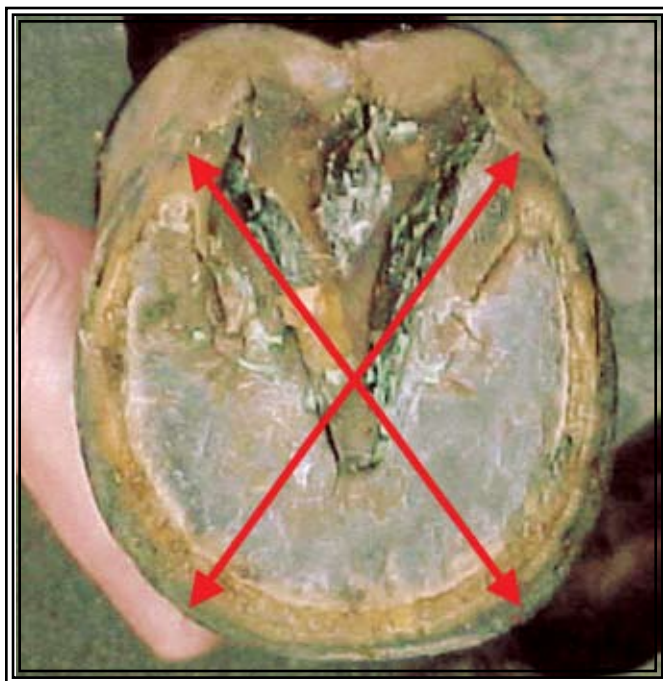
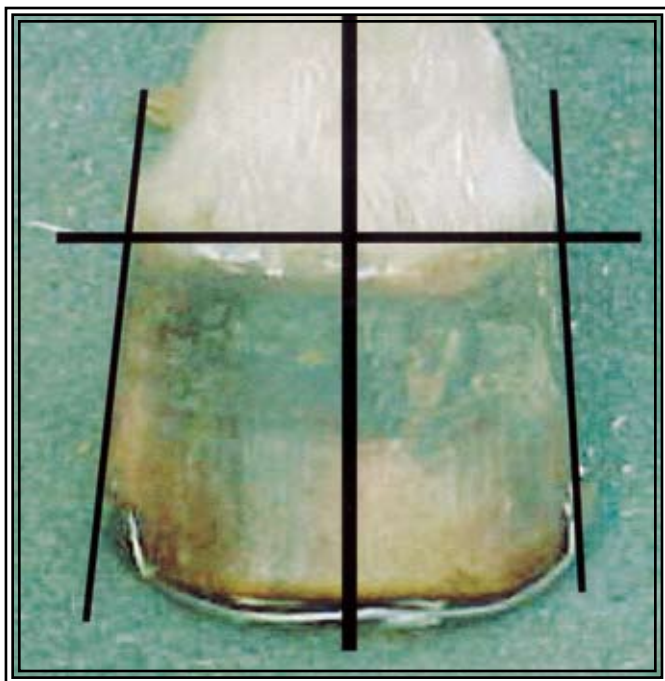


The Art & Frustration



OF HOOF BALANCE

Minnesota veterinarian and veteran farrier says it's a mistake to emphasize technique over the needs of the horse

By Tracy A. Turner, DVM, MS, Dipl. AVCS

BALANCE IS DEFINED in the dictionary as a harmonious adjustment of parts or as the harmonious performance of functions.

So what does that have to do with the hoof?

The hoof must perform its functions in harmony with the rest of the limb, otherwise weight-bearing stress will be shifted abnormally on the limb and result in overload and overstress of a ligament, tendon or bone which then results in lameness.

Doug Butler has used a better definition of hoof balance. Balance, says the Colorado-based farrier educator, is a condition that exists when the weight placed on the legs of a horse is equally distributed over the foot of each leg.

So, how do we achieve balance? There are a number of methods available. They include:

- 1. Geometric**
- 2. Dynamic**
- 3. Diagonal**
- 4. Natural**
- 5. Four-Point**
- 6. Duckett's Dot**
- 7. Hairline**
- 8. Strasser Trim**

GEOMETRIC BALANCE

Geometric balance is based on an assessment of the horse's hoof with the horse standing as squarely on all four legs as possible. Geometric balance is based on the notion that the horse's hoof should position itself in a predictable geometric pattern (Figure 1).

