

# COMMENTARY ON RACEHORSE SHOEING

by William Moyer, D.V.M.



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*The following comments are excerpted from Dr. Moyer's presentation to the American Farrier's Association at the 11th Annual Convention in Valley Forge, Pennsylvania in February 1982. Dr. Moyer's comments are printed here to share his views on horseshoeing and the overall state of the horseshoeing industry today. He is on the staff at the New Bolton Center of the University of Pennsylvania's School of Veterinary Medicine's Large Animal Facility.*

## • On hoof-related injuries:

I seldom get to see a normal horse. They don't come to me because they are doing well. I get them when they are on their way down, or in some cases, when they are on their way up but somebody doesn't understand what is going on.

A lot of horses come to us because they aren't performing to expectations. Frankly, the owner paid too much money for the horse, perhaps a quarter of a million dollars. When the owner finds himself putting even more money into the horse, he wants to know what is wrong with the horse.

Race horses are in this category generally. In a survey that was done several years ago, it was found that over 80% of the problem horses seen by equine practitioners had foot problems, either directly or indirectly. That's an incredibly high figure.

The race horse provides the best example of what shoeing does or doesn't do for a horse. A race horse is going to show the change in shoeing quickly. A race horse, particularly a Thoroughbred race horse, is a 1000-pound object carrying something else on its back and capable of going around a track at about forty miles an hour. The average Thoroughbred is operating with between five and seven square inches of surface area on each foot. When you actually compute the distance around the hoof and the depth or width of the material going around it, it's a pretty small figure. When you try to compute how much energy this is in the way of impact absorbed by a seven square inch object, it gets rather fantastic.

The problem with an awful lot of what we see is, of course, that this seven square inches has been altered because of shoeing or because the horse wasn't built correctly in the beginning. To compound that, Thoroughbreds don't seem to have any feet anymore. That, presumably, has been bred out of them, or something has happened, because the inside wall of most of the Thoroughbreds I see is almost nonexistent. You end up with a quarter of an inch at best, and that's about it. In many cases, that inside hoof wall is just straight up and down. How can you get a nail in there without causing a problem? It amazes me. To do something that precise, a veterinarian anesthetizes a horse. You, however, are forced to try to nail in a tiny object on a moving animal.

## • On Thoroughbred yearling sales:

A man pays three-quarters of a million dollars to breed to Northern Dancer. He pays his money and he takes his chances. When and if the foal comes, he already has an investment of \$750,000 in the baby. Do you think that horse will get exercise? No. For that price tag, the foal is going to live in a padded box somewhere and hope that he can stay alive until the time comes for it to go to a yearling sale. With any luck, someone will bid way into the seven figures for the foal. The majority of those animals — in the price range — will never race. Do you know that? And it is because they won't hold up to training. They've had little or no exercise up to the point of training. They're weak, soft animals. And they're certainly not ready for competitive athletics.

As a result of this, the feet on these horses are usually not good. The foot may be abnormal to begin with. The blacksmith is called in to give this horse an artificial support system. There's an under-run heel and too much toe. It's not necessarily the fault of the farrier who has been trimming the horse as a yearling. The horse has been standing out in grass up to its ears. The grass is wet half the time and it is very, very soft. It's the kind of grass that makes the horse sort of bounce along. So there is no wear at all to the bottom of the horse's foot. And the foal has had little exercise. It is not allowed to exercise with any other foals for fear that one might kick the other and put a blemish on it or even injure it. Normal wear is just not a part of this section of the horse industry.

## • On keg shoes for racehorses:

The keg shoe, I think, is one of the horse's leading enemies. You can argue that a lot of horses can wear a keg shoe and continue to wear it forever, and I don't doubt you. The high performance horse, however, has a great deal of difficulty in that situation. The backyard horse could probably wear frisbees and not have problems. Or go without shoes. But the horse that has to run forty miles an hour is a different game.

Look at our own sneaker industry. You can go into any number of sporting goods stores and pick out, just to jog, forty or more types of running shoes. It just depends on what you want and what you need. Not so with horse shoes.

First of all, keg shoes are heavier on the average than a well made hand-



forged shoe. Most keg shoes are too narrow. They require a larger than necessary nail. They seldom, if ever, fit. They are difficult to shape.

