Landmarks for Evaluating, Trimming, and Shoeing the Equine Foot

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From many horse owners' point of view, the farrier's profession throws out a lot of confusing terms and directives when it comes to balancing a foot. Fit the shoe full? Trim to the widest point of the frog? Use a four-point trim? These nebulous statements can place the horse owner in a precarious position, as it seems like everyone has a different way to describe what can or should be done to a horse's foot during trimming and shoeing.

"Although we as horse owners pay for a farrier's professional service, it is advisable that we at the very least have a basic understanding of what a well-shod horse is," Dave Duckett stated at the 52nd Annual Convention of the American Association of Equine Practitioners, held in San Antonio, Texas.

Duckett, a Fellow of the Worshipful Company of Farriers in London, England, and a member of the International Horseshoeing Hall of Fame, developed a system for evaluating hoof balance and shape more than 20 years ago (you might have heard of Duckett's Dot and Duckett's Bridge), and his work fundamentally changed how many farriers evaluated feet. He believes that farriers, owners, and veterinarians need to have a consistent, reproducible way to evaluate foot shape and balance, and that his system gives us this. At the convention, he presented a discussion of his system and its implications for foot care during the standing-room-only "Putting Science into Farriery" session.

General Thoughts on Hoof Care and Soundness

"Farriery is one of the most important elements in general horse health care and maintenance in preservation of the sound horse," Duckett began. "Preservation of the sound horse is important, because if we do preserve the soundness of our horses, we won't get problems to fix later.

"Our objectives are to maintain a comfortable, sound horse, protect the foot and support the limb, accurately apply treatment procedures to prevent and treat pathological conditions, and enhance the horse's natural ability and allow maximum potential development," he noted.

But how do you know what care and trimming/shoeing a foot needs? Duckett says it is imperative that we work in harmony with the naturally designed hoof. "Moreover, knowledge of the horse's anatomy, physiology and biomechanics plays a crucial role in understanding good horseshoeing," he commented.

Since not everyone keeps a radiograph (X ray) machine in their back pockets to see and understand the hoof's internal structures, he used the fundamentals of these sciences to map out external reference points on the hoof (Duckett's Dot and Duckett's Bridge; more on these shortly) and correlate them to the internal structures. In other words, certain areas of the hoof correspond with certain internal structures no matter how distorted a foot might look.
"Why do we need this system?" he asked the audience. "Owners, farriers, and equine health care practitioners need to be able to accurately appraise a horse's foot. We all have a basic need for accurate hoof evaluation, and a need to communicate using the same terminology. Using this information (hoof shape and balance relative to Duckett's Dot and Duckett's Bridge), we can:

- "Discover the interval for optimal shoeing (ideal time between shoeings).
- "Evaluate the correctness of trimming and shoe placement. We need to know the horse's anatomy before trimming and applying a shoe.
- "Make an accurate diagnosis to arrive at the correct treatment measures.
- "Establish criteria for biomechanical studies. There is a definite need for a baseline (level of hoof balance) to work from and criteria to understand what a well shod horse is, before we do these studies. Having such a system sets standards for inter-professional communication."

**Duckett's Dot**

"The basic concept of using Duckett's Dot and Duckett's Bridge is to measure the foot from the center to its peripheral borders, rather than using traditional methods of calibrating the exterior, which would perpetuate the errors of the past (with distorted feet)," Duckett explained.

So where is the center of the foot, and how do you find it? Duckett explained that the center of the foot is the center of the third phalanx bone, which is often termed the coffin bone.

"The third phalanx is the physical, dynamic foundation of the foot," he stated. "Therefore, knowing its position within the confines of the hoof capsule is crucial. The external landmark of the center of the third phalanx is noted by Duckett's Dot. This is a consistent external reference point situated 3/8" behind the apex of a trimmed frog on the average-sized horse. This is proportionate from the Shire to the Shetland (the point is slightly further back from the apex on a Shire, and slightly closer on a small Shetland).

"From the position of the Dot, the third phalanx can be balanced by measurement and weight mass," he went on, showing a photo of a coffin bone balanced on the point of a pencil at the Dot to illustrate its physical balance.

