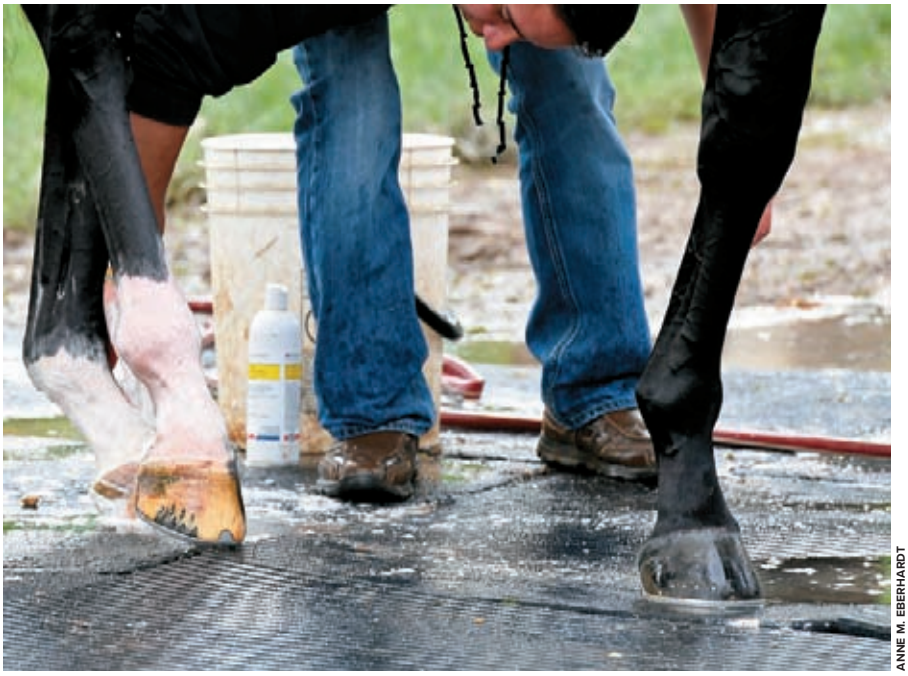
Hoof Cracks: Prevention and Treatment

BY HEATHER SMITH THOMAS



ANNE M. EBERHARDT

Constant wet/dry situations can lead to hoof cracks

THERE ARE SEVERAL TYPES OF HOOF CRACKS, and some are more serious. Splits often start at the ground surface. Quarter cracks are located in the rear third of the hoof and can be either proximal (along the side) or distal (more toward the rear).

Some cracks start from a weakness at the top of the hoof from disrupted growth at the coronary band and travel downward. A horizontal crack/slit in the hoof wall is created by injury (a blow to the foot) or sometimes after an abscess found an exit at the coronary band that created a weakness and subsequent cracking.

