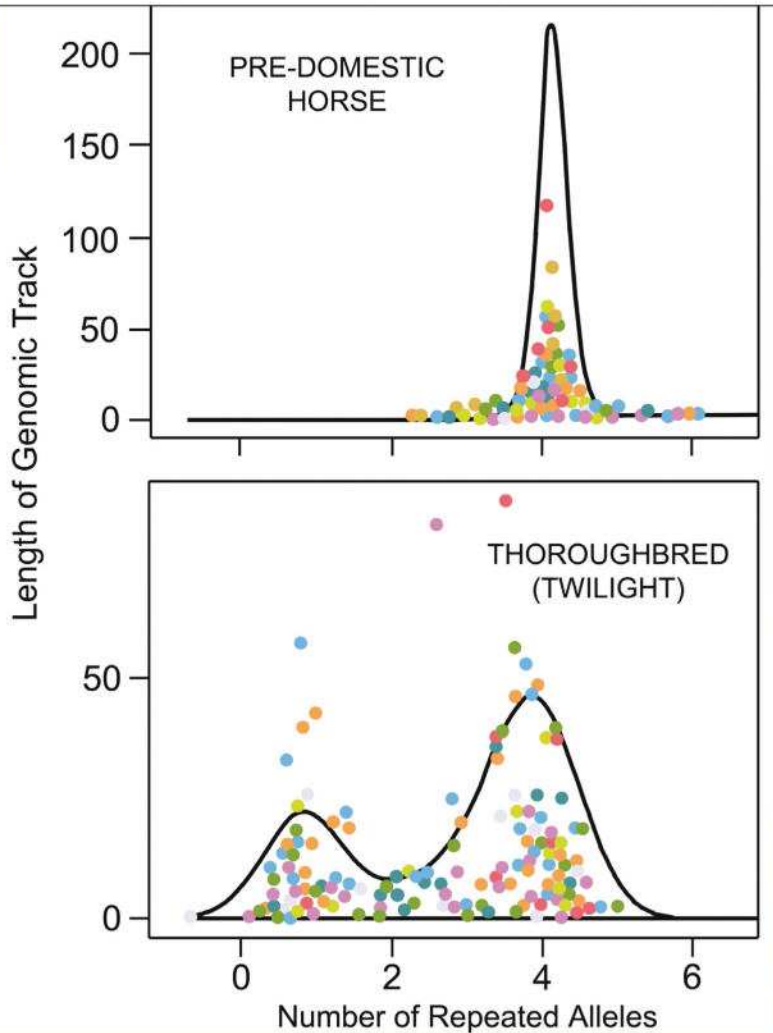
of seven domestic horses belonging to the different breeds indicated. By contrast, the strongly pointed, light blue curve comes from a horse of the same species, *Equus caballus*, as the domestic horse, but who lived more than 40,000 years ago—long before horses became domesticated and long before mankind had any influence whatsoever upon how horses were bred. Schubert’s research team extracted DNA from bones of the ancient horse that had been preserved in

Russian permafrost. Note the range in degree of inbreeding, from least in the ancient horse to greatest in the Thoroughbred. The least inbred domestic horse was one of the two Icelandic horses sampled. The Przewalski horse (green curve), which was once a wild animal, has existed since 1942 only in zoos or in managed herds. All living Przewalski horses descend from only 13 individuals, and this is why they exhibit more inbreeding than some domestic horses.



PRZEWALSKI HORSE

WIKIPEDIA



These charts are also from the Schubert team study. The colored dots represent samples taken from different chromosomes (the domestic horse has 64 pairs of chromosomes). Again, a tight, strongly one-pointed distribution of sampling points

indicates the absence of inbreeding. This chart contrasts Twilight's genome with that of the ancient pre-domestic individual, and indicates that she has about 400 times more repeated alleles—in other words, she is much more inbred.



TWILIGHT

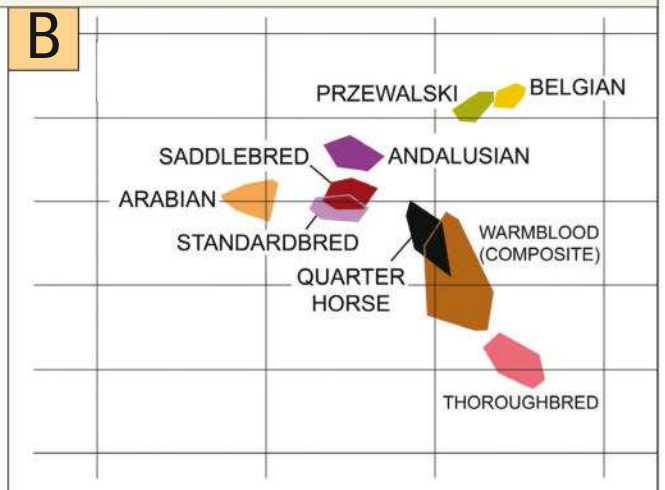
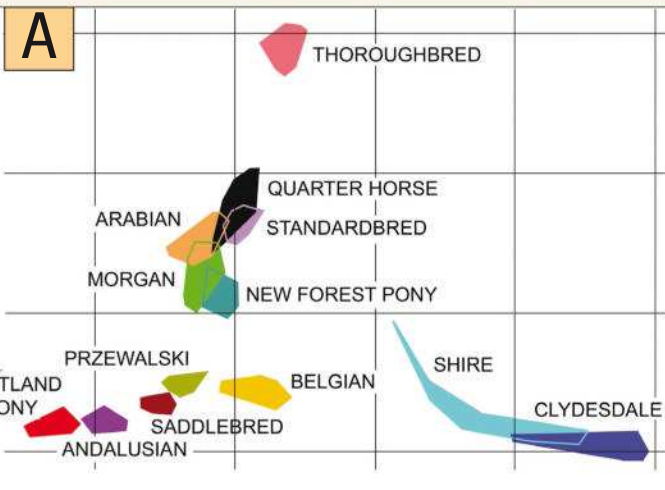
DOUG ANTCAK BAKER INSTITUTE FOR ANIMAL HEALTH COLLEGE OF VETERINARY MEDICINE CORNELL UNIVERSITY

The charts below are summaries of “cluster analyses” of various horse breeds based on surveys of their genomes. Chart A is from a 2013 study by J.L.

Petersen and research team, Chart B from a 2012 study by McCue et al. The two research teams surveyed neither the same list of breeds nor the same alleles, and this

is why the clusters occupy different areas when projected onto the same arbitrary scale. Despite this, many of the breeds relate similarly in the two studies, and in both,

the Thoroughbred plots as an outlier. Its distance from other breeds is a measure both of its unrelatedness to other breeds and also of its high degree of inbreeding.



ECLIPSE SIRE-LINES: PROGENITORS

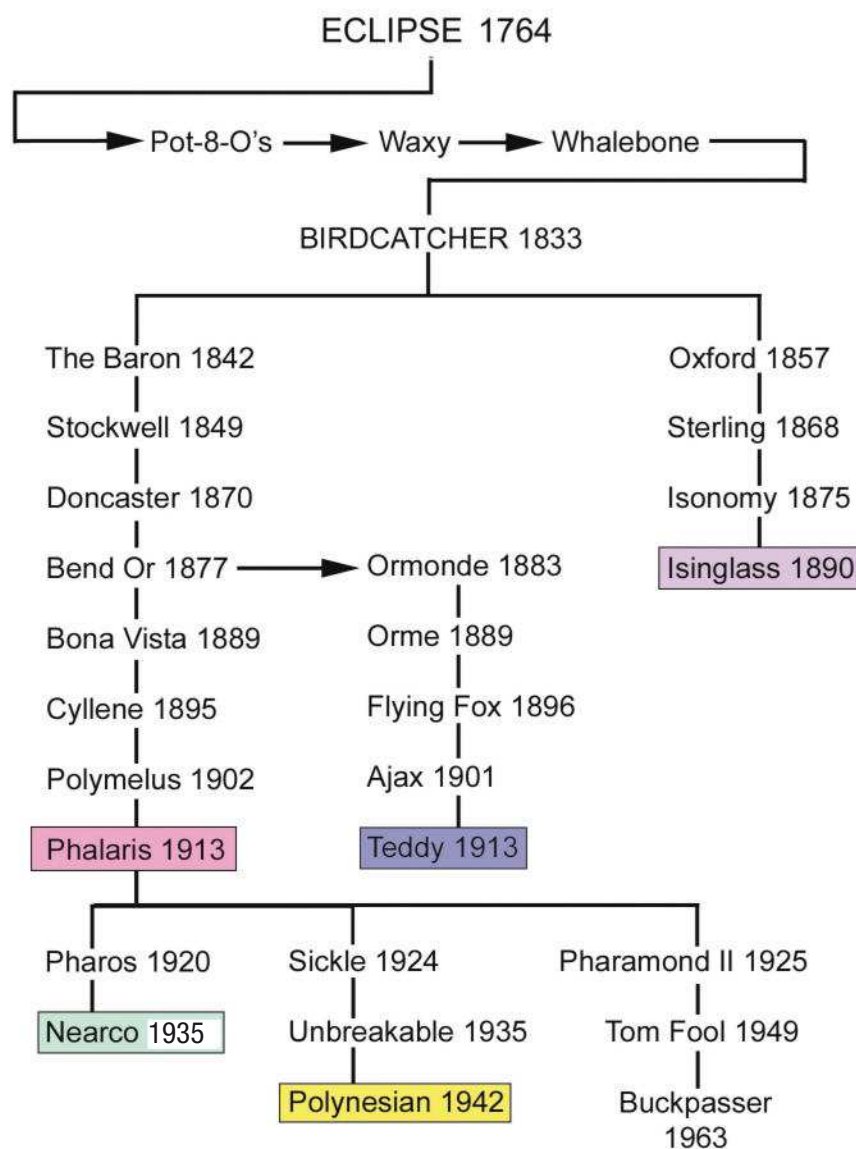
All the horses discussed in this installment descend from Eclipse through the early-day racer Birdcatcher (also called Irish Birdcatcher). In our last installment, we looked at the earlier part of this related group of horses—those that came from Isinglass, Bend Or and Teddy. This installment