#### ● On aluminum racehorse shoes:

You can put a set of aluminum shoes on and they fit well. You run the horse, or train him for a week. Run him on a Saturday and by Monday the inside branch of the lefthand shoe, or the outside branch of the righthand shoe, has moved a quarter of an inch. In many cases, the inside branch of the shoe has moved in under the sole off the wall. The sole of a horse's foot is not designed to take the energy of impact. And you will remember that the horse is running 40 miles an hour. With the shape of racetracks, it's like running on concrete. As a result of the pounding that these horses are subjected to, the aluminum or light steel is quite capable of deforming. You can almost, depending on your strength, bend an aluminum shoe with your hands. Think what a thousand pounds does at 40 miles an hour.

#### ● On shoeing modifications:

The aluminum racing plate is probably one of the most poorly designed pieces of equipment made for horses. Interestingly enough, there is no research to indicate what all the modifications to racing plates actually do. We can only suppose that the addition of a toe grab changes the functional angle of the foot because it raises the toe. And again, you might argue, that that doesn't happen because the toe grabs into the track and therefore makes the shoe flat. That would be true if the horse was going on grass. He is going on a surface that the toe grabs might not cut into and the toe may actually become elevated and the functional angle that the horse is trying to maintain to be able to do his fastest time is lost.

The worst modification is an outside sticker on the hind foot of a Thoroughbred. The problem here is a hard track. It raises the outside part of the foot. We've had several Thoroughbred racers in who were wearing toe grabs and an outside sticker. At a walk, the inside heel never touched the ground. In other words, the foot hits first on the outside and then slams down to the inside. And then the foot begins to follow it. The foot becomes malformed so that it flares to the outside, straight on the inside wall.

The horse couldn't break over centrally at all. So when the horse starts breaking over this way, he starts carrying the foot in. Then it starts scalping and doing all sorts of things. Bone spavins are a very common thing with these guys because the other thing that the trailer does is that it occasionally gets planted right into the foot.

You will remember that the Thoroughbred has about seven square inches of foot surface. How much do we have now? We've got an inside heel that isn't doing any work at all, so probably dump those 1,000 pounds onto, say, three and a half square inches. Even that can be decreased if there is a toe grab and the foot doesn't hit in the quarter, either. In any case, this shoeing situation is not unusual.

On one horse that we had about three months ago, the shoe was broken right off in front of the grab. I had to pull the grab out with a pair of vise grips. It was jammed about a half inch into the hoof. I had to do a little bit of work with a hoof knife because the wall was pretty well shattered the whole way up. We put a bar shoe on and hoped for the best. There was a lot of damage.

What do these modifications do to the performing horse? Whether it is a race horse, a performing horse, a carriage horse, or whatever, if a horse is landing on only part of the hoof surface, the inside, you invariably get soreness on the outside. The horse makes an effort to stay away from the side that is sore, so he changes his way of moving in order to avoid pain. As a result, his change in function angles may result in a sore back, stifle problems, hock problems, whatever.

#### ● On bar shoes for race horses:

Trainers tell me that there is no way that a horse can run on bar shoes. Bar shoes slow horses down. Well, that's an old wives' tale. Kelso wore bar shoes, and he was probably one of the fastest horses that ever lived. Nitros wore bar shoes. I don't think that they slowed him down too much. A well made bar shoe has nothing to do with speed. A horse that needs a bar shoe needs it because he is sore. If he doesn't get the bar shoe, he's going to run a lot more slowly because of the soreness. Sore horses do not run fast.

The other thing you hear about is that if you put a bar shoe on it is going to contract the foot because it takes away

from pressure. I think that, in most horses, the frog never touches the ground and never will, unless the horse is barefoot. I'm not saying whether that is good or bad; I just don't think that the frog does nearly what we give it credit for in the way of expansion.

In most of the bar shoe cases at New Bolton Center, a bar shoe was the only thing that we could use to expand the foot because it was the only way we could balance the foot. And without balance, of course, the foot will never expand.

#### ● On nails and nail holes:

The manufacturer tells you where to put the nails. I think that this is an imposition on your intelligence. The manufacturer, moreover, assumes that the horse has a symmetrical hoof. Have you ever seen a horse with a symmetrical foot? You are seldom even going to see a horse that has a left and right front foot, for instance, that are identical. Even in humans, foot size may vary a half size from left to right. This is also true of horses, particularly race horses. The horse is constantly going in one direction. This means that on the turns one leg is getting a little different angular force than the opposing limb. For instance, the front left is on the inside of a turn, and it is always on the inside of a turn because we don't ever change directions. So, you seldom have two feet that are the same size.