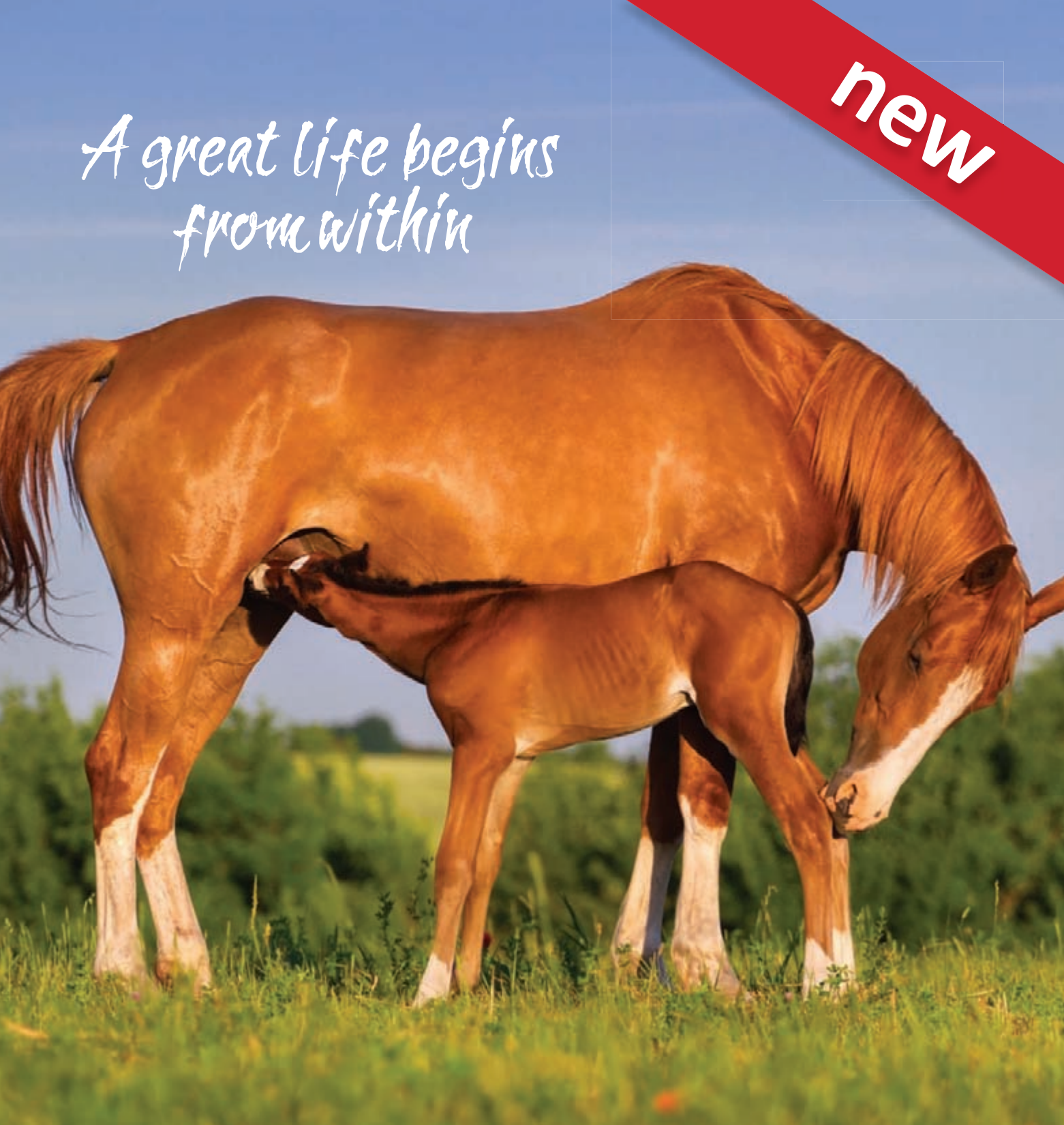
Treatment for a hoof crack depends on the location, and how long it has been there and how extensive it is, and whether it goes into sensitive tissue.

Dean Moshier, a farrier in Delaware, Ohio, who does a lot of therapeutic shoeing, says horsemen often wonder when they should call their farrier about hoof cracks that show up between farrier visits.

"My answer is that they should call the farrier if the horse is lame from a result of the crack," he said.

Steve Norman, a Kentucky farrier who shoes mainly Thoroughbreds, says the term sand crack refers to a superficial crack that's not completely into the white line and sensitive tissues.

"Some of the deeper ones might start out as a sand crack and progress into a more serious situation," he said.



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"Most of the cracks we see out on the farm are not going to cause lameness," said Moshier. "Most are just weather cracks, where the surface of the hoof wall looks rough and layered like shingles on a roof."

These are superficial cracks in the external layer of the wall, like chapped hands, similar to when your skin cracks after it's been wet and dry, wet and dry.

Tommy Boudreau, a farrier in Mineral Wells, Texas, says the first thing he thinks of when a horse develops hoof cracks is dry feet.

"Horses that come here from desert regions in Arizona and New Mexico often have quarter cracks just from their feet being extremely dry for a long time," he said.

"Another common cause of cracks is old scars," Moshier said. "The coronary band has been injured at some point. There is a weakened area of the foot (like a fault line) where the hoof horn doesn't grow quite as strong below that scar in the coronary band. Sometimes this is a single line down the hoof, and sometimes a striated line with layers. Those are full wall cracks but generally don't cause lameness."

"A blow to the coronary band causes a bruise and damages the tissues," Boudreau explained.

If there is enough damage to compromise horn-growing cells at the coronary band, there may be some weakness in the horn at that area, which can turn into a crack.

"If there's not enough blood supply in the damaged area, this can cause a quarter crack," Boudreau said. "If the horse overreaches and hits the coronary band, it is usually somewhere in the area between the region of the heel nail and the buttress—the back part of the foot."