completes our review by looking at the last and largest branch, the currently wildly popular Phalaris family that descends from Bend Or through his grandson Cyllene. This sidebar highlights the sires who founded the main branches of the Phalaris family. Readers who own

Thoroughbreds (or Quarter Horses descended from Birdcatcher-line horses such as Patriotic, Romany Royal, Rejected, Lake Erie, Beduino, Nechao, etc.) and want to trace ancestry back to very early times can do so by using these charts and pictures.

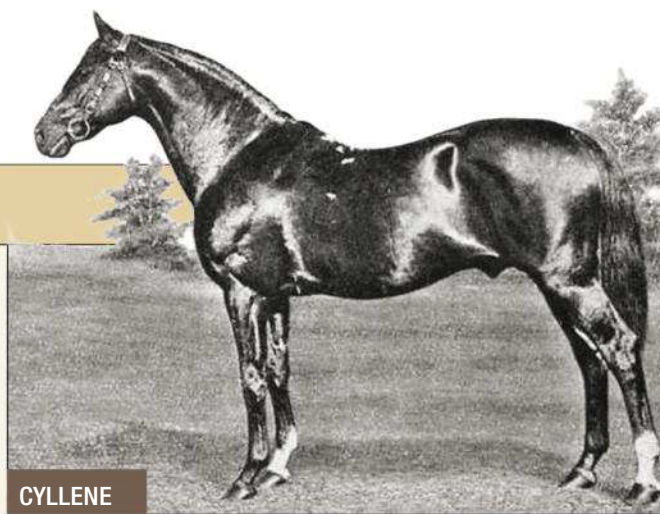
Cyllene 1895 (by Bona Vista by Bend Or, out of Arcadia, herself a Birdcatcher-line horse through Isonomy). This is a handsome stallion of very masculine aspect possessing good bone and a huge, muscular pelvis. Typical of Eclipse-line horses, he stands low to the ground. The withers and shoulders are very good, better than can be found in many Birdcatcher descendants.

Phalaris 1913 is the fashionable “genetic bottleneck” through which 90 percent of today’s successful flat-track Thoroughbreds come. He was by Polymelus and out of Bromus, a granddaughter of St. Simon. This horse inherited all the good features of Cyllene but one: He lacks what is termed “harmony of the parts.” While Cyllene could have sired a jumper or a pleasure-riding horse, Phalaris represents extreme specialization only for racing. Note the markedly downhill body balance; long, rather soft back; the low set to the base of the neck; low withers; steep, rather shallow shoulder; enormous rear quarters; short forearms coupled with a high set to the hocks; relatively light bone and small, narrow feet. A speedy individual, absolutely; but to serve the future of the



breed, there's a neon sign on this animal—for those who can see it!—that says “use with extreme caution.”

Nearco 1935 (by Pharos, by Phalaris; out of Nogara, a St. Simon-bred mare). If a bottleneck can have a bottleneck, this horse would be it: The Nearco branch is one of the two largest from Phalaris. I compliment the breeder of this horse—the Italian genius Federico Tesio—because he was obviously someone who could read the above-mentioned neon sign. Nearco's dam carries two close-up crosses to St. Simon, though probably even more importantly registers numerous crosses to Matchem (through Humphrey Clinker) and to Herod (most through Woodpecker, but also through rarer sires including Lexington and Butler's Columbus). She



CYLLENE



PHALARIS

traces in tail-female to Place's White Turk and the Layton Barb mare. Note how she has corrected Phalaris' excesses: shortening the back, raising the withers, and restoring a

long and deep shoulder. The cannon bones are still rather long, with high knees and hocks, and the bone could be heavier, although the feet are improved.

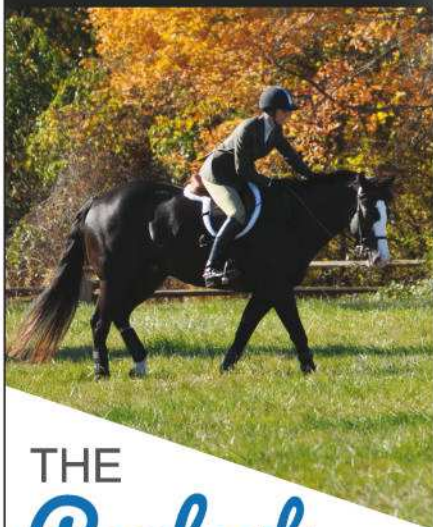
Polynesian 1942 (by Unbreakable, by Sickle by Phalaris; out of Black Polly, a great-granddaughter of Cyllene). This is another horse to which breeders have flocked in such numbers as to make him a “bottleneck.” It certainly is instructive to compare the conformation and breeding of this horse, who is inbred to Cyllene, to the effort at outcrossing that Nearco represents. While Polynesian is a more harmoniously constructed individual than Phalaris, he is nothing like Nearco. A pure sprinter in body type, Polynesian features the low withers and huge rear quarters normal in Quarter Horses. In Polynesian we also see subtly misaligned cannon bones and ball-shaped fore ankles that cannot help but be problematic in such a massive horse.



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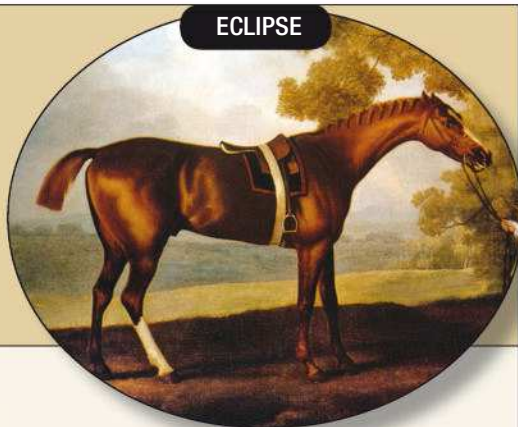


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BUCKPASSER

Buckpasser 1963 (by Tom Fool, a great-grandson of both Phalaris and Teddy; out of Busanda, a Matchem-line mare through Man o' War but herself also a great-granddaughter of Teddy). I confess that this horse makes me smile, because overall, this is what a classic-distance racehorse should look like. Buckpasser's best features are the beautiful shoulder and withers; medium-length back; a

coupling that is slender and flexible yet not weak; long pelvis and long thigh. The neck is not set on as high, nor with as much arch to it as one would want in a pleasure-riding horse, but its shape is perfect for a racehorse. The bone is just adequate, but the knees and hocks are large, dry and perfectly formed. Ogden Phipps, who bred Buckpasser, also bred his dam. No photograph of Busanda is

available, but one glance at Tom Fool—so similar to Phalaris—tells you that Busanda must have formed an excellent contrast. It is this skill—in picking the right mare to bring to the stallion, the mare that will both complement and correct him—that distinguishes breeders who benefit not only themselves, but also the long-term welfare of any horse breed.

attract quality entrants and media interest. Just as in professional football or baseball, it is a large “fan base” that makes these things possible. Old films show Australian grandstands packed full whenever Phar Lap was brought to the gate; the great gelding was a true cultural hero that people wanted to see “in person.” The same can be said of Seabiscuit, Kelso, Citation and John Henry. These horses were not faster than champions such as Northern Dancer or Secretariat; their drawing power lay in the fact that they were congenitally sound—and thus could remain at the track for years, long enough to develop a popular following.