**Using the Dot**

*Optimal toe length* "Understanding that there's an equal amount of tissue (wall) attached to the third phalanx bone, we can scribe around the hoof wall to gain maximum toe length (with a compass like the one we used to draw perfect circles in school)," he said. "From the Dot to the medial wall, scribe to the toe. This will assure maximum toe length (anything outside that line means the toe is too long).

If the horse's toe is very long, he advised a cautious approach: "Radical reformation of the hoof capsule at one time is not necessarily a good thing, it has to come over time. You're only doing a little at a time, don't overdo the job to emphasize the work."
"For the working farrier, a better perspective on the foot's internal structures can be gained when using these external reference points," he said, noting that the third phalanx on most horses toes in an average of four degrees.

**Dubbing the toes** "We don't have to rasp the toe off to conform with the traditional type of shoeing," he commented. "If the hoof wall is long, rasping it back to match an ideal is not necessary. The foot is a conical (cone) shape, and its strength is in its shape. If you rasp the toe back, you are rasping away the cortex and strength of the foot. If the foot loses that strength, it will collapse onto that shoe, creating lameness. This has been witnessed by many horseshoers attempting to create a short toe and in following the 'natural craze.'"

**Duckett's Bridge**

The Bridge is a line rather than a point like the Dot, and it lies behind the Dot. It is a horizontal line running from medial (inside) to lateral (outside) sides of the foot. The Bridge is directly beneath the center of rotation of the distal interphalangeal joint, also called the coffin joint. Externally, you can see this as the widest part of the foot, which corresponds to this horizontal line. Therefore, the Bridge can be used to separate the foot into halves.

"The anterior or cranial (front) half of the foot includes tendon attachments on the third phalanx for movement, among other things," he said. "This half holds the bone and laminar attachments. The caudal or rear half is made up primarily of softer, elastic tissue. The separation of these occupations is an area named the Duckett Bridge, which is also considered to be the central biomechanical balance point of the foot."

When the foot is properly balanced, Duckett says, the bridge is exactly halfway between breakover at the toe and the heel end of the shoe. And if it's not, he noted that the heel bearing areas of the foot will be under great stress, resulting in collapsed, underrun heels. But the heels will collapse no further forward than the bridge.

**Shoe Placement and Size**

"When a horse is shod, he is no longer standing on his feet--he's standing on his shoes," Duckett stated. "Therefore, it is imperative that the shoe is placed with biomechanical congruency (to match the biomechanical needs of the foot). The shoe should be placed central to the Bridge (with equal ground surface length in front of and behind the Bridge) and in harmony with the horse's movement, regardless of the hoof shape."

The distance between breakover (the forwardmost point of the shoe's ground contact) and the Bridge should equal the distance from the Bridge to the heel end of shoe, he clarified. Breakover is not centered on the toe, he added; as mentioned earlier, most horses' bony columns toe in slightly. "The anatomy and its mechanics determine where the breakover is," he said.

Using this technique also gives you a basis on which to evaluate an existing shoeing job. Duckett gave case examples in his presentation and challenged the audience to "raise their conscious
awareness to such a level that you see what you are looking at. This may be a simple statement, but it has a important meaning," he said.

Using radiographs to complement the information on a particular case, he noted: "If the front half of the foot is for tendon attachments, laminae, and bone, and the back half is for weight bearing, how much shoe is there to support that limb (i.e., how much shoe is there under the rear half of the foot bearing the horse's weight)? Just the little bits at the ends of the branches. It's not nearly enough."

**Take-Home Message**

"Think about what you've leaned today and place it into practice when appraising a horseshoeing job," he concluded. "Some schools of thought view the art and science of farriery as merely covering the preparation of a horse's foot and the application of a shoe. But it's a little more than just slapping a shoe on. We all must appreciate that the foot is the foundation of the horse, and we must also become aware that it's the art of horse shoeing, not FOOT shoeing."

**Further Reading**

*Bumbaugh, Sue. "Buzz Words and Brainstorms to Decode Duckett's Dot."

*Readers are cautioned to seek the advice of a qualified veterinarian before proceeding with any diagnosis, treatment, or therapy.*