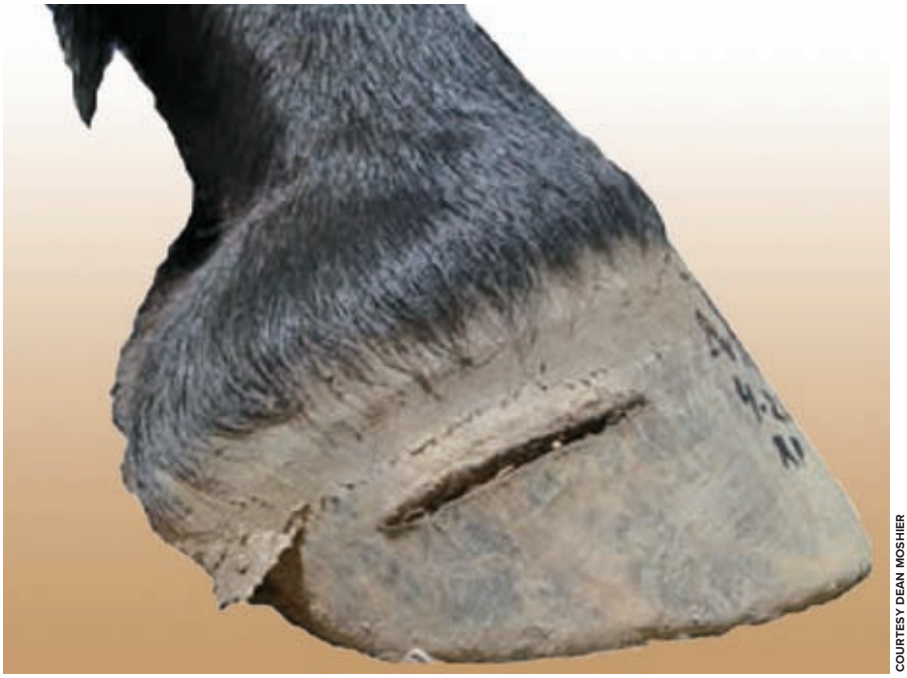
Moshier says most cracks are vertical.

"Horizontal cracks are usually the result of an injury or a gravel abscess that blew out at the coronary band," he said.

This can create a deficit in the hoof wall that creates a horizontal crack as the horn grows down.

"A horizontal crack can also be due to an abnormal stress," he continued. "Horizontal cracks are usually not lameness related, even though the initial cause of that crack could have been a lameness-causing abscess or foot injury. The crack itself is nothing to worry about as it grows down. It will eventually grow out."

A farrier may have to smooth it up as



COURTESY DEAN MOSHIER

Horizontal cracks can be due to abnormal stress

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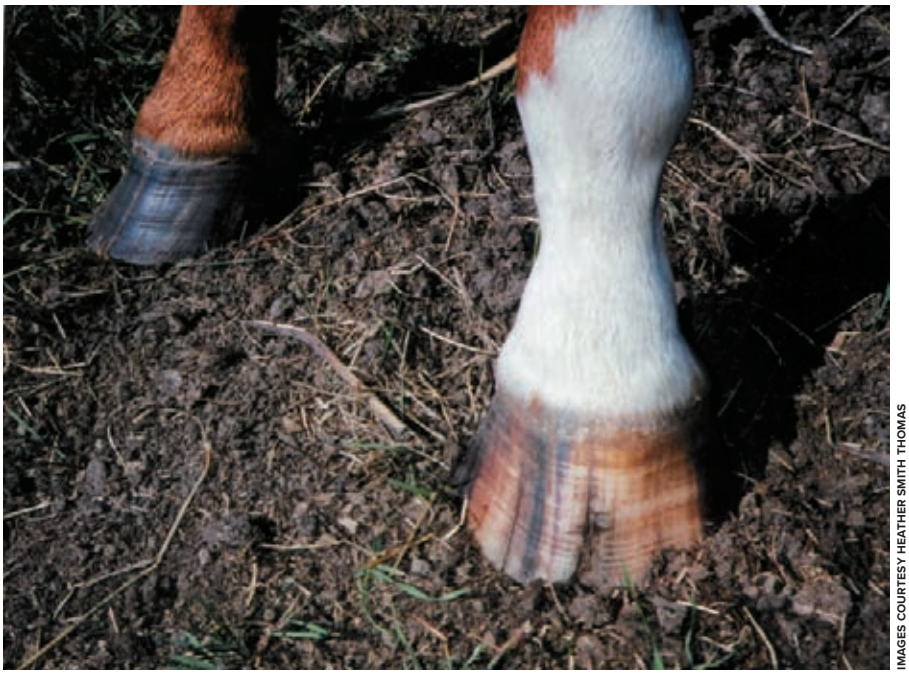

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One of the causes of cracked feet is nutritional imbalance

it gets toward the ground (removing the hoof below the crack), on the weight-bearing surface of the hoof wall.