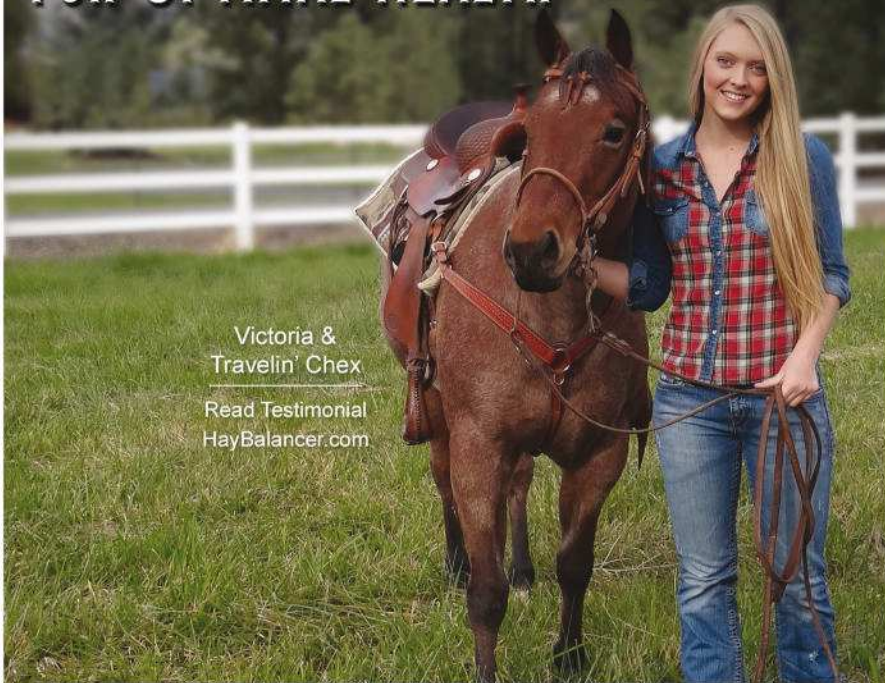
I suggest also that consideration be

I have heard many track veterinarians lament that “we are breeding the legs and feet right off these horses.”

I submit that 90 percent of performance-enhancing drug use at the racetrack would disappear if 2-year-olds could not race.

given to opening the Thoroughbred stud book. It is notable that many of the horses who have won the Italian Gran Premio Merano and the Grand Steeple-Chase de Paris have not, strictly speaking, been purebreds; they have ancestors, generally on the distaff side of the pedigree, whose ancestry cannot be fully verified. They are classified as “autre que de pur sang” or AQPS. Their inclusion in this division of Thoroughbred sport is analogous on the one hand to the highly valuable American champion Lexington, whose female ancestry is partly unknown and whose progeny are therefore not registrable by the British Jockey Club. AQPS parallels the “appendix” concept in Quarter Horse breeding, whereby Thoroughbreds can earn their way to full Quarter Horse registration by

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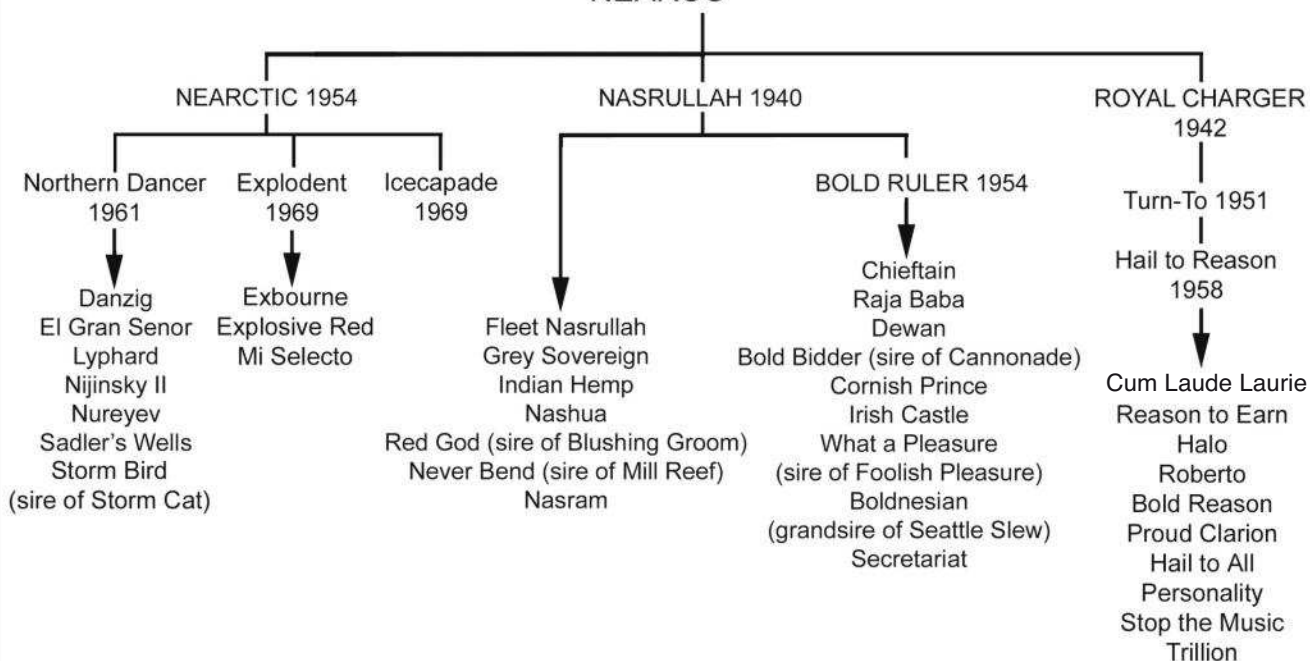
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THE NEARCO



FAMILY

NEARCO 1935



Northern Dancer 1961 (by Nearctic out of Natalma, by Native Dancer and thus highly inbred, yet with much strength in the tail-female including Mumtaz Mahal, Hindoo and Matchem). I present Northern Dancer here rather than Nearctic, because the son is the spitting image of his sire. It must be the Matchem—thus the Godolphin “Arabian” in tail-female—which produces the noticeable crestiness, unusual even in thick-bodied descendants of Phalaris. Typical of that family, this horse presents

a huge hindquarter, a somewhat steep shoulder and a wedge-shaped head



NORTHERN DANCER

broad across the orbits but with a very fine muzzle. The musculature in this stallion is

massive yet he has tons of “bone substance,” the factor that made it possible for this speed machine to cover ground in record time without breakdown. Raced as a 2- and 3-year-old, Northern Dancer logged 18 career starts with 14 wins, then retired to become the 20th century’s top “sire of sires.” Look at the sidebar featuring the conformation of Kentucky Derby winners through time: I regard Northern Dancer as the nodal point at which winners began to look like Quarter Horses.