This method presumes that the hoof will be roughly centered on the distal leg. The hoof itself should have the general shape of an inverted cone. This means that the weight-bearing area of the hoof is larger than the area of the coronary band. The hoof capsule should be straight from coronary band to ground. One should be able to place a straight edge along any place on the hoof wall. In

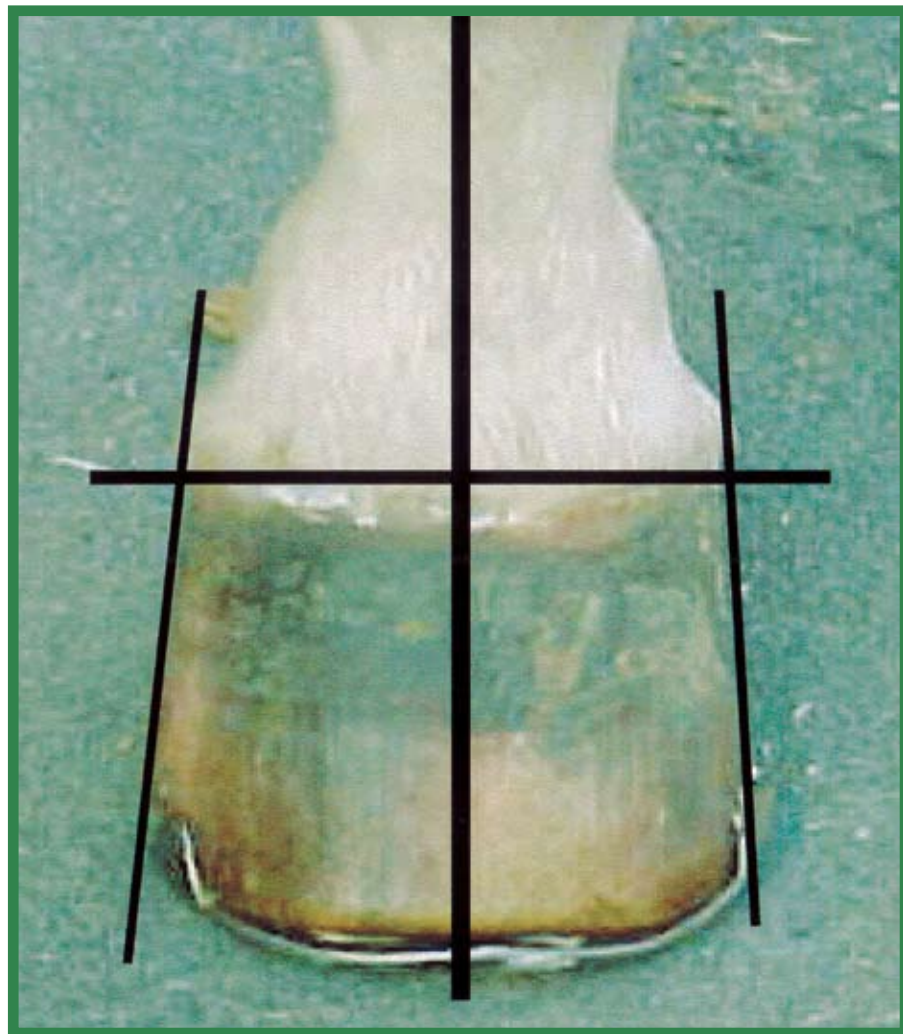


FIGURE 1. The front view of a hoof showing some of the configurations needed to evaluate with geometric balance. The line bisecting the leg and hoof and the lines along the medial and lateral walls show an upside-down cone appearance.

addition, the coronary band should form a straight line.

There are several other measurements and observations that can be made. First, the pastern and hoof capsule should be

“Balancing a horse’s hoof is both an art and science...”

aligned when observed from the side. In addition, the angle of the hoof capsule at the toe (hoof angle) should be the same as the angle created at the heels. When observed, the bottom of the hoof capsule should be perpendicular to a line drawn through the center of the pastern and the cannon bone.

Further, a bisecting line through the center of the frog and the widest portion of the hoof should bisect at the center of balance of the foot. The line drawn through the frog should point to the center of the toe and the center of break-over. A line drawn at the point of ground contact of the heels should be at the widest portion of the frog.