"Sometimes at that point I take out the unattached wall below the crack," Moshier said. "I'm getting more of my owners and trainers to take pictures of the feet with their phone, and they can send a photo to me if there is anything they wonder about."

Another type of crack is a toe crack caused by the way the coffin bone inside the foot is shaped.

"The laminae (interface between coffin bone and exterior wall) have to follow the surface of the coffin bone," said Moshier. "Every coffin bone has a dorsal notch (at the front) so there is a slight fold in the laminae at the toe. Some notches are larger than others, so this fold is bigger, and sometimes results in a chronic toe crack. But those are the most stable cracks I've ever seen. They don't go anywhere and don't cause problems.

"I have seen horses with beautiful feet, with chronic toe cracks, and have had arguments with clients about these. One owner was convinced that if I shod the horse I would get rid of the toe cracks. I told her that shoeing would not get rid of those toe cracks because the crack was emanating from the way the foot was made. It was a very fine crack that never opened up and would never be a problem."

Heather O'Brien, a farrier in British Columbia, says that in rare instances severe cracks may be the result of a genetic defect passed from parent to foal.

> "It takes time to feed the foot and grow out a better hoof wall and see a difference."
>
> —HEATHER O'BRIEN

"This appears on just one foot and mainly affects the toe. It results in a full thickness crack that goes from top to bottom and usually shows up when the horse is about 2 years old," she said.

"Those cracks never go away," O'Brien continued. "If the farrier can properly balance the foot and the horse is kept shod, you can sometimes get it to grow out, but there is always a thin seam that remains as a reminder to keep the feet short and in proper balance or the crack will return. Rarely is there any lameness associated with these cracks, and stabilizing the foot with proper shoeing keeps these horses working."

Other causes of cracks can be nutritional, if diet is deficient in important vitamins and trace minerals necessary for healthy skin and hoof horn. There are some hoof supplement products that may help.

"Nutritional imbalances that weaken the wall (and allow cracks to develop over time) may need an equine nutritionist or veterinarian to help determine what is needed," said O'Brien.

There can be nutritional components, and also genetic factors, when it comes to strength/health of the hoof wall.

"Some horses simply have poor feet and will always have poor feet," Moshier said. "Some may benefit a little more from a hoof supplement. It takes time to feed the foot and grow out a better hoof wall and see a difference, however. Even though, as farriers, we may not be perceiving a change in the foot, maybe it will help keep the foot from expanding/squashing so much in the barefoot horse."

The supplement might aid the strength/integrity of the hoof wall enough that it won't start to crack due to the hoof wall stretching and flaring.

Environment is another important factor in hoof health and cracking. A continual change from wet to dry to wet causes problems.

"It's not just a horse constantly standing in mud, or a horse that lives in a dry desert environment," Moshier said. "The biggest problems occur when horses are always alternating, such as going from a stall bedded in kiln-dried shavings to turnout in the muck (or a wet, dewy pasture in the mornings)."

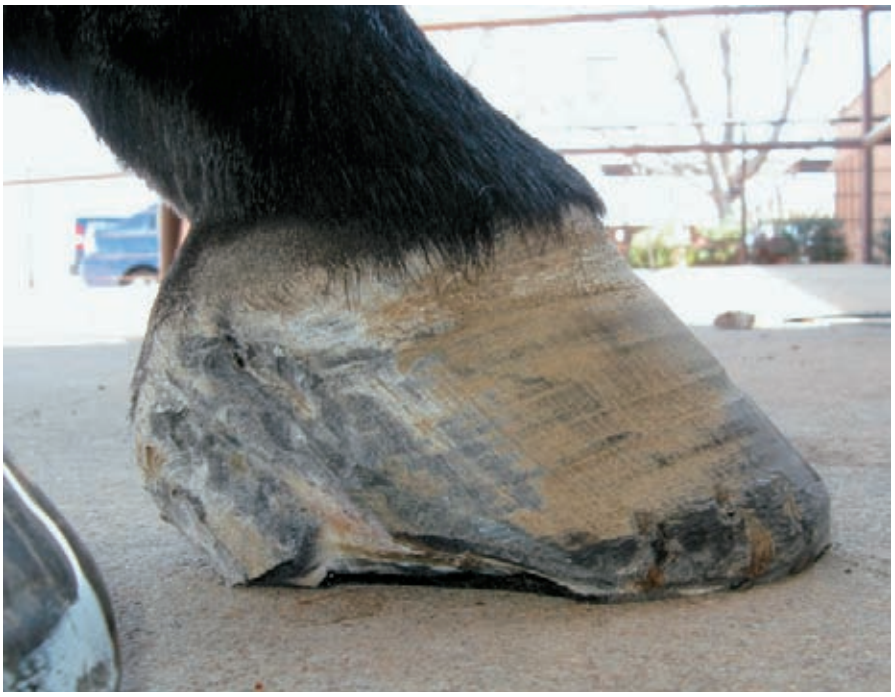
The wet/dry, wet/dry disrupts the protective outer layer of the hoof and can lead to cracks, just like your hands chap and crack if they are continually in and out of water or going from moist to dry

