

Tackling Hoof Cracks

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A half-dozen American Farriers Journal Editorial Advisory Board members share their many years of experience in dealing with hoof cracks

Hoof cracks can occur anywhere on the hoof wall and are caused by improper mechanics, environmental extremes or pathology concerns that lead to hoof deformities that result in failure. Named for where they appear on the hoof wall, they include quarter cracks, heel cracks, bar cracks and toe cracks.

Randy Luikart says some cracks are chronic in nature while others end up being short-lived. The farrier from Ashland, Ohio, finds a significant difference between cracks that start at the bottom and work their way up the hoof compared with other cracks that start and work their way down from the top of the hoof.

Some cracks actually occur only in the stratum externum of the hoof wall, while other cracks sometimes tend to go completely through the wall and involve live tissue.

Know Crack Causes

Amy Rucker treats most hoof cracks without using laces or stabilization of the hoof capsule by concentrating on the forces that led to the crack. The Columbia, Mo., equine veterinarian evaluates the conformation of the horse (angular limb deformities, rotational limb deformities, club or long/low heel will have quarter crack in the low foot, not the club), the environment, nutrition, how the horse is used, the timetable for work or competition, breakover and owner compliance.

She wants to determine where the load is at landing and where the load is during the weight-bearing phase. Radiographs help her evaluate the shape of the P3, P2 and P1, joint spaces, digital breakover, sole depth, palmar angle and horn-lamellar distance.

“To treat the crack, I try to reduce the load/forces that are causing it, accelerate foot growth and establish soundness,” she says. “Once the foot gains mass and the crack grows out, I’ll come up with a maintenance shoe. The conformation and work conditions don’t change, so you must figure out how to keep the horse sound and prevent future cracks.”

Advisory Board Sources

For this article, we asked American Farriers Journal Editorial Advisory Board members for their thoughts on dealing with various types of hoof cracks. The contributors included:

Travis Burns, chief of farrier services at the Virginia-Maryland Regional College of Veterinary Medicine in Blacksburg, Va.

Randy Luikart, a farrier from Ashland, Ohio, who came up with the following series of questions dealing with hoof cracks that were answered by three other AFJ Editorial Advisory Board members.

Steve O'Grady, a farrier and equine vet from Marshall, Va.

Amy Rucker, an equine vet in Columbia, Mo.

Bob Smith, owner of the Pacific Coast Horseshoeing School at Plymouth, Calif.

Steve Stanley, a Standardbred track shoer in Versailles, Ky.

Dealing With Hoof Cracks

Q: What are the mechanical differences between a crack that starts at the bottom of the hoof, one that starts at the top and one that runs from top to bottom?

Smith: Cracks that start at the ground surface and move toward the coronary band can be caused by a horse remaining barefoot along with environmental stresses that create cracks that migrate to the coronary band. Nails placed in the wall rather than the white line can also create cracks that move upward from the ground surface.

A damaged coronary band with scar tissue or a hoof with poor integrity can cause cracks that originate at the coronary band and move downward.

These cracks can be maintained, but can't be eliminated. Cracks that begin at the coronary band and move downward may be due to unequal weight bearing, which may result in a conformation defect, poor foot preparation or not shoeing for the defect.

Burns: A crack starting at the bottom is likely secondary to white line disease (WLD). A crack beginning at the top is likely secondary to some type of mechanical failure.

Stanley: Nearly 90% of quarter cracks in performance horses are related to hoof balance while 10% are a result of an injury from a pathological incident that compromised the hoof wall. Many stress-related cracks start at the distal and caudal border of the laminar attachment between the hoof wall and coffin bone. Horses without enough caudal support often show remodeling of the coronet band where the hoof wall is sinking.

Quarter cracks that begin along this line of hoof wall tubules often follow the crack up that line to the coronet and may point to where the sinking

began. These unsupported hooves appear to be falling off the bone. I assume this happens where the less



Steve Stanley

moveable hoof wall that has the support of laminar attachment meets the more moveable “floating” area in the heels. Shear forces can occur when this happens and my theory is that this is where many cracks begin.

They usually migrate up the hoof wall proximately toward the coronet band and become increasingly troublesome. They may also migrate distally, but that kind of situation is much easier to deal with.