Also, the nail holes are too far back. The nail holes, theoretically, should never go past the widest part of the foot, to allow for expansion. Expansion of the back part of the foot is of great importance. When the foot hits the ground and expands to the inside and outside, it helps to dissipate the energy of impact in a direction away from the vertical leg. The foot is part of a whole system that accepts energy with every stride. We really don't know how much energy the foot dissipates in proportion to the rest of the limb.

The manufactured shoe invariably gives you four holes on each side and one that is too far back. A horse's foot must be able to expand. Just take a shoe off a horse for a few minutes and then try to put it back on. You know it doesn't fit anymore because the foot is expanded beyond the shoe. We had one horse at New Bolton Center whose foot we traced the minute we pulled off his shoes. We then put him on some grass



across from the shop for ten minutes. Then we brought him back in and re-traced his foot. It had expanded three-quarters of an inch.

There are an awful lot of manufactured shoes that fall into the category of decreasing the ability of the horse's foot to expand. This is particularly true of the Standardbred. The nails are way far back on Standardbred keg shoes. As a result of it, the quarter cracks that we see are incredible. I know several people on the racetrack circuit that are working up and down the east coast, just repairing quarter cracks on Standardbreds. They don't treat anything else and they are working five, six, or even seven days a week.

Nail hole sizes are the same regardless of shoe size. It costs too much money to punch different size shoes with different size punches. You are basically held to one or two nail sizes. The manufacturer is telling you where the holes are and where they are to go on the horse's foot. And most of the racehorses we are seeing these days have no foot at all. A Standardbred still seems to be able to maintain a little bit better foot, at least in the way of hoof wall thickness.

This means that the great big Thoroughbred that looks like a hunter is going to get a particular sized nail. Then you are going to turn around and use the same size nail on an eighteen month old Thoroughbred filly that doesn't have any hoof wall at all. The likelihood of putting in a bad nail is greatly increased with the filly. And not only is the nail hole the same size, but they are the same distance from the outside portion of the shoe. Regardless of its size, the nail is potentially in a bad spot.

All this doesn't mean that a keg shoe won't fit. It may. But the odds are against you. The odds are that, more than likely, at least one — if not two or three — of the nails will not be in the appropriate spot. They will either be too far back or too close to sensitive tissue.

The handmade shoe allows you to use a lot smaller nails. A well-placed small nail is certainly going to secure the shoe to the foot as well as a big thick one will, but without the problems of possible discomfort.

#### ● On nailing injuries:

How common are nailing problems? I would say that they are extremely common. The thing that most of us look for is to see if the horse has been pricked.

That's pretty easy to identify. I'm interested in a horse that has a nail driven into sensitive tissue. I'm even more interested in horses that have nails next to sensitive tissue. That's the one that is difficult to identify. That's often the horse whose performance is starting to fade. That might be the horse who, when he gets to the turn on the track, starts to bear out or bear in. That might be the barrel horse that is starting to go around Newark, New Jersey instead of cutting the barrel. That might be the show jumper that all of a sudden is accused of being show sour. All the while, it's just that the foot hurts the horse. The foot doesn't hurt badly enough to make the horse lame, but the horse is smart enough to know that it is surely going to hurt when it jumps that six foot fence and lands on the other side.

All of us humans have worn a pair of shoes that were uncomfortable. You wouldn't play tennis in a pair of uncomfortable shoes. The horse doesn't have the ability to change shoes when they hurt. He is wearing the same thing all the time. And the nails play, I think, a really big role.

Hopefully, when a nail goes in, it is going to go in the nail wall and slide past sensitive tissue without being shallow enough to hurt the wall. Every time a nail goes in, it splits hoof wall material. You don't have a whole lot of room to fool with. The margin of error is very small. A little mistake in the wrong direction can split the hoof, or potentially split it, or put the nail into sensitive tissue, or at least close to it.

One of the most common occurrences that I see in the horse business is the owner who calls the vet because the horse is lame. The vet asks how long ago the horse was shod. The owner instantly rules out the shoes as a problem because the horse has been shod for two weeks. The reasoning is that if a bad nail had been at fault, it would have shown up soon after shoeing. That's a fallacy. A close nail will move. Any nail will move. It can move either away from the sensitive tissue or toward it or into it, depending on the forces that the horse applies to the shoe.