air. Frequent bathing after a workout can also be a problem, causing feet to be alternately wet and dry.

Other causes of cracked feet include inappropriate trimming intervals, going too long between trims. O'Brien says hoof imbalance and overgrowth are common causes.

"When horses are turned out on grassy pastures, their feet often grow quickly (due to good nutrition in the green grass), and there is nothing abrasive in their environment to wear the hooves as they grow," she said. "This can also happen to shod horses, if they go too long between shoeing intervals and their hooves overgrow the shoes.

"When the hoof wall gets too long, it will bend, then crack. Debris from the environment can become imbedded in the crack, especially if the horse is barefoot, causing abscesses and even white-



Going too long between trims is a cause of cracked feet

line disease. More frequent trimming is needed (every four to six weeks) to keep the feet from being damaged by overgrowth."

Flares can easily cause cracks, and flares may develop when feet are neglected.

"Imbalanced feet can be an issue, but generally the flares are due to neglect, or a farrier's failure to remove the flares when trimming/shoeing," Moshier said.

If the farrier simply fits the shoe to the foot, without first balancing the feet and removing the flares, they simply get worse.

Flares can be conformation-related.

"Some problems tend to be chronic, due to the way the horse lands and loads the foot," said Moshier. "And this will be farrier-related, in terms of how frequently the farrier gets to work on the horse. If this type of foot is neglected it will have more problems."

"An overweight horse, with more stress and force on the feet, along with faulty conformation, can have problems," Norman said. "In Kentucky, when broodmares get heavy in foal their feet splay out and start cracking. The average mare here gets trimmed every 30 to 40 days, but these barefoot mares still get cracks because of extra body weight and conformation; when they get heavy in foal, it catches up with them. If you shoe them, you can support the foot and hope the shoe will be strong enough to help get rid of the cracks, but I've seen a lot of broodmares with cracks that never go away. You can keep them sound with a shoe and they are not lame, but they still have cracks.

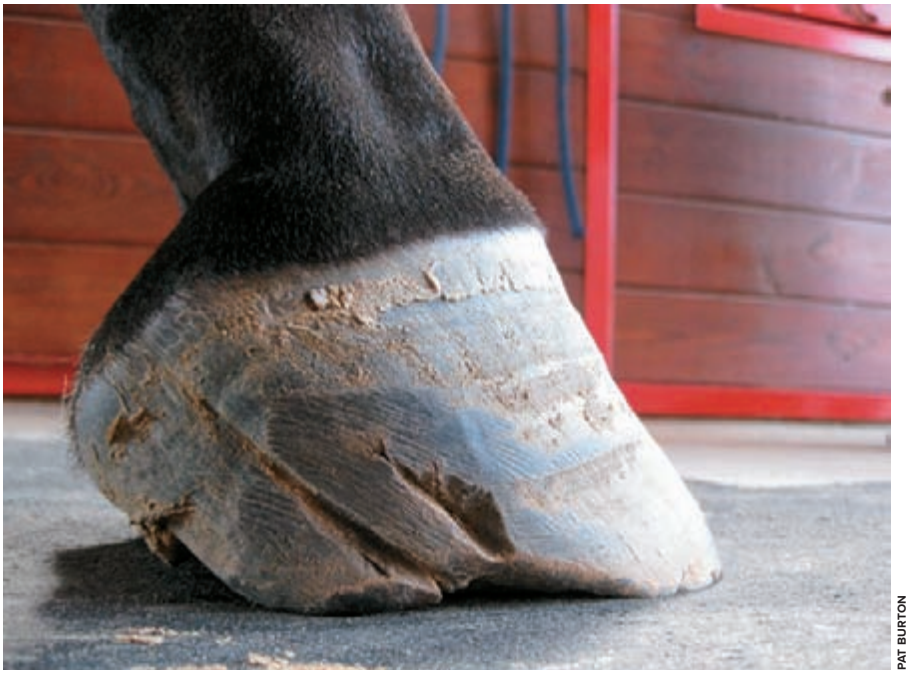
> "Probably the worst evil is the incorrect shoe. Many people remove a lot of hoof wall when trimming, and excessive rasping of the wall thins it out."
>
> —STEVE NORMAN