The theory is that if these rules are followed, the hoof should be balanced and mechanically as efficient as it can be. This would reduce the potential for hoof-related lameness.

GEOMETRIC SHORTCOMINGS

Critics of geometric hoof balance point out several problems with this

method. First, they are quick to point out that it is hard to find horses with perfect conformation. This implies that geometric balance only works if the horse has good conformation. Further, there is sufficient evidence to show that the hoof is not normally perfectly shaped. In fact, the hoof wall is usually steeper and the sole is narrower on the inside. Due to these inconsistencies, the critics dismiss this method of balancing a hoof.

DYNAMIC HOOF BALANCE

Dynamic hoof balance is based on the assessment of the horse's hoof in motion. Dynamic balance is based on the notion that a horse's hoof should land flat, side to side and heel to toe. The technique is relatively simple. Observe the hoof with the horse in motion. Simply watch how the foot lands.

The hoof needs to be trimmed or shod so that the foot essentially lands flat as one watches the horse, moving toward the shoer and away. The second step is to watch the horse from the side and shoe or trim the horse so that it lands heel to toe or at least flat. The horse is observed at the walk and the trot and the trimming is adjusted accordingly.

GAIT PROBLEMS

Critics readily point out that most horses do not just walk and trot and in most athletic endeavors, the horse uses a much faster gait. Even more importantly, kinematic research shows that the horse does not land on its hoof in the same way at all gaits.

Nevertheless, it is not possible to see how a horse lands on its hoof at the canter or gallop. The horse simply moves too fast. This problem has been overcome by assessing the horse on a

treadmill. In this manner, the horse can run but the hoof will land in the same relative location.

HEAT SEEKING

A unique method to overcome the same problem is to utilize thermography (Figure 2). Thermography assesses temperature patterns of the hoof capsule. Research so far has shown that the thermal patterns can be related to how the horse is landing on the foot.

In particular, the friction pattern on the shoe correlates to how the horse lands on the hoof. In this manner, the horse could be evaluated at any gait and the thermal patterns on the shoe evaluated. Then the trimming or shoeing adjustments needed are determined based on these patterns.

NATURAL BALANCE

A relatively new method of hoof balance is "natural balance." The concept is based on the observation that feral horses stay relatively sound, need little or no hoof care and have a unique and consistent appearance to their hoof capsule. This theory is that all horses should be trimmed in a manner consistent with the way feral horses wear their hooves.

First, the ground surface of the hoof bears weight on four points; each of the heels and the medial and lateral aspects of the toe (Figure 3). The toe is rockered and there is a flat wide area at the toe of the sole that may be used to support weight. In addition, the length of the foot is 1 1/2 times the frog length. More than this indicates the horse has too much toe. These concepts have lead to a method of balancing hooves commonly referred to as the four-point trim.

FOUR-POINT TRIM

The basic theory of the four-point trim is that the horse's hoof should be centered on the four pillars of support previously mentioned (both heels and the abaxial regions of the toe). The theory is, that by trimming the horse in this fashion, the hoof will seek its "normality."

