

EQUINE HOOF CARE

The Flourishing Frog

The horse's frog is a highly adaptable structure that's crucial to hoof health.

This highly adaptable structure is crucial to hoof health

The seemingly inconsequential triangle of tissue on the bottom of your horse's foot is anything but. In fact, the frog serves a variety of special functions that help keep a horse sound.

“Paying attention to the frog is one of the most important aspects of keeping a happy, healthy, functioning hoof capsule,” says Travis Burns, CJF, TE EE, FWCF, assistant professor of practice and chief of farrier services at Virginia Maryland College of Veterinary Medicine, in Blacksburg, Virginia. “When the foot starts to have issues, frog health deteriorates,” he continues. “Then the problem is self-exacerbating, and the unhealthy frog is prone to thrush and even canker,” two anaerobic (able to survive with little to no oxygen) bacterial diseases of the frog and surrounding tissues.



That triangle of tissue on the bottom of your horse's foot provides shock absorption, traction, protection and more

The Frog's Function

Here are some of this structure's roles:

Shock absorption

Bob Bowker, VMD, PhD, professor and head of the Equine Foot Laboratory at Michigan State University, in East Lansing, says the frog is vital for absorbing shock. “Without a good frog, in my opinion, the foot does not function well, and that is why we have so many foot problems.”

When the foot lands on the ground, the elastic, blood-filled frog helps dissipate some of the force away from the bones and joints, says Amy Rucker, DVM, an ambulatory practitioner in Central Missouri who has a special interest in horses' feet.

Blood flow

The frog plays a major role in pushing blood up out of the hoof. Tia Nelson, DVM, a farrier and veterinarian with Valley Veterinary Hospital, in Helena, Montana, explains: “From the knee and hock on down, a big part of what pushes the blood back up to the heart is the venous plexus right above the frog. When the horse puts a foot down, this dissipates concussion and the blood squishes out of it with that impact and goes back up the leg. It's a brilliant multipurpose structure. Thus, a horse with a healthy frog won't be stocking up as much, and the feet and legs are healthier. It affects the whole body.”

Protection

A healthy frog helps shield the sensitive digital cushion (the soft tissue beneath the sole that separates the frog and heel bulb from the underlying tendons and bones) and the deep digital flexor tendon above it. “Then there's the bursa and the navicular bone itself,” says Burns. “There are vital structures just beneath that bottom surface. Once people realize that, they understand the importance of the frog.”

Coordination

Because the horse's heel has sensory nerve endings, the frog likely has a role with proprioception (a horse's awareness of where his feet and body are), with sensitivity a bit like the nerves at the ends of our fingertips, says Rucker. “How the horse actually puts the foot down may be partly due to the frog—feeling the ground (conditions) in regard to how it will land,” she says.

Traction

The frog also provides traction on various surfaces. We see this in snowy and icy conditions, when barefoot horses seem to have better purchase (because the frog's in direct contact with the ground) than shod horses—unless the horse is shod with special traction devices.

The Healthy Frog

A healthy frog in the unshod horse should have full contact with the ground when he is standing and should look like a wedge at the back of the foot.

“If the frog is big and healthy and contacts the ground—and loads at every step—it pushes the heels apart,” says Burns. “This aids the normal biomechanics of the horse's hoof capsule.”

“It has a nice V- or heart-shape,” adds Nelson. “A contracted foot with a recessed frog that never touches the ground is not healthy. A big robust frog that hits the ground and has as much contact as the hoof wall and the bars (the folds of the wall on either side of the frog) is doing what it was meant to do. The bars and the frog and the caudal (back) two-thirds of the hoof wall should be touching the ground in a barefoot horse.”

Shod horses, especially those wearing toe or heel calks for traction, do not experience frog contact with the ground. Neither do club-footed horses, whose frog on the affected hoof is recessed. And even some barefoot horses' feet are just more concave than others.

So, every horse's frog is a little different. “A Thoroughbred's frog will be much different from a Shetland pony or a draft horse,” says Rucker. “Various breeds have different frog characteristics.”

Frog Care and Trimming

Bowker says the best way to care for the frog is to leave it alone. “Trimming the frog is the worst thing that we do to the frog; 'neatening it' just begins the slow process of its deterioration,” he says. “A lot of people are more concerned about how it looks—keeping it trimmed and tidy—than how it needs to function.” But there is debate among farriers about frog-trimming.