"Other causes are excessive work (too much concussion and stress on feet), dry ground, and unbalanced feet," he continued. "If there is uneven distribution of weight, this causes a force that could lead to cracking. A person needs to distinguish between an accidental cause and conformational cause. The average horse toes out, and most of the weight is on the medial quarter. Thoroughbreds in general are started at a young age, before their feet and legs are mature. Overall immaturity leads to a lot of cracks in young racehorses. The inner structures and hoof wall are not yet as strong as an adult foot's. Any blow or concussion may cause trouble, especially on a toed-out horse."

Contracted heels can be another factor.

"There may be more concussion and inflammation that causes heat," Norman said. "The wall and horn become dry and brittle, and the improper distribution of weight causes cracks.

"Probably the worst evil is the incorrect shoe. Many people remove a lot of hoof wall when trimming, and excessive rasping of the wall thins it out. Sometimes farriers put on a shoe that's too wide in the toe area where they haven't taken enough toe off, and this creates a force that could possibly break down the wall. Nails too large for the foot may start breaking out the wall. Many use toe clips, and the way a toe clip is seated into the foot can create a crack."



PAT BURTON

Foot imbalance must be addressed to resolve a crack

TREATMENT

Most cracks that are just starting are readily resolved with more frequent trimming and a shoe, if necessary, to protect the foot and take the stress away from that area of the hoof wall—to enable the crack to grow out. Norman says it is crucial to unload that part of the foot and get rid of the forces in that area.

"You can do this by trimming, or with a shoe, after you balance the foot with whatever conformation you have to work with," he said. "If the crack is not detrimental, you can just concave the trim and unload that area. Sometimes a four-point trim on a barefoot horse can be beneficial, or you can just trim away the toe area if a crack is starting there. You can manipulate the pillars of the foot to unload the forces in certain areas on the

barefoot trim. You can also do that with a shoe, putting the weight-bearing surface where you want it, and leave the weight off another part."

"Trauma to the hoof, such as an abscess, or scars that leave a permanent defect in the growth center at the coronet band, seldom require more than good regular trimming and in some cases a properly fitted shoe," O'Brien said.

If the coronary band is compromised, Boudreau suggests applying a good hoof dressing to keep the coronary band as supple as you can.

"Then, hopefully, the crack won't get too bad," he said. "When horses come here from the dry desert, I try to keep plenty of hoof dressing on the coronary band, applying it twice a week, to get those cracks (the ones that originate at the coronary band) to grow out."

With a more serious crack that is deep or unstable, the farrier may have to address it with trimming or in some cases special shoeing.

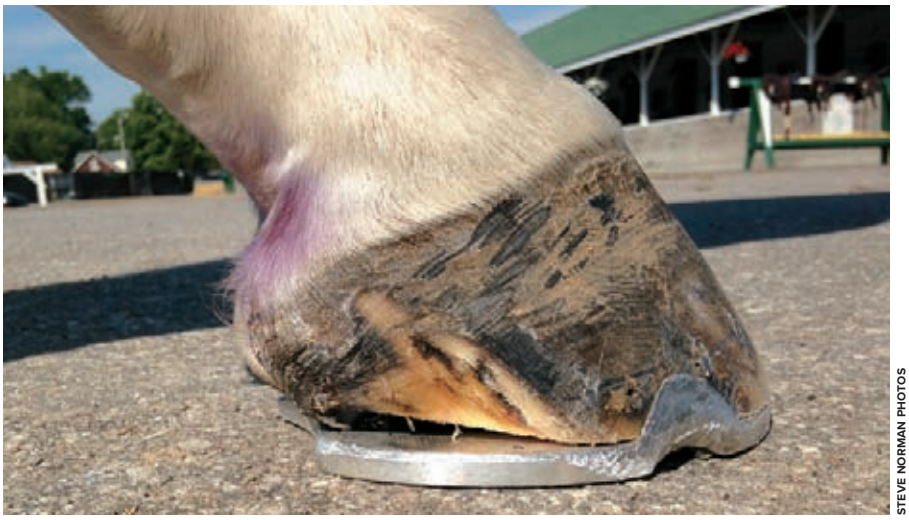
"If there is a lot of movement in the crack, we might have to lace it together," Moshier said.