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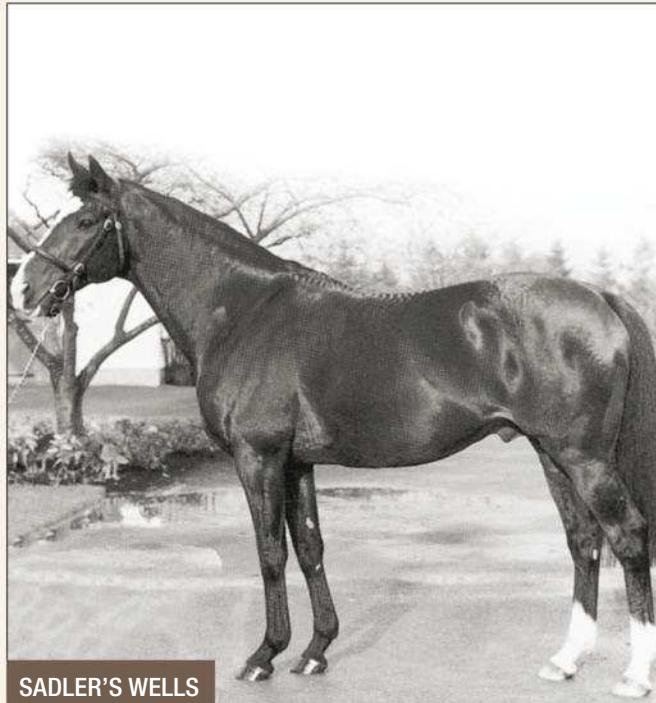
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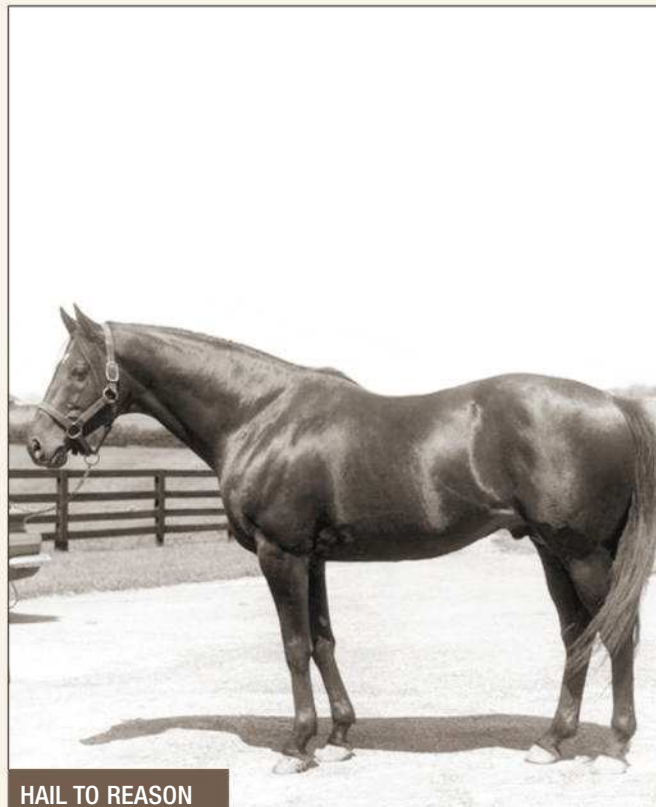
THE NEARCO FAMILY CONT.

Sadler's Wells 1981 (by Northern Dancer out of Fairy Bridge by Bold Reason, a Phalaris-line horse; inbred to Nasrullah in tail-female but also with a line to Matchem). I present this stallion as a fine example of correct conformation and soundness, which he passed to many offspring. Compare him to Mr. Prospector (page 82). Racing primarily over classic distances, he had 11 starts in a two-year career with six wins. His achievements at stud were greater, with more than 300 stakes winners and many champion-producing mares.



SADLER'S WELLS

Hail to Reason 1958 (by Turn-Of, out of Nothirdchance by Blue Swords, a Domino-line horse; with a preponderance of Eclipse-line horses in tail-female, including St. Simon and Hambletonian). Very similar in conformation to Nasrullah, like him this horse is short in the forearm and light of bone. Retired to stud after racing for only one year because he broke both sesamoids in a fore ankle, such is his popularity with breeders that Hail to Reason nonetheless has become the progenitor of a racing dynasty extending into the third and fourth generation.



HAIL TO REASON

Nasrullah 1940 (by Nearco, out of Mumtaz Begum by Blenheim out of Mumtaz Mahal). This horse's conformation is similar at first glance to that of Northern Dancer—the one main difference being in Nasrullah's light "bone." Although he retired sound, it is difficult to gauge what aches or pains an animal may experience simply as a result of athletic effort—and these are guaranteed to be greater, however difficult they may be to quantify, in the racehorse who has a weaker frame. Nasrullah had the reputation of being "difficult" and was labeled "a rogue" because on numerous occasions he was reluctant to leave the paddock, difficult to get focused forward once started, and once pulling into the lead, would idle as if hoping that the effort so far made had been enough. Horses descended from him have similar reputations, especially Bold Ruler. Retired to stud at age 4, he was sold several times before settling down to produce numerous fast offspring, a veritable dynasty of race winners.



NASRULLAH



SECRETARIAT

Bold Ruler 1954 (by Nasrullah out of Miss Disco, a Fair Play/Man o' War-line mare tracing multiple times to Matchem and directly to the Godolphin "Arabian" in tail-female). In terms of conformation, of this horse we may well ask, "Where have the withers gone?"—as well as noting the light bone. Plagued not only with the "behavioral"

problems already noted, Bold Ruler struggled with weak ankles and shelly hoof quality. Raced into his 4-year-old year, he compiled 23 wins in 33 starts, including the Preakness. For a time after retiring to stud, he too became a fashionable go-to horse—another genetic bottleneck.



BOLD RULER

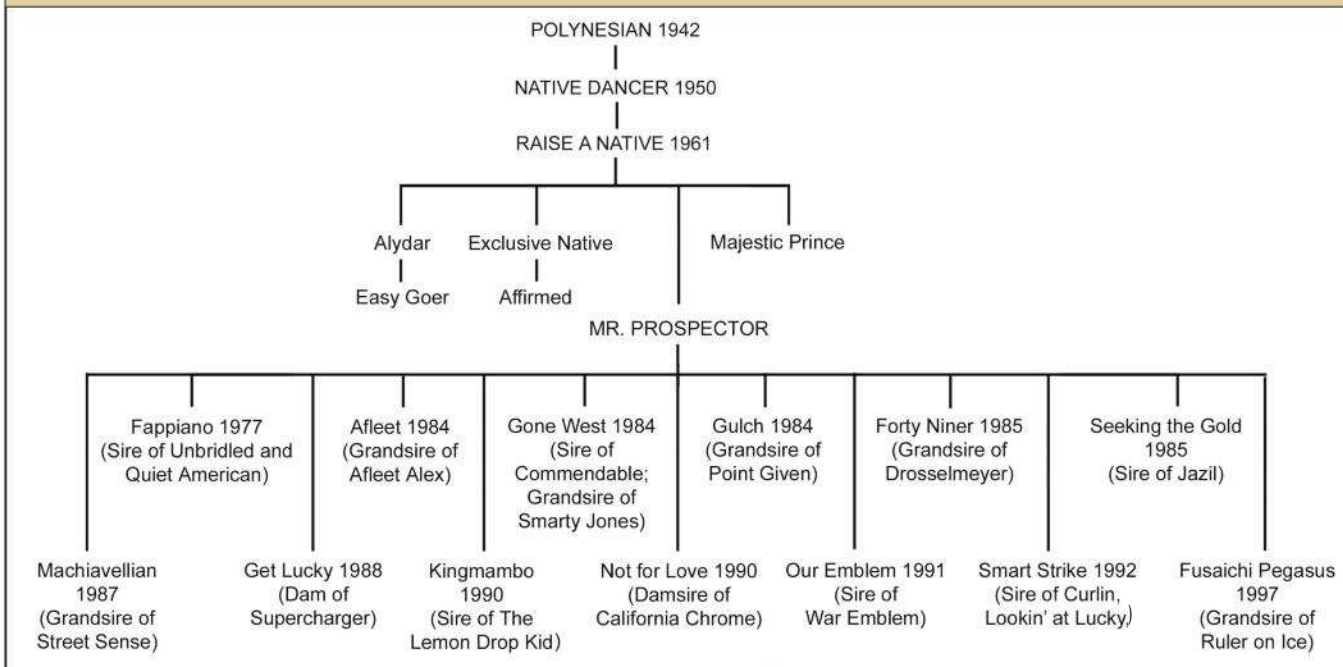
Secretariat 1970 (by Bold Ruler out of Somethingroyal by Princequillo; in tail-female, tracing back to Cyllene without going through Phalaris and tracing also to Herod, Matchem and directly to the Godolphin "Arabian"). I have praised this horse numerous times in print, most recently in an article concerned with

superior racing technique and biomechanics (see "Secrets of Secretariat's Speed," EQUUS 434). However, readers should be alert to exactly what was said: I would not change a single hair on this horse if what I wanted was a sprint-racer, for in Secretariat we have complete convergence with

Quarter Horse type, including massive muscularity, huge hindquarters, low withers, wedge-shaped head, and noticeably downhill body balance. He has better "bone" than most of his sire-line ancestors, and that's a crucial part of what enabled Secretariat to support his incredible speed over classic

distances. In a two-year career he was offered 21 starts and logged 16 wins. At stud, he was not as outstanding, but he has produced a number of remarkably speedy colts plus stakes-winner-producing broodmares.

THE POLYNESIAN FAMILY



Native Dancer 1950 (by Polynesian out of Geisha, a mare of Man o' War and Ben Brush breeding, with a preponderance of Eclipse in tail-female). The first horse to be made famous by TV coverage, "the Grey Ghost" raced for three years, compiling 21 wins in 22 starts, many over classic distances. His only loss, and that by a narrow margin, was in the Kentucky Derby. Retired to stud due to unsoundness from recurring hoof problems, he sired 43 stakes winners and is the ancestor of the most successful racing dynasty in history. In build similar to horses of the Nearco family, he has better "bone" than Nasrullah and is a little more open in hind limb angles.