Every time that the horse's foot hits the ground, you've got vibration between shoe and hoof. If the horse goes around a turn at 35 miles an hour or takes a six foot fence and lands a little off to one side of the foot, the shoe can move within the confines of the hoof.

So a nail doesn't have to be driven into sensitive tissue to be a bad one.

You can drive a nail in a bad spot or go too shallow or too deep. You can drive a perfectly good nail and over-clinch it, bending it into sensitive tissue. An abscess can be one result.

An abscess, like so many other bad infections, tends to expand. The way an abscess expands in the foot is to expand along the lines of least resistance. Least resistance means that it is not going to pop out of the hoof wall. And it's probably not going to go into bone, because that is dense tissue. So it's either going to go up the white line and come out the coronary band or it's going to go under the sole.

These abscesses can be serious threats to a racehorse's career. In one horse, the infection travelled completely under the sole, the whole way around, and undermined the frog and the sole, and of course went all the way up the hoof wall. We had no choice but to surgically remove the hoof wall to allow it to heal. The horse was out for a year.

So there are a lot of ways to get a bad nail. Sometimes you start and the darn thing is a little bit where you don't want it, so you just tap it sideways. It's like hanging a picture on drywall, right? The thing is not going the way you want it, so you just hit it sideways in order to drive it home. It kinks the nail. Now if the kink happens to be toward the sensitive tissue then it's very likely to travel next to or into the sensitive tissue.

#### ● On Standardbred shoeing:

The Standardbred is not immune to any of the problems that we find with Thoroughbreds. Years ago, when I first started to fool with horses, Standardbred shoers were the guys to talk to about shoeing horses. They all had to hand-forged the shoes and they had a very difficult time with it. Shoeing trotters — not pacers — is the most difficult shoeing job there is, to me. It's more difficult than shoeing a gaited horse.

The reason that Standardbreds are so difficult to shoe is that limb interference is such a tremendous problem with race horses. They have to be precisely shod. This is the reason that they are often wearing toe weights, all kinds of fancy looking trailers, or whatever will stop them from interfering. Because of the problems in training a trotter and the lack of handmade shoes, I think that the trotter is becoming an animal of the past.



Most of the Standardbreds are pacers.

With Standardbreds, the keg shoes have the same problems as with any breed. In addition, the Standardbred steel shoe is very light. They want it light steel instead of aluminum. As a result, it wears down in a hurry. So what was on the horse on the day he was shod isn't necessarily what is on him ten days later, depending on the track he is training on. A Standardbred keg shoe is also invariably thicker and heavier than a comfortably made handmade.

● **On the half round, half swedged:**

This is a commonly used shoe in the Standardbred industry. In this industry, a lot of horses are shod with this type of shoe whether or not they need it. A lot of the young Standardbreds, particularly pacers, are brought up and broken without shoes. As soon as they start to throw the speed at them, someone decides that it is time to put these "pacer" shoes on, or half round, half swedged shoes.

What's the problem here? You've got a surface on the inside that has a low coefficient of friction. In other words, it's not going to grab much at all. At the toe and around to the outside branch, it's

swedged. So it is very easy for one side of this shoe to hit the ground and hold while the other side slides around.

● **On the ideal racehorse shoe:**

What's the ideal shoe? I haven't a clue. I have some ideas, but no fact. I think ideally that we should be looking toward as light a shoe as possible. It shouldn't have any nails in it because we know the damage that nails cause. It should be flexible so that the foot flexes appropriately. But how much should it flex? I think that we have to put shoes on most of the Thoroughbreds we see because they flex too much already. They need the stability of a shoe to keep from just plain flattening out, and to keep them from breaking off because they are just plain weak from the way that they are raised.