Cracks that start at the top and go down are often called “sand cracks.” They are very superficial and not normally a problem in terms of lameness and treatment. Most cracks that start from the bottom are in the toe and begin as a result of WLD.

Q: Can these cracks be initiated environmentally, pathologically or mechanically?

Stanley: We used to believe hard feet due to the environment caused quarter cracks, but I don’t agree with that any longer. Hooves that are too soft are more susceptible to hoof distortion, yet these cracks are still mechanically induced, given the stresses imposed upon the soft distorted hoof.

If you believe the environment causes the pathological problems, then I’d say yes to all three reasons.

Q: Should farriers be in charge of pain management with hoof cracks?

Burns: Absolutely not, as that’s a veterinarian’s responsibility.

Smith: Only to the degree that the trim, shoe or other appliance reduces pain.

Stanley: Not from a chemical sense.

Toe Cracks

Q: When toe cracks start at the bottom of the hoof and work their way up, what mechanics, pathology or environment are involved?

Burns: Mechanical, environmental and genetic issues can predispose the horse to WLD. Mechanical factors include placing less stress and strain on the dorsal hoof wall from too long or very upright feet. Environmental factors include dirty or wet conditions. Genetic concerns include horses with an extremely upright foot, long toe/low heel conformation or susceptibility to WLD.

Stanley: Toe cracks that start at the bottom are nearly always a result of WLD. When the dorsal wall becomes too thick, the distortion accelerates as the lever inhibiting breakover becomes longer and the hoof is distorted forward from the point of the frog.

As the dorsal wall is distorted, it will widen or stretch the white line, which is more vulnerable to the

WLD bacteria. The disease separates the white line from the hoof wall, weakening the dorsal wall.

With no support behind it, a crack will start at the bottom and follow the disease proximally up the hoof wall. Trying to lace, patch, burn or bridge that crack before taking care of the WLD is futile. I've seldom seen these cracks cause lameness in racehorses unless it is very advanced.

Wet areas, dirty stalls and soft hooves are friends of bacteria and distortion. Plus, constantly standing in urine weakens the hoof walls.

Smith: Barefoot horses kept on hard or rocky terrain often have toe cracks that start at the bottom of the hoof. A failure to effectively round the hoof's ground surface will increase the probability of a toe crack.

Q: What type of clinical differences may be present with these variations?

Stanley: Toe cracks that start at the bottom are not normally debilitating to a racehorse. Quarter cracks in the upper third of the hoof are apt to cause bleeding and/or lameness.

Q: If pathologies were present, how would you deal with this type of situation?

Stanley: Debride the affected hoof horn and treat any existing pathologies before trying to repair the crack. With toe cracks and WLD, debriding alone is often enough if you have exposed all of the diseased area to the air. Enough hoof wall often remains that a patch isn't necessary. If it needs to be patched, make sure that you first take care of the WLD.

Q: Let's say you're presented with a toe crack that goes from top to bottom and is associated with a flat area on the wall so the toe crack appears bent inward toward the lamina. What would you do?

Smith: Debride the crack and check for infection. If there's no infection, stabilize the crack with polyurethane or acrylic hoof repair



Bob Smith



A typical quarter crack originating at the coronary band, indicating how the coronet is displaced proximally at the crack.



Made of four layers of polyester vectran cloth impregnated with polymethyl-methacrylate, this patch extends the length of the hoof and 2 inches to either side of the crack.

material. Fill the crack while the foot is non-weight bearing.

Stanley: Whether you use a rolled toe, square toe or rocker toe, ease the moment of breakover as much as you can without affecting performance.

Burns: Here is what I'd do:

- Trim the foot normally.
- Align the dorsal hoof wall with the dorsal surface of the distal phalanx.
- Debride the crack to healthy margins.
- Apply a shoe to limit stress and strain on the dorsal laminar interface with a rocker toe, rolled toe or a setback shoe.
- Incorporate load-sharing principles with the sole and frog by using Equi-Pak, a frog pad, impression material, a heel plate, a heart bar shoe, etc. Spread the load and limit distal displacement of the hoof capsule when under load.
- Stabilize the crack or hoof wall fracture. I'd use several layers of polymeric fabric saturated with polymethyl-methacrylate.