NATIVE DANCER



RAISE A NATIVE

Raise A Native 1961 (by Native Dancer out of Raise You by Case Ace, a Teddy-line horse. Raise You has both Man o' War and Ben Brush close up but a preponderance of Eclipse in tail-female). Inbreeding Eclipse on top to Eclipse on the bottom will produce speed, yes—the effect produced by doubling up on the "power" parts of the horse: the enormously heavy, thickly-muscled and wide upper body. Thus Raise A Native is another thick-bodied, low-withered stallion similar in conformation to a Quarter Horse. At stud, Raise A Native has produced countless champions, many of which, like those descended from Nearco, have had difficulty staying sound.



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THE POLYNESIAN FAMILY CONT.

Alydar 1975 (by Raise A Native out of Sweet Tooth, a Nearco-line mare that is Touchstone, i.e., predominantly Eclipse, in tail-female). Many people remember the media-hyped rivalry between this horse and Affirmed, who beat him narrowly in all three races of the 1978 Triple Crown. The better conformed of the two, Alydar has more in the way of visible withers and a longer and more laid back shoulder, but his back is longer and more weakly coupled, and he has misaligned knees. In a three-year racing career he totaled 14 wins (three against Affirmed) in 26 starts and retired sound. A major success at stud, he sired Easy Goer and many other champions.



ALYDAR



AFFIRMED

Affirmed 1975 (by Exclusive Native by Raise a Native; out of Won't Tell You, a Teddy-line mare with Phalaris close up in the pedigree, but with some strength in tail-female from Boston and Matchem-line horses). As with Bold Ruler, we may well ask in this case where the high withers and laid-back "slashing" shoulder so characteristic of the "original" Thoroughbred horse have gone. Affirmed benefits from a strong coupling and correctly structured knees and hocks



MR. PROSPECTOR

that are well let down. In three years of racing, he won 22 of 29 starts and is the last horse to have won the Triple Crown. At stud, Affirmed got more than 80 stakes winners. His death, like Secretariat's and that of many other thick-bodied horses, was due to chronic laminitis.

Mr. Prospector 1970 (by Raise A Native out of Gold Digger, a Nearco-line mare tracing to Bull Dog plus Hindoo and Ben Brush, with Herod in tail female). In this horse we move a goodly distance back to the original Thoroughbred phenotype. Mr. Prospector has nicely balanced conformation with good bone supporting a lighter upper body. The hindquarters and coupling are particularly beautiful, and the well-carved head with wide muzzle speaks of quality. No horse in Thoroughbred history has dominated bloodlines as much as this one, and I think that in some ways this speaks well for breeders who are trying to look for sires with good conformation as well as proven racing ability. In two years of racing with 14 starts, this horse was tried only over sprint distances, but he has sired numerous classic distance champions: 70 percent of all recent Kentucky Derby winners trace to Mr. Prospector.



NOT FOR LOVE

Not For Love 1990 (by Mr. Prospector out of Dance Number, a Nearco-line mare through Northern Dancer, with Buckpasser and Fair Play also fairly close up, and almost exclusively Eclipse-line horses in other parts of her pedigree). With this horse we return to the “Quarter

Horse” type, and I include this stallion primarily so that you can compare his conformation with Northern Dancer. Still actively at stud, Not For Love’s main fame to date is as the damsire of 2014 Kentucky Derby and Preakness Stakes winner California Chrome.



DROSSELMAYER

Drosselmeyer 2007 (by Distorted Humor, a grandson of Mr. Prospector; out of Golden Ballet, a Nearco-line mare through Northern Dancer and Seattle Slew and Storm Bird). An amazing example of inbreeding, only the “tail” of the tail-female line of this horse contains anything other than Nearco/Phalaris, and even that consists primarily of Eclipse-related horses. Conformationally this stallion is noticeably higher on his legs but with an upper body similar to Alydar, with the same long back and narrow coupling and the same lightness of bone and subtly

misaligned knees and hocks. Once again, the most important thing to know about his race career is that, while he came out four times as a 2-year-old, he improved through the year, winning his last race of that season. As a 3-year-old he won the Belmont and Breeders’ Cup Classic, retiring in 2012 with five wins in 16 career starts. The best of his 2014 yearlings sold for \$180,000 to \$300,000, proving that so far as the popularity of Mr. Prospector and Phalaris go, as the Jockey Club Register notes, “There is no end in sight.”



CURLIN

Curlin 2004 (by Smart Strike by Mr. Prospector; out of Sherrif’s Deputy, a Nearco-line mare through Northern Dancer, with Phalaris, Swynford, Hambletonian and

finally a little Herod in tail-female). Compare this horse’s conformation to Secretariat. The most important piece of information to have about his racing career is that he was

not raced as a 2-year-old. Having been given more time to mature, he entered the field at age 3 to win the Preakness, the Breeders’ Cup Classic and the Dubai World

Cup, eventually to become the highest North American money winner at over \$10.5 million. He is the sire of Belmont Stakes winner Palace Malice.

winning on the short track or by siring winning offspring.

Opening the Thoroughbred studbook—to be sure, in a metered way—would allow an influx of new genes to “refresh” the breed by multiplying the number of possible allelic combinations. Looking back to the first installment in this series, it is obvious that Turkmene horses direct from the

Middle East would constitute the single best source for refreshment. They could be given place, along with other possible “appendix TBs,” in trial races designed to identify those most suitable for racing over distances of from one to four miles.

Scoffers may label such horses “plodders,” but the ability to “run the legs off another horse” is precisely what

flat-track Thoroughbred bloodlines desperately need a dose of right now. However it is accomplished, means must be found to prevent the extinction of non-Phalaris bloodlines; otherwise, the Thoroughbred itself will succumb to the fate of its own ancestor the Hobby, which today exists only within the distaff bloodlines of other breeds. 🐾

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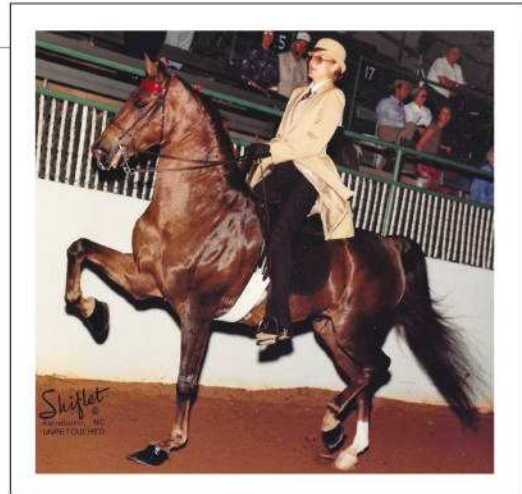
By *Alica Laurido*

Who is your favorite horse, Ms. Alica? The one you love best?"

I gaze down into the small face. My students ask this often. Most are waist high, their hair tucked under pink helmets. Some come once a month, in worn jeans and borrowed boots. Others come weekly in expensive outfits from the local tack store. All are starry-eyed and breathless with their first ride, their first canter, their first ribbon. They all still have so many firsts ahead of them.

I pause to think. What horse do I love best? I have been in the business for more than four decades and have loved many horses for different reasons. There was Sugar, the backyard pony who helped me perfect my emergency dismount. Floyd, my first training project, whom I eventually paired with his perfect owner. Castlewood's Checkmark, a seasoned performer, who taught me showmanship and gave me my first blue ribbons. I owe my reputation as a trainer to the many talented horses I've worked with over the years, many of whom brilliantly carried my riders to victory passes. And, of course, my riding program would be nothing without my school horse partners, who do their jobs unerringly, day after day.

Yes, I have loved many horses. But as I face the pure innocent emotion beaming from a little girl's eyes, I wonder what answer could possibly satisfy her expectation? In truth, the horse business is often exasperating. Hours of sweat, freezing cold, flies and bone-weary exhaustion blend with the



STANDOUT: For the moments of triumph and jubilation. There is disappointment, loss, injury, old age and, yes, inevitably, death. This little girl wants a love story that transcends all this. She wants to hear a fairy tale about a forever horse.

So what is that elusive something that elevates one horse above all others to become a superstar in your heart? What name pops up again and again when I try to define words like heart, presence and courage? What single horse could also be friend, teacher and business partner?

