NEGATIVE PALMAR ANGLE SYNDROME

BY ANDREA E. FLOYD, D.V.M.

YOUR HORSE is training well, but you notice that his heels are starting to thin-ner, and they look like they are col-lapsing. Soon, his foot looks longer, and he may be off his game. His tendons may be getting puffy, and his ankles are starting to fill. He may be developing quarter cracks and heel fractures.

You are icing him and trying to keep him in training, but he is sore. Although he looks good in every other way, you start injecting his joints, which helps, but he just is not coming back to where he was. As the condition worsens, osteo-phyltes, or bone chips, may become apparent in the coffin, pastern, or fetlock joints. Superficial and deep flexor tendinitis may occur with navicular bruising and adhesions.

Sound familiar?

What you see happening to his feet on the outside is just the tip of the iceberg. What is happening to his feet on the inside is the bigger problem. You are doing everything you can to keep your horse in top shape, but this aspect of his care has gone untreated. Why? Because, until now, we have not had a good way to explain and treat negative palmar angle syndrome (NPAS). NPAS has been associated with a number of factors:

- Research has shown that Thoroughbreds lose hoof-wall angle as they start galloping;
- Foals born and raised in sandy, humid soil conditions also have been observed not to develop good heels;
- Surgery called deep flexor tenotomy can produce NPAS; and
- A genetic predisposition for NPAS may exist.

Farriers have to fight to keep good feet on the Thoroughbred right from the start. So what can you do to help? Request good, soft-tissue lateral radiographs of your horse’s feet. Your veterinarian probably is using a digital X-ray machine now, and with this machine you will be able to see all the tissues of the foot.

Essential measurements

There are some basics you need to know and questions to ask when...

For further information on NPAS, read the November 2010 article for veterinarians and farriers in the Journal of Equine Veterinary Science. Further information on NPAS also will be available at www.serenityequine.com.

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observing the radiographs with your veterinarian. What does normal look like? What does a negative palmar angle look like? What does an increased palmar angle look like?

The palmar angle is measured along the bottom of the third phalanx (also called P3 or the coffin bone) inside the foot and the ground surface or standing surface of the hoof. This angle is a lot easier to read when your horse is standing on hoof blocks that have a wire in the center outlining the standing surface of the block. A normal palmar angle is a positive palmar angle of 3° to 5°. An abnormal positive palmar angle exceeds that measurement and is seen in clubfeet and laminitic (foundered) feet.

The focus here is a negative palmar angle, and what you need to avoid. The NPAS feet have more sole under the tip of the coffin bone than under the wings of the coffin bone. (See Figure 1, which shows an example of NPAS in a Thoroughbred, where more sole is under the tip of the coffin bone than under the wings of the coffin bone, and the digital alignment is not a straight line.)

If trimming alone cannot achieve the proper palmar angle, the horse has a higher grade of NPAS and will require specialized shoeing. The digital alignment usually will correct itself with the proper palmar-angle trim. If it does not, a special shoeing will correct the palmar angle and digital alignment.

Figure 3 shows the line, in red, of the correction that is to be made with the rasp on the solar-surface hoof wall or the load-bearing hoof wall. This will increase the digital alignment while making the palmar angle positive. This radiograph was taken of a two-year-old Thoroughbred taken out of training due to sore feet. The feet were corrected and the colt became sound.

It has been observed that it is not necessary to remove sole. In fact, we rarely touch the foot with a hoof knife. We do like to see the bars about a millimeter below the bearing surface of the hoof, though. If there is a little load-bearing on the sole at the white line of the toe, we consider that normal, as that area is called the solar callus and is load-bearing in the feet of wild, unshod horses. However, instead of paring out the sole with a knife, we grind out the shoe so there is no load-bearing on the sole at any point of hoof-wall coverage. All shoes—aluminum, titanium, or steel—can be ground to prevent sole pressure.

If, after trimming the foot to a zero palmar angle or a positive palmar angle, a radiograph reveals that you have not corrected the digital alignment, a full-rocker shoe is used. Full-rocker racing shoes are available on the market today, and they have met with great success. (See Figure 4, which shows the final digital alignment correction on an NPAS foot that has a zero palmar angle. The next shoeing should yield a positive palmar angle.)

It is a wise idea to follow at least the first few trims with radiographs to ensure you have achieved the
correction. This may require synchronizing the farrier and the veterinarian and allotting the time required for the work.

More severe NPAS

There are higher grades of severity in NPAS. The higher grades require a two-plane trim of the solar or load-bearing surface of the foot to achieve a positive palmar angle while allowing for good growth of the heels. Figure 5 shows the trim with the red line indicating the achievement of a positive palmar angle on the dorsal or toe plane.

The green line indicates the removal of the hoof wall of the heels on the palmar or heel plane to a healthy level of heel. The heel plane has been rasped back to the widest point of the frog, thus placing load-bearing back where it belongs.

The two-plane trim is done in front of the quarters and behind the quarters. The shoe is nailed to the toe while suspending the heels in the air. Do not put the foot down until the heel area has been properly filled with a material such as Equipak, which provides a soft platform for the heels to rest on. (See Figure 6.) Healing will occur to the heels over several months’ time, and then they may be allowed to be trimmed and shod normally.

Remember that as the foot elongates and slides forward, away from perfect conformation, the heels will be where the quarters should be and the quarters will be where the toe should be. The actual toe becomes a fulcrum point that tears the sensitive lamina of the toe, elongates the hoof further, and weakens the heels. Having the load-bearing and landing spot of the heels so far forward causes another fulcrum spot that starts heel crushing or heel fractures and quarter cracks.

The horse with NPAS always is going to need proper alignment. If one is aware of those needs and learns how to care for them, the actual trimming and shoeing will become second nature, and it will prevent the deterioration of the condition and prolong the racing athleticism of the horse. You work hard every day to ensure that they are in the best condition possible, and now you have a way to condition the foot as well.

Andrea E. Floyd, D.V.M., is co-author of the textbook Equine Podiatry and founder of Serenity Equine in Evington, Virginia, a veterinary facility that specializes in the equine foot. To read more about her work, visit www.serenityequine.com.