Steve Sermersheim, CJF TE, AWCF, lead farrier at the University of Illinois College of Veterinary Medicine, says frogs in certain environments do need trimming. “Here in Illinois it is wet nine or 10 months of the year, which can lead to thrush and other problems,” he says. Trimming essentially helps prevent pockets from forming where bacteria can proliferate.

“I don't get overly aggressive with trimming the frog, however; I like it nice and big and healthy because it needs to bear weight, touching the ground,” he adds.

Burns says he trims the frog only to remove loose edges and to mimic the shape of the horse's dermal frog (the solid base that it grows from). “It does need to be trimmed and maintained,” he states. “Just like the hoof, you don't get a nice healthy foot by leaving it alone and forgetting about it.”

Another scenario in which farriers reach for their trimming knives is when the frog sheds, or exfoliates, naturally—which can happen once or twice a year.

Sermersheim says he sees a lot of shedding frogs in the spring, when he receives phone calls from worried horse owners who think their horses' frogs are falling off. "It is just shedding the old dead tissue," he says.

"You'll see a natural separation between the old frog and the new tissue underneath," says Rucker, who recommends trimming off the old, loose dead material before it traps thrush-causing mud and debris.

Regular cleaning around the frog also helps in this effort. "You need to make sure the commissures (the valleys between the frog and the bars of the hoof) are clean," with daily hoof-picking, says Sermersheim. "If those edges are not cleaned out, they collect a lot of muck, bacteria, sand, manure, etc."

Environmental Impacts

The hoof copes in different environments amazingly well. "When you think of equines that live in the arctic, the tropics, high mountains, low valleys, swamp conditions, and deserts, you realize they do adapt," Bowker says. "A frog on a desert horse's foot will look different from that of a horse in a humid climate, yet both are doing their job."

Regions with major changes from wet to dry to wet again can compromise hoof tissues, causing thrush in horses kept outdoors, says Rucker, especially if the animals have contracted heels.

Farriers and veterinarians also see a lot of thrush in moist seasons and regions. "Standing in mud all the time is not healthy for feet," she says, suggesting owners design their paddocks with raised areas for loafing sheds or higher spots where horses can get out of the mud.

"Another problem is feeding round bales, with horses always standing in the wet muck and wasted hay around the feeder while they eat," Rucker adds. "Even if the horse owner or farrier treats the frog for thrush, if the horse goes back to the same wet, dirty environment, it can't get better."

But don't be too quick to lock your horse up in a clean, dry stall. Movement and exercise are also key to frog health. "For a healthy foot, horses should be able to move when they want to and be able to walk on different surfaces," says Bowker.

Sermersheim agrees, saying the most unhealthy frogs he encounters are on pasture pets that aren't exercised. "The frogs look great on horses that get ridden several times a week," he says.

A horse trimmed regularly that is in consistent exercise and isn't fetlock-deep in mud will have the best shot at a healthy frog, he says.

When the Frog Suffers

A variety of factors, ranging from poor management to conformation to genetics, can cause frog problems and resulting lameness.

An irregular trimming schedule, poor hygiene, and wet conditions, for instance, can all cause necrosis (tissue death) and, as we've described, *thrush*. Sermersheim says the remedy is a proper trim and balance and exercise. “We can use a lot of topical treatments to retard thrush, and they all work—as long as horse owners commit to doing it every day—but regular exercise is even better,” he says. “It creates more blood flow and also enables the foot to clean out when the horse is moving around.”



The frogs on club feet might be recessed and require special trimming and support

Horses with club feet or contracted heels might have *recessed frogs*. “When I see a foot that is very contracted and the frog is recessed up high in the foot, with thrush present, my goal is to get good weight-bearing re-established for the frog,” which is crucial for blood flow and support, says Nelson.

With these horses Nelson says she trims the feet to proper balance and puts the horse in a pea gravel- or sand-based stall or paddock. This nice, dry

footing conforms to the bottom of the foot, creating contact. “As soon as you can get the frog into active contact with the ground, it starts to respond the way it is supposed to,” she says, noting that the heels begin to expand.