There is one. As the years have passed, I suspect the facts of his life have gotten mixed with the myth of what remains of him in my heart. I don't know that they can be separated. He is the horse by whom I measure all others. He helped "make me," not just as a professional, but as a better human being. I smile at my young student and say, "There was an American Saddlebred called Folly's Topcat...."

I never officially owned Topcat, but he owned my heart from the first day I met him. He arrived at the barn and stumbled off the trailer, tall and gangly with multiple conformation faults. He was over at the knees and had one dished foot. His head was as long as his neck and his ears flopped. He tripped once on the way to his stall, and I tripped twice leading him. We seemed destined for a future together.

His previous barn name had been Cornbread, but we always called him Toppers. I had the privilege of schooling him for a juvenile rider over the next few years. I called it luck when our careers merged at that time, but perhaps it was fate. Something happened when this horse went to work: There was a dramatic shift you could feel, from croup to poll. He had a way of looking at things in the far distance and a desire to get there that changed his whole demeanor. I had my first introduction to “presence.”

Presence makes a horse seem much bigger than the competition. It is a quality that emanates from within that surmounts physical flaws and draws people closer to the rail for another look. It can hold a crowd in awe and stir them to a frenzy. Presence—it’s not what you have, but how you present it to the world. Standing in his stall, Toppers was just plain old Cornbread. But when he hit the show ring, he owned it. He taught me, too, to stand tall and proceed with confidence.

Folly’s Topcat carried his young rider to many victories, but the show I remember most was a little two-day event in the mountains of North Carolina. It was there he demonstrated the true meaning of “heart.” The Saturday night American Saddlebred Pleasure Championship class started with 30 horses, who had to walk, trot and canter both ways in the ring. In a class that big, it is common to pull the top horses in for a second workout and send the rest out of the ring. Topcat and his rider made that first cut.

So 18 horses went back to the rail to perform again at all three gaits. As the horses lined up once more, steam rose from lathered necks, shoulders and heaving sides, fogging the ring under the lights. Who among so many would win the blue ribbon?

Then the judge did something rare, even in those days: He cut the class again and sent eight horses back out to work a third time. Topcat had already put everything he had into each workout. His rider was exhausted.

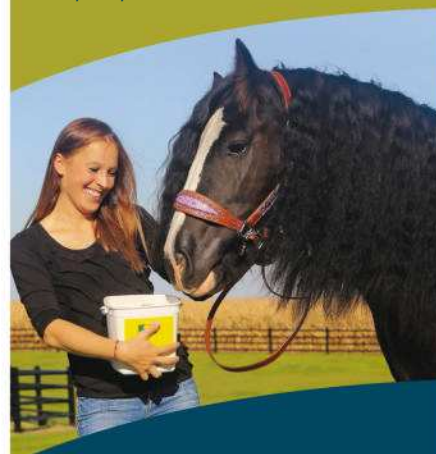
But, on the way back to the rail, Topcat seemed to gather himself, pulling on the reins, as if to say, “Trust me, I will handle this.” Then he settled back and started climbing—trotting higher and higher as the mist swirled and the crowd cheered. It was as if he were drawing energy from some divine reserve. He won more prestigious ribbons in his career, but that blue stands out in my memory as his best performance.

In his later years, Topcat had an eye infection that required drops every two hours. The whole process was painful. He was a tall horse and could easily have slung me against the walls. Instead, he kept still, body tensed, until I finished and we both sighed with relief. He lost sight in that eye but continued his career as school horse. He was my go-to choice when a rider was ready to go from school ponies to show horses. A rider who could post his big trot without getting left behind was ready for just about any Saddlebred. One quirk Topper had was that his canter always started with a long stride and then settled. That stride was intimidating. But he helped me teach my students one of the most valuable lessons a rider can learn: Trust enough to let go.

Time passed, and I got married and drifted out of the horse business for a while. I had lost touch until a barn manager I knew asked me to feed while they went on vacation. As it turned out, Topcat was boarded there. I arrived and took a look at my old friend. He was down in the stall but got up and shook

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himself off when I approached. He was well over 20 and showed the signs of age. I went on with my rounds, but when I got back to him he turned to the corner and ignored his grain. I immediately called his owner and the veterinarian and haltered him to start walking.

He followed willingly with a few pauses as dusk deepened to dark. When he lay down again, he wasn't stressed, so I let him rest while I waited for the veterinarian. I ran my fingers into the deep hollow above his blind eye, traced the gray hairs on his face, and stroked those ears he always used so well. His knees had grown knobby and stiff with age. I suddenly realized I had never owned this horse, and yet here we were, together again by some quirk of fate. I sensed it might be the last time.

People want to continue a tangible connection to what we love. This was the horse who never gave up. Surely he could be saved? This was the horse who taught me the most important lessons of my career and symbolized the characteristics I continue to strive for. My mind raced wildly for ways to resurrect his body, forgetting for a moment what the cost in quality and dignity of his life might be. Where was the vet?

I tugged at the halter. Topcat raised his head, ears forward and looked up past me, as he had done so many times from a center ring lineup. This night there were no crowded rails, no spotlights, no organ music or cheering. It was just him and me joined once more under an infinite country sky littered with stars. I'm not sure I believe in animal communication, but at that moment as he lay his head down once more, I felt the words, "I'm so tired."

Love. It is how we can best serve our equine friends. Sometimes we have to give them permission to go without the added trauma of our own selfish needs. Sometimes we simply need to say goodbye. The veterinarian arrived, but once again Topcat, my forever horse, had already taken the reins from my hands to handle it his own way. 🐾



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DISEASE

Advances in Lyme diagnosis and treatment

Q My warmblood mare was recently diagnosed with Lyme disease, and she also has uveitis (perhaps coincidental, perhaps related—who knows). It seems like treatments for Lyme are different depending on who you talk to, and I'm having trouble getting answers to a long list of questions.

Do you recommend blood testing every six months? What type of test? Is there a vaccine for it, is there one being developed, or is that even possible? It's frustrating to know my mare has a high titer but not know when she was infected. Did she have it when I bought her, did it develop years later, or was it this spring? Is it unusual for her to have uveitis, but no other symptoms? What is the most effective approach to treatment?

Jennie Hakes
Monticello, Minnesota

A Lyme disease, caused by the bacterium *Borrelia burgdorferi* and transmitted to horses by *Ixodes* spp. ticks, is a controversial topic in equine medicine today because the relationship between infection and true clinical disease is difficult to define. Roughly 45 percent of horses in the northeastern United States will test positive for *B. burgdorferi* antibodies, but most of these horses show few to no clinical signs. Even ponies who were experimentally infected with *B. burgdorferi* in a laboratory showed no clinical signs despite high titers.

So to diagnose a horse with Lyme disease we must satisfy four criteria:

- potential exposure to an infected



deer tick
(*Ixodes scapularis*)

dog tick
(*Dermacentor variabilis*)

VECTOR: The deer tick, which can carry the organism responsible for Lyme disease, is much smaller than the dog tick.

tick, or a history of a known tick bite.

• **clinical signs consistent with Lyme disease.** These can be vague and nonspecific but most commonly include