Q: Would you approach this crack differently if the horse wasn't lame?

Burns and Smith: No.

Stanley: If I'm shoeing a horse that has a little toe crack and a big race coming up, I don't make changes.

Q: If you were presented with a horse that is not lame, but has a toe crack that starts at the bottom of the foot and goes up, along with a flared hoof wall on both sides and spreading out at the toe, what would your approach be?

Smith: Shoe with clips, reduce the flare, debride and patch the crack.

Stanley: Address the distortion that started the problem. Clean up the WLD that allowed the hoof wall to crack.

Q: If you are presented with a grade 4 clubfoot and there's a toe crack at the coronary band extending distally about an inch, what would your approach be?

Smith: On a grade 4 clubfoot, the coffin bone has been absorbed



Travis Burns



Resulting from poor conformation, a sheared heel often occurs in the development of a quarter crack.

Thoughts On Dealing With Hoof Cracks

By Stephen E. O'Grady, DVM, MRCVS

Hoof wall defects, especially full thickness quarter cracks or toe cracks, are a common cause of decreased athletic performance in competition horses and frequently lead to foot lameness. Various materials and techniques exist for stabilizing and repairing hoof cracks, but none will be successful in the long term unless the cause of the hoof wall defect is determined and addressed through basic farriery.

We know that continuous, repetitive overload or stress on a given section of the foot over time will lead to damage or disease. Furthermore, these disproportionate forces will change the conformation of the hoof capsule and lead to a distortion. Full thickness hoof wall defects are not generally seen in horses with good feet or in barefoot horses.

A full thickness quarter crack is always associated with a sheared heel conformation where there is excessive load placed on one heel-quarter or heel relative to the other side of the foot. A full thickness toe crack that originates at the coronet is usually associated with a long toe-low heel conformation where there is an excessive bending force on the toe or an upright or clubfoot where there is excessive load on the dorsal part of the foot.

By addressing the hoof capsule distortion, farriers will redistribute the load on the solar surface of the foot and thus change the forces on the section of the foot having the defect. When a horse is presented with a full thickness hoof crack, my preference is to advise the client to take the horse out of competition for a month if possible.

With hoof capsule distortion, I don't stabilize or repair the crack. At 4 or 5 weeks, there should be 1/4 to 3/8 inches or more of new solid growth at the coronet above the defect, which indicates the farrier work is successful. I will then repair the crack or just let it grow out, depending on the circumstances.

If the horse has to continue to compete, I do the farriery work and wait 24 hours to stabilize the crack. This allows the coronet to settle into a more suitable position before the repair.



Freshly shod foot showing the displaced coronet (red line) and the ground surface of the shoe (yellow arrow).



Note overload at coronet (red circle) and bending of the dorsal hoof wall.

beyond help and the toe crack would be of no importance.

Stanley: Clubfeet are distorted for more reasons than just a thickened dorsal wall. Grade 4 is a very abnormal hoof and I would carefully ease the heels down to try and engage the frog, which may require packing or a pour-in material.

Avoid trimming off as much heel as you think you can. From a lateral view standpoint, place breakover behind the point where the forward distortion begins.

Q: What secondary problems might occur with different types of toe cracks?

Burns: Scar tissue formation may result in weak or abnormal hoof wall growth, abscesses or exacerbated WLD under the patch from inadequate debridement.

Smith: There's always the possibility of infection leading to serious lameness issues.

Stanley: If the flared, spread-out hoof is not put back into shape, the crack can keep going to the hairline. If the clubfoot is not managed properly, P3 can degenerate and WLD can cause a loss of massive amounts of hoof wall.

Q: What instructions would you leave for the owner or trainer?

Smith: With an infected crack, a veterinarian needs to be involved. Stabilize the crack with a drain line for flushing and handling whatever medication the veterinarian prescribes.

Stanley: The owner or trainer needs to know the circumstances that led to this crack so they can be eliminated. Make it clear that whoever is in charge of the horse is just as important as the farrier and vet.

Burns: If the crack is left open and not patched, the owner, trainer, groom or rider must regularly clean the crack bed and apply topical treatments to eradicate the WLD microbes that could not be debrided to provide a clean and dry environment. If they don't do an adequate job, the WLD and crack will continue.