"This can be done by putting horseshoe nails across the crack to hold it together, or lace with stainless steel threads," he said. "Quarter cracks are usually done with stainless steel thread if they need laced, but a toe crack can often be laced with just a horseshoe nail. Some severe cracks can be stabilized with polyurethane—gluing it to keep the edges stable so they won't be moving as the crack grows out."

Several products can be used to fill a crack. Some are acrylic, and some are polyurethane.

"It depends on the crack, but in most cases I use a polyurethane," explained Moshier. "If it's something I want to reinforce with fiberglass, I might use an acrylic. We want to make sure we keep these materials away from the coronary band.

"We will also shoe the horse, and in most cases put clips on the shoe—on each side of the crack—to help prevent movement. It depends on the case. With



STEVE NORMAN PHOTOS

Hoof crack repair

some kinds of toe cracks, we don't need clips because that's not the motion we are trying to prevent. With that type of crack we don't need to keep the foot from spreading out on each side of the crack. This kind of toe crack has a tendency to roll inward when the horse puts weight on that foot. When putting the polyurethane or acrylic in, it is important to do it with the foot unloaded, with the crack at its widest. While people tend to think we need to stabilize that crack by keeping it together, many types of crack repairs involve keeping the edges of the crack apart, so they don't roll inward. You can see a rounded edge that develops because the crack is rolling inward, from an inward force instead of an outward force. Clips, in this case, won't do much good."

Many things need to be taken into consideration when trying to resolve a crack.

"Some farriers and horsemen use the edge of a file and rasp across the top of a crack," Moshier said. "This is an old practice that theoretically halts upward progress of the crack, but it doesn't work. In order to stop a crack, you must go all the way through the wall, and you don't want to rasp that deeply or you've created another crack and seriously weakened the hoof wall. You have now invited the crack to go east and west.

"Foot imbalance must be addressed to resolve a crack, but there are some other things to try to halt the top of a crack," he said. "With a full wall crack we can burn a round hole at the top, using a pritchel, turning it as it burns the hole. This must be a full wall thickness hole, and causes a cul-de-sac effect. As stress travels up the crack, it can't continue in any single direction so the stress travels back down."

A small, smooth, round hole/circle is much more effective than a rasped line across the top. But at the same time the cause of the crack must be addressed, or burning the top of it will be of no value. The cause might be a flare, a too-long foot, hoof imbalance, or some other pressure-causing situation that has to be resolved.

Lameness is caused by a full-wall crack.

"It might occur right away or might be a worsening crack that is not addressed early on, and then becomes infected when it gets into sensitive tissue," Moshier said.

"For a small crack I might use a rasp to put a little V-notch in the bottom at the ground surface. This is just to keep any debris from collecting in there; any dirt and debris will fall back out instead of getting caught in the crack and forced up in there. If there is any white line stretching, I want to make sure there is no debris or rocks wedged in there.

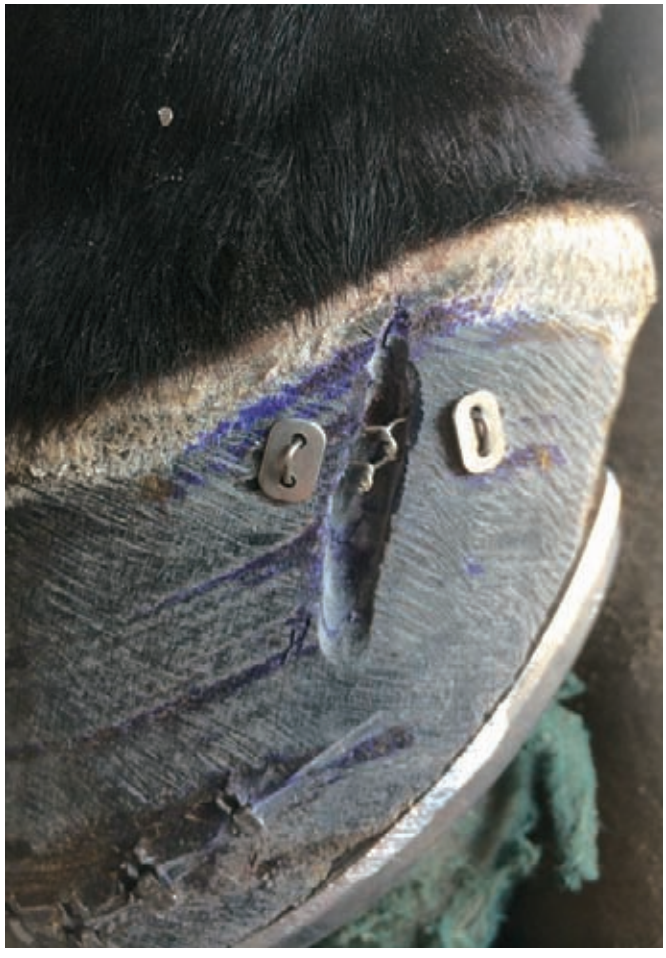
"For a deep crack, I pack it with a small piece of chair foam and treat the foam with a thrush product," he said. "This stops any foreign matter from getting in there and continuing to wedge the crack upward, while at the same time treating the bacteria and fungi that are weakening the wall. I have treated many cracks successfully, using this technique."