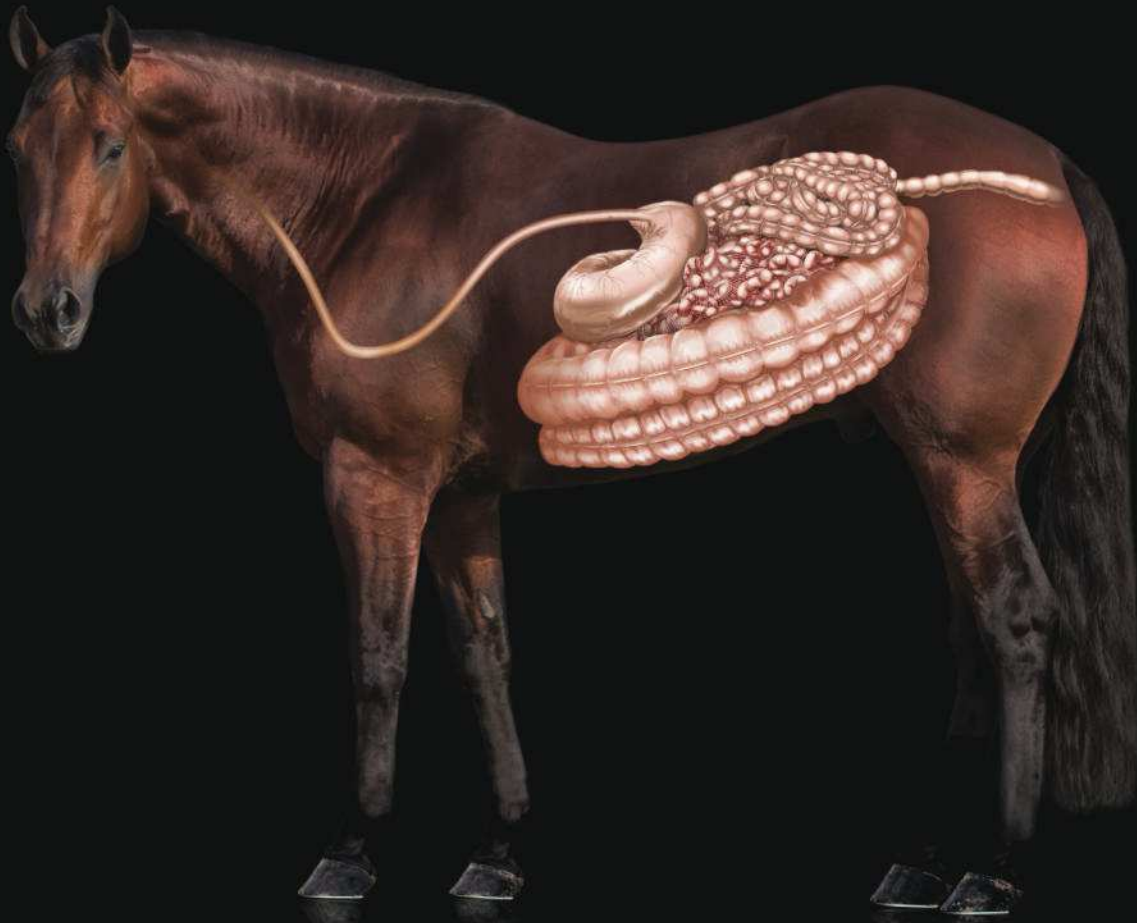
weight loss, shifting leg lameness, hypersensitivity of the skin, muscle soreness and lethargy. (There are several reports of uveitis associated with Lyme disease, but these cases all had additional, more typical clinical signs. Unfortunately, a definitive connection between uveitis and *B. burgdorferi* infection has been made only with post-mortem testing.)

• **absence of other disease.** Other causes of the clinical signs must be ruled out.

• **high antibody titers in the blood.**

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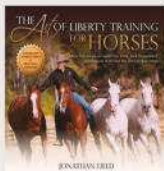
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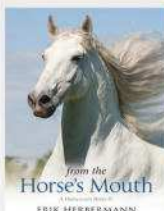
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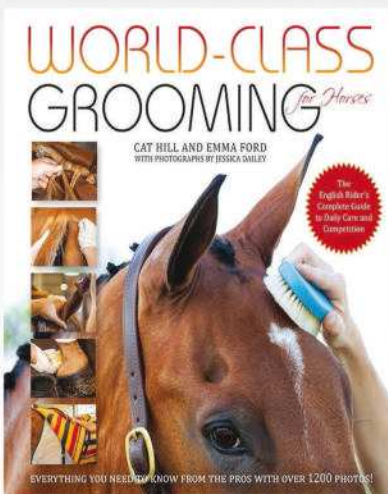
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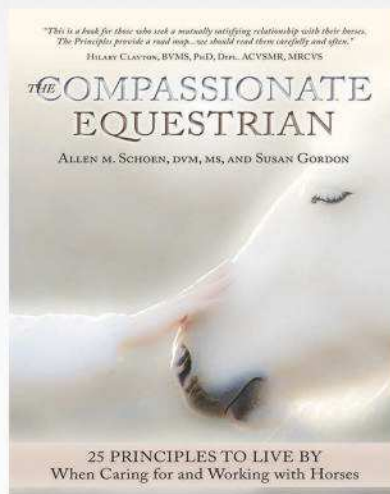
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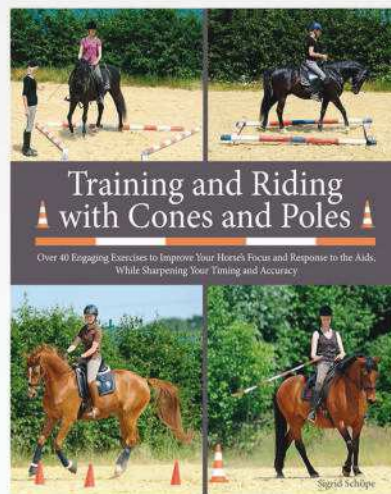
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is the equine Lyme multiplex assay, offered by Cornell University. This assay looks for three distinct antigen proteins (Osp A, C and F) that fluctuate in intensity as the disease progresses:

Osp A is found in horses who have been vaccinated, which differentiates them from those who have positive antibody titers from a natural infection. (While no Lyme vaccine is currently approved for horses, many people use the canine vaccines off-label, although equine safety and efficacy studies have not been performed.)

Osp C antibodies will be present in horses who have acquired an infection recently. The antibodies can be detected as early as three to five weeks after the initial exposure; these levels will decline within seven to 11 weeks and are undetectable after five months.

Osp F antibodies are an indication of chronic infection; these begin to rise two to three months after infection and remain at high levels thereafter.

By referring to the timeline of these antibody fluctuations, we can estimate whether an infection is acute or chronic. The older ELISA^o or Western^o blot tests are still good screening tools for infection, but the multiplex test gives us far more information.

Once a diagnosis is made, a treatment protocol can be selected. Two antibiotics—intravenous (IV) oxytetracycline and oral doxycycline—have been widely used to treat Lyme disease. In experimentally infected ponies, the IV oxytetracycline led to a larger decrease in antibody titers than did the oral doxycycline. However, in a study done on horses who were infected naturally, both options performed equally as well, although the decrease in antibody titer was not as large as was seen in the experimental model. Horses in the field may not respond to treatment as readily as the ponies infected in the lab because they may have repeated exposures to the bacteria or perhaps because their cases are not treated as soon after the initial infection.

Many veterinarians use the protocol of IV oxytetracycline for up to five days followed by oral doxycycline for anywhere between 14 and 30 days. Response to treatment can be difficult to interpret, in part because the antibody titers may not decrease as much as expected, but also because the medications have anti-inflammatory properties that may cause the resolution of clinical signs rather than a resolution of the infection.

I would recommend routine screening every three to six months to monitor your mare's titers and differentiate between acute and chronic infections. If high titers seem to be causing clinical signs in your mare, then I would recommend treatment. However, I would caution against administering antibiotics simply to prevent clinical signs from arising. Anytime we give antibiotics to a horse (IV or oral) we risk disrupting the gastrointestinal flora and causing colonic inflammation and diarrhea. In addition, the overuse of antibiotics is leading to increased resistance in bacterial populations. It is far better to use routine testing to monitor for exposure and reserve treatment for when clinical signs coincide with high titers.

Joan Norton, VMD, DACVIM

*Norton Veterinary Consulting and
Education Resources
Noblesville, Indiana*

THIS MONTH'S EXPERT



Joan Norton, VMD, DACVIM, is a senior lecturer at the University of Queensland Equine Specialist Hospital in Queensland, Australia, and is the founder of Norton Veterinary Consulting and Education Resources, a firm dedicated to the education of horse owners and equine veterinarians through internal medicine consultations, lectures, webinars and writing. More information on her services and courses can be found at www.nortonveterinaryconsulting.com.

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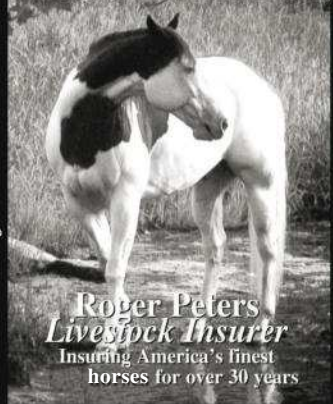
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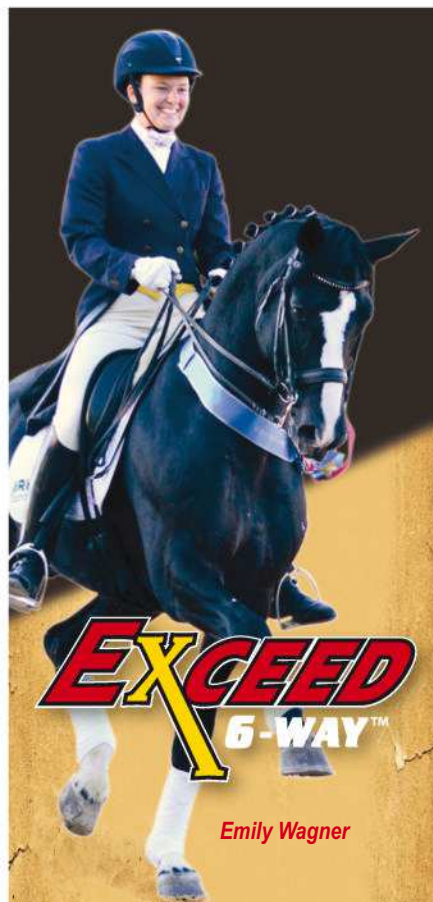
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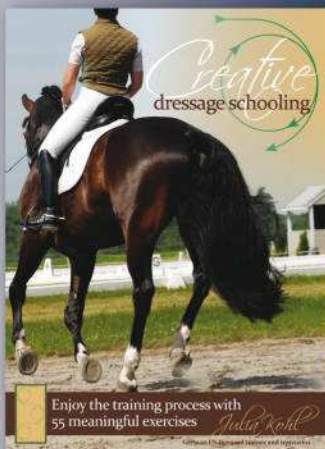


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bone spavin—bone enlargement or destruction on the inner surface of the hock.