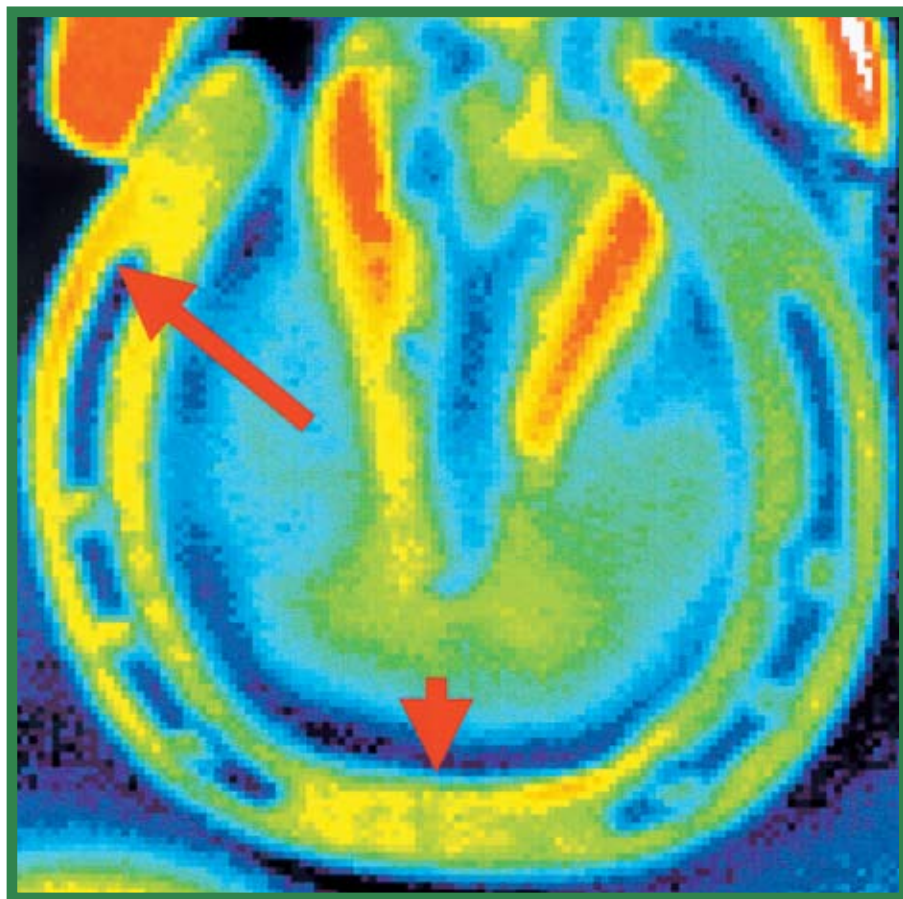


FIGURE 2. A thermograph of the shoe of a horse after it has trotted on a hard surface. The friction patterns show that the inside and toe (red arrows) are hotter, indicating that this horse is landing asymmetrically on the hoof.

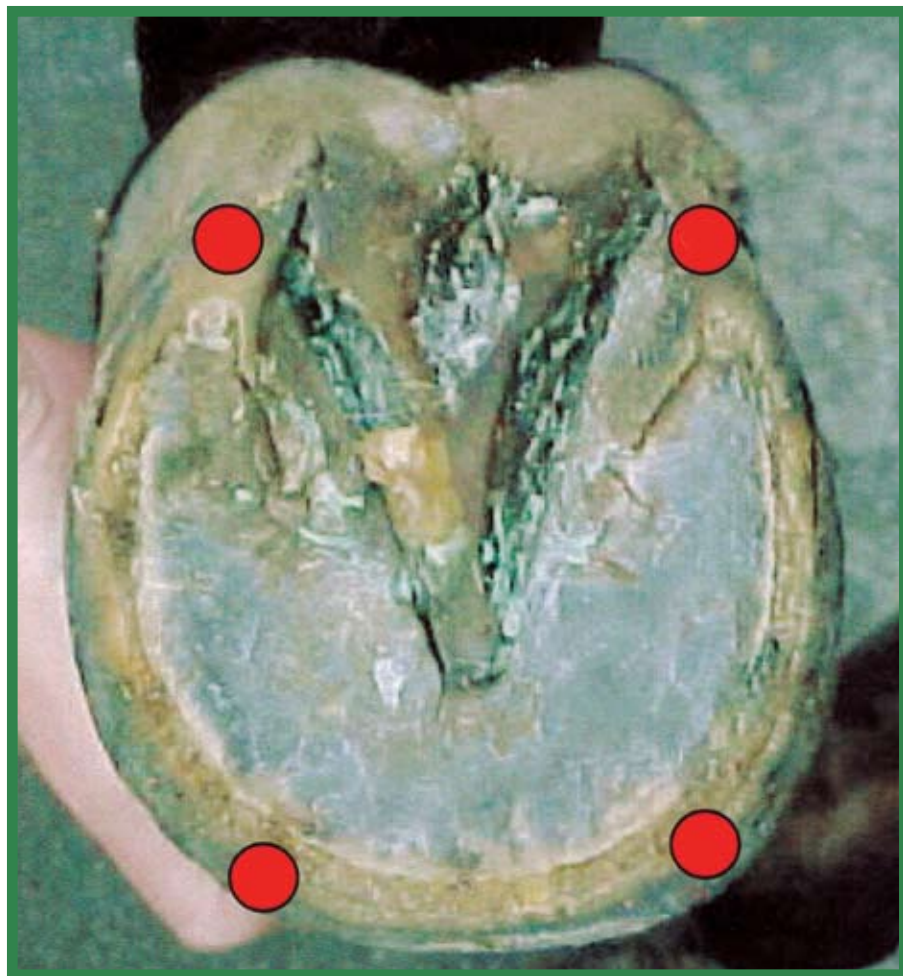


FIGURE 3. Natural balance showing the four pillars of support (red dots). The hoof should be symmetrical on these points.