QUARTER CRACKS

Quarter cracks can be serious issues. Moshier says a common cause of a quarter crack is hoof imbalance where one heel bulb is higher than the other (sheared heels).

"This combined with heavy work leads to shearing of the internal laminae at the quarter until it 'blows,' " he said.

"Distal quarter cracks originate at the ground surface on the side of the hoof, usually about the middle of the quarter," O'Brien said. "They are usually on the flared side of the foot of horses with either base-narrow or toed-out conformation. Balancing these feet to the horse's conformation and the temporary use of frog support such as a heart bar shoe, will allow the distal quarter crack to grow out. Maintaining proper hoof balance will prevent flaring, keeping these cracks from returning.



Sample of a hoof crack laced together

"Proximal quarter cracks begin at the coronet band, the top of the hoof wall."

Often causing lameness, they can be challenging to fix.

"The farrier and veterinarian need to work together with the cooperation of the horse owner to find the cause and solution for these cases," O'Brien said.

"Proximal quarter cracks are found in the rear third of the hoof wall, at or near the point where the laminae go from boney attachment to P3 (coffin bone), to the soft tissue attachment in the heel region, following the angle of the horn tubules in that region. These horses are usually toed-out, base-wide, or base-narrow, which contributes to unequal loading—creating shearing forces on their hoof wall and lamina that cause the proximal quarter crack," she explained.

"Radiographs often show the mediolateral orientation of the coffin bone to the ground is in opposition to the mediolateral orientation of the hoof wall. Many farriers and veterinarians have successfully treated this type of quarter crack by patching and/or stitching the crack. Using heart bar shoes transfers the load off the affected heel. In some cases, frequent barefoot trimming has been effective," O'Brien said.

"The one thing consistent in all successful recoveries from a proximal quarter crack is the proper balancing of the foot to the horse's conformation. Without this, the quarter crack will keep returning until proper balance is restored."

Boudreau said: "Make sure the feet are landing level. You don't want any extra pressure on any one part of the hoof wall. When the hoof is out of balance, it creates too much pressure on one side of the capsule. This will push into the coronary band and cause it to jam up. With all the extra pressure in one spot on that side of the foot, it can make it break out and crack.

"On many of these, I often use a heart bar shoe that has a tongue that rests against the frog, to help take the pressure and weight," he explained. "It supports a good portion of the weight that would normally be on the heels. Before I tack on the shoe, I make a notch or trim off a little bit of hoof wall in that area, so it doesn't touch the shoe—from the quarter crack back to the heel of the shoe. I don't want the hoof wall in that area to be taking any weight.

"That will give the quarter crack a better chance to grow out and heal because you are taking away all the pressure that might keep spreading it," he said. "You can take that treatment a step further in severe cases, lacing the quarter crack together with a small stainless steel wire. You can then put acrylic over the top of that, to stabilize the crack. Then there will be no movement and it can grow out.

"When I apply a patch like that, I run it up within a half inch of the coronary band," Boudreau said. "If you apply the patch properly, you can keep trimming the patch just like the hoof wall as it grows down. If everything works the way it is supposed to, it will grow right on off and then you'll have a strong, healthy foot again."

Boudreau also uses pour-in pad material on some feet.

"I use the kind that has copper sulfate in it," he said. "A horse with a quarter crack can be shod with the heart bar shoe, and then I use duct tape to block off the area where I've trimmed out the hoof wall, so the pour-in material can't get in under the shoe. Then I fill the sole up with pour-in pad material and it gives the foot and sole more support and stability so there's no pressure on the quarter crack, and it can grow on out." BH

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>
> —HEATHER O'BRIEN

Heather Smith Thomas is a freelance writer living in Idaho.