DNA (deoxyribonucleic acid)—large organic molecule that consists of two chains of nucleotides wound around each other; the material of which genes are made. Genes are responsible for the individual inherited characteristics of living organisms.

electrolytes—simple inorganic compounds that dissolve in water and are essential for many of the chemical processes in the body.

enzyme-linked immunosorbent assay (ELISA)—test for small amounts of antibody in body fluid and/or tissue.

flunixin meglumine—generic name for a nonsteroidal anti-inflammatory pain reliever commonly given for colic, eye pain or generalized body discomfort.

genome—complete array and sequences of genes for a species, arranged into chromosomes and residing in the DNA of each cell's nucleus.

genotype—total genetic inheritance; all of the genes present in the chromosomes of a horse's cells, one-half of which came from his father and one-half from his mother.

hereditary equine regional dermal asthenia

(HERDA)—inherited disorder characterized by weakened connective tissue throughout the body but most noticeably in the skin. HERDA is found only in Quarter Horses and related stock breeds, especially in several lines of prominent cutting horses.

hyperkalemic periodic paralysis (HYPP)—inherited muscle disorder of Quarter Horses and related stock-horse breeds that is characterized by muscle tremors, weakness and recumbency. Most cases are managed by diet and medication, but severe attacks can be fatal.

ichthammol—coal-tar-based ointment that has a soothing, drawing effect. Ichthammol is used to treat abscesses and other bacterial infections.

kissing spines—contact between the slender bony projections that rise upward from the top of each vertebra (dorsal spinous processes) along the back. This contact is unnatural and may be the source of back pain.

laminitis—inflammation of the sensitive plates of soft tissue (laminae) within the horse's foot caused by physical or physiologic injury. Severe cases of laminitis may result in founder, an internal deformity of the foot. *Acute* laminitis sets in rapidly and usually responds to appropriate, intensive treatment, while *chronic* laminitis is a persistent, long-term condition that may be unresponsive to treatment.

Lyme disease—potentially debilitating and even fatal bacterial infection spread by deer ticks (*Ixodes dammini*), affecting people and domestic animals, including horses. Signs of infection in horses include lethargy, fever, swollen joints, shifting leg lameness, laminitis, ocular inflammation and hypersensitivity of

the skin and underlying muscle.

nonsteroidal anti-inflammatory drug (NSAID)—drug that contains no steroids and acts to reduce heat and swelling.

pedal osteitis—inflammation of the coffin bone.

phenotype—physical makeup and appearance of an organism as determined by its genes and environment; expression of a genotype.

sarcoïd—viral tumor composed mainly of connective tissue which appears on the skin; the most common tumor of the horse.

tail female line—continuous matriarchal ancestry.

uveitis—inflammation of the pigmented structures within the eyeball.

visceral—pertaining to the large internal organs in the thoracic, abdominal and pelvic cavities.

West Nile virus—flavivirus transmitted by mosquitoes. West Nile virus can infect birds, horses, humans and other mammals. In horses, as in people, infection with the virus usually causes little or no illness. For reasons not yet determined, however, West Nile infection sometimes triggers swelling of the brain (encephalitis) that produces limb weakness, muscle fasciculation (twitching), incoordination, behavioral changes, paralysis and recumbency. In severe cases, West Nile encephalitis can lead to coma and death.

Western blotting (immunoblotting)—test for antibodies in fluid or body tissues; the Western blot separates the proteins in a horse's sample into bands on a sheet of gel so that the ones causing reactions can be identified. 🐾

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The experiment

My story started out like many: My daughters wanted a horse. This must be some genetic trait, because I, too, was born wanting a horse. Unfortunately, my parents responded to my requests with plastic toys, so I vowed that my daughters would have the opportunity denied me.

We set out to buy a horse, eventually settling on a 10-year-old Appendix Quarter Horse gelding. My girls, aged 10 and 15, walked him in a circle on a snowy slope, proclaimed his face beautiful, and it was a done deal. They renamed him Robin Hood, but truthfully, he should have been called Dumb Luck. He took my younger daughter all the way through her B Level in Pony Club and became a second-level dressage horse—and that doesn't even come close to what he taught them about love and life.

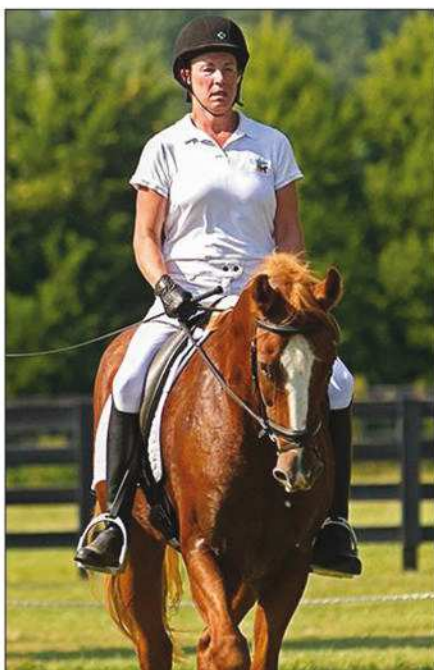
Robin Hood taught me a thing or two as well: how to muck, chase a horse in the dark, load an unwilling beast into a trailer, survive on virtually no sleep.... I became a groom and a human tack rack. I sloshed water on myself on icy mornings. I wrote checks, lots of checks. I learned to always look on the bright side. And that's the end of the story for many horse show moms, right?

One evening my younger daughter presented me with a proposition. She was by then a college junior majoring in psychology, and she wanted me to be the subject of an experiment for her behavior modification class. Her idea: She would turn me into a dressage rider.

She would achieve this goal by providing rewards and by having me keep

My daughter's college psychology project transformed me from a "horse mom" into a dedicated rider in my own right.

By Susan Sughrue



a journal in which I wrote excuses for why I did not ride on any given day. Oh boy, where do I start? It's too hot, too cold, too wet, too windy. I'm too tired, too nervous, too busy. Sound familiar? Still, what parent who is shelling out for college tuition would refuse to help her child get an A? And so it began....

Let me be clear: I am a librarian. I have never been an athlete of any kind. But I was game. It was decided that I would learn on Robin Hood's successor, Strider, who once had a rearing problem. He was much too

old to pull his stunts anymore, but I was old enough to have a clear memory of them. The first excuse in my journal was, "I am scared."

I was also determined. I would ride five days per week, take regular lessons and aim toward competing. It looked so easy when my girls were riding. It wasn't. Talk about a role reversal. I whined, I made excuses. My daughter yelled at me, telling me to "lighten up," "have fun," "get back on." Where had I heard those words before? I was used to dishing out the advice; now it was being served to me.

I'm not sure exactly when, but somewhere in between "let's try this experiment" and the final grade, I decided I was doing this for me. I undertook a horse-boarding business to pay for les-

POSITIVE REINFORCEMENT: Once only a "groom, sponsor, spectator," the author, shown aboard Strider, is now a dressage rider.

sons. I rode several horses, and each one taught me not only about riding but more about myself. Eventually, I found a free lease on an amazing Prix St.

George school master. And while he is more difficult to ride than any horse I have encountered, he has so much more to teach me and the largess of patience to go with it.

Not a day goes by that I don't marvel over this journey. I am not the person I used to be. I have learned to work harder than I ever thought possible, to embrace failure as progress, to be more patient and understanding with others. I am no longer the groom, the sponsor, the spectator. Now I am a rider, and this is for me. 🐾

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