● **On new ideas for horseshoeing:**

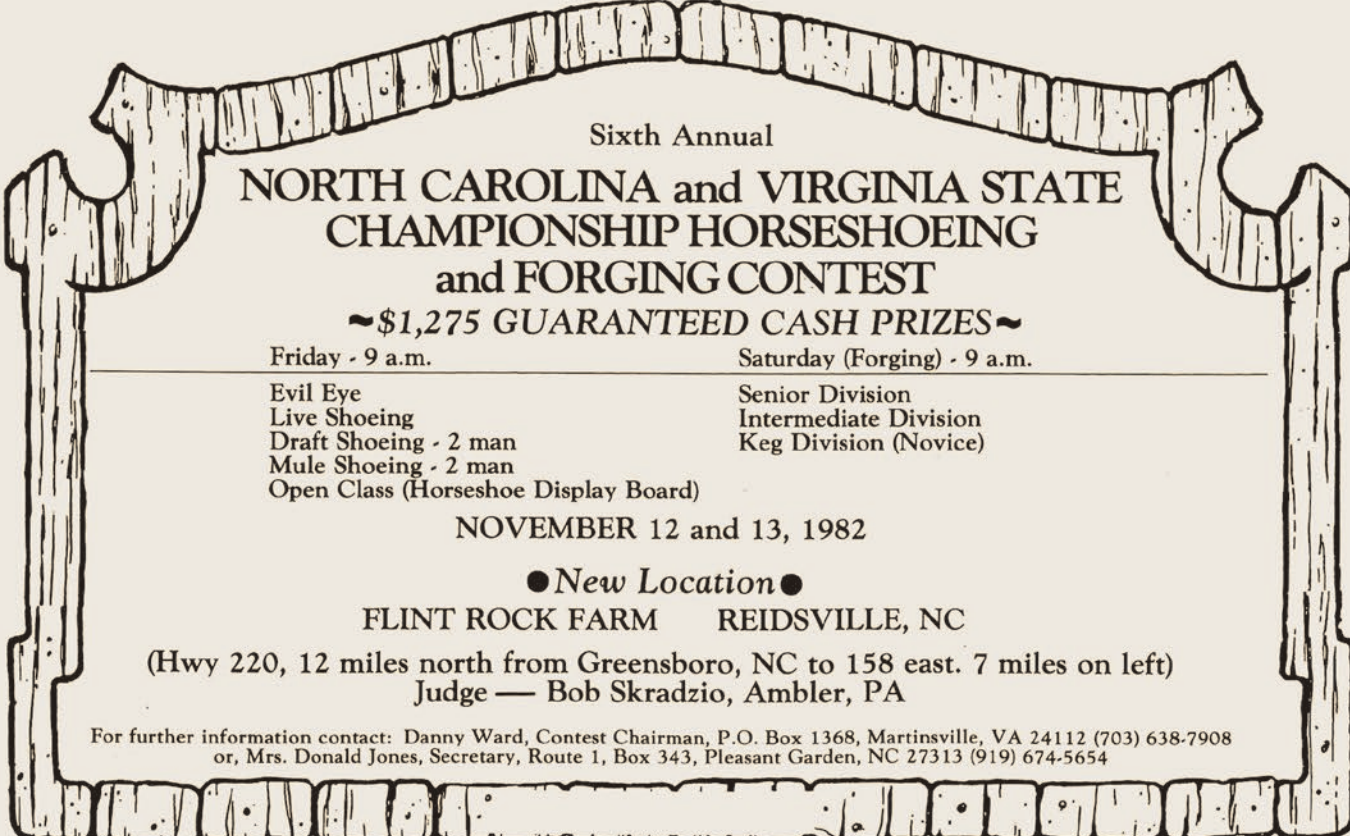
I don't think that we are meeting the demands of the present generation of weak-footed horses. And I don't see that the feet are going to get any stronger. In certain parts of the world, they are able to get away with it. Horses that come here from England, Ireland, France,

and South Africa run on grass. They come over here with a reasonably flat foot that helped them perform well on grass overseas. Once here, it will take six months or even a year before they will get on a track. In some cases, they'll never see the track. They already have sort of a pie plate foot. You have a difficult time getting some kind of shoe on them that is going to let them perform in comfort. It's a real problem.

I would like to see materials that are lighter than steel. The technology is here to produce them. Graphite, for instance, has replaced steel in tennis rackets and fly rods. There are other fibers that are coming along that are even stronger than graphite, and even lighter and easier to work with.

I see the day when shoes won't be nailed on. There will perhaps be a shoe that can be glued on all the time without problems. Perhaps it could even be sewn on.

There are some things that have been done already. There have been shoes molded out of synthetic materials. It involves stepping the horse into a material that sets up so that we can get a precise definition of size and shape. Then we make a positive image from the mold and make the shoe fit. 



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