TELL-TALE HAIRLINE

In addition to these theories, the concept has been added that “the hairline tells all.” This idea holds that by evalu-

ating the hairline, one can determine where stresses are occurring on the hoof capsule. Raised or “jammed up” regions of the hairline indicate excess stress on the hoof capsule in that region (Figure

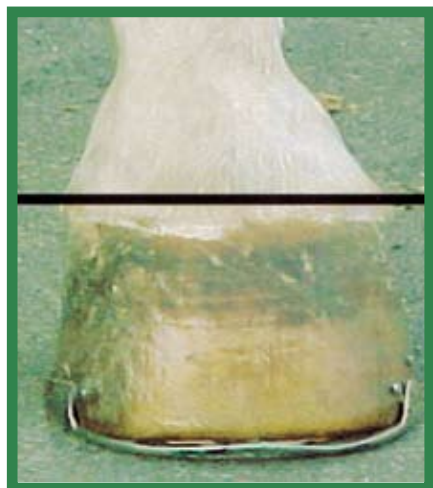


FIGURE 4. The hairline method of balance holds that any deviations of the hairline (black lines) need to be evaluated as potential points of excess stress.

4). So in addition to following the normal pattern, one must also remove the stress from any area of the hoof wall by evaluating the hairline.

FERAL FLAWS

Critics of these methods usually point out that feral horses are not athletes. And since they are not athletes, their hooves are not stressed as much as those of the domesticated equine athlete.

Dr. Robert Bowker from the Michigan State University College of Veterinary Medicine, has shown when comparing the feral horse to the domesticated feral horse, the hoof structure does change. He found the number of laminar attachments increases with

“Critics point out that feral horses are not athletes...”

domestication. This indicates the hoof capsule is strengthening its attachments to the third phalanx (coffin bone).

Some other critics of this method point out it is solely based on the feral horses of the Rocky Mountain region. The technique has not considered the wear patterns of other feral horses. Other work also indicates the horse’s hooves adapt to the horse’s environment. Therefore, the observed changes may be more an adaptation to the environment rather than some ideal method of hoof balance.

DUCKETT’S DOT AND DIAGONAL BALANCE

Some older methods of balancing hooves utilize Duckett’s dot and diagonal hoof balance. The Duckett’s dot method first determines the center of the horse’s hoof (Duckett’s dot). The remainder of the hoof capsule should then be centered around this point (Figure 5).

Determining the center of the horse’s hoof or Duckett’s dot has been described in various ways. The most common

FIGURE 5. The Duckett's dot method of balance holds that the hoof should be centered (red circle) around Duckett's dot (red dot).

method is to determine the widest part of the hoof. Duckett's dot is located on the centerline of the frog along a line through the widest part of the hoof. This will typically be between 1/2 and 1 inch behind the apex of the frog.

Diagonal hoof balance has similar concepts. In this method, two lines are drawn, from the heel to the opposite toe. The point where the lines cross should be the center of the hoof and the hoof capsule should be centered on these points (Figure 6). Interestingly, the lines are drawn utilizing the four points of support previously described in the four-point method, although they are rarely described as the four pillars of support.

WHAT'S BEST?

Obviously there are many ways to "balance" a horse's hoof. But what do all these techniques have in common?

First, they all worked well for the person that originally described them. Each of these techniques is backed by descriptions of case after case of how the method helped fix a poor hoof. Highly respected members of the profession described each of the methods.

But secondly, there are always an equal number of people that will tell you why each of these techniques can't work. In other words, people will tell you that they cannot get the technique to work for them, therefore the technique itself must be flawed.

Once again, these naysayers are generally well respected and typically are proponents of some other method. So what technique should you use?

There is no easy answer. It must be understood that the various balancing techniques described in this article are