“Packing the shod foot with dental impression material will also bring a frog into active, dynamic contact with the ground, creating a ground force reaction,” she continues. “It doesn't matter what is used, as long as the frog regains contact with the ground. This is why I don't always clean the dirt out of a horse's feet. It offers protection and contact with the frog. If the horse is limping I definitely pick up his foot and clean it out, in case there's a rock stuck up in there, but sometimes the horse benefits from that 'natural' hoof pad that provides frog contact.

”Sermersheim says he also sees *displaced frogs* in concert with displaced digital

cushions. “Those frogs become elongated and come out the back of the heel bulbs,” he says. “The digital cushion is so displaced that the frog has to follow it, being connected with it, and it is hard to get those frogs healthy again.

Sometimes horses in very dry or wet conditions benefit from an application of *hoof softener or hardener* to the bottom of the foot. “On the racetrack trainers used to use mud packs in the feet to try to soften them so they'd be more flexible—to handle concussion better—and less apt to crack,” says Rucker. “People apply hoof hardeners to try to toughen the sole and frog so they will be more durable and handle abrasion and weight-bearing more readily.”

Puncture wounds to the frog are scary because of the delicate structures above and around it. You might not notice the puncture immediately if the horse stepped on a nail that's since fallen out. Or, the frog might be so soft and spongy that you don't see the hole; it closes over, and your farrier or veterinarian only finds the wound when pinpointing the reason for the horse's lameness.

“If you pick up a foot and the object is still sticking into the frog, contact your vet immediately (don't pull it out) and have it radiographed to see where it goes,” says Burns.



There's no hard-and-fast approach to frog therapy for all horses. Work with your farrier to tailor yours to the horse, environment, and season.

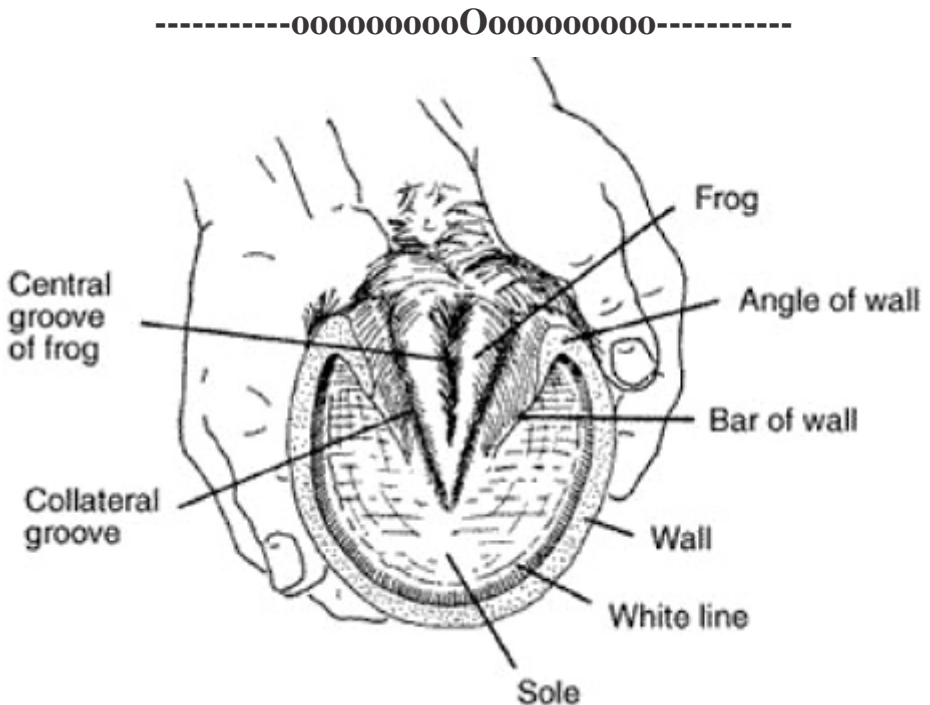
Take-Home Message

The hoof is remarkably resilient. “Some farriers think that once a frog becomes small and narrow, that's the end of it, but that's not true. The frog continues to grow and is a living, dynamic structure,” says Bowker. “Even an unhealthy frog can recover, but it may take some time, depending on the age of the horse and what he's doing. The tissue inside the foot is designed to adapt and respond to whatever environment it lives in.”

The key is doing your part as an owner by understanding what makes a healthy frog and caring for your horse's feet accordingly between farrier visits every four to six weeks.

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The wall, bars and frog are the weight-bearing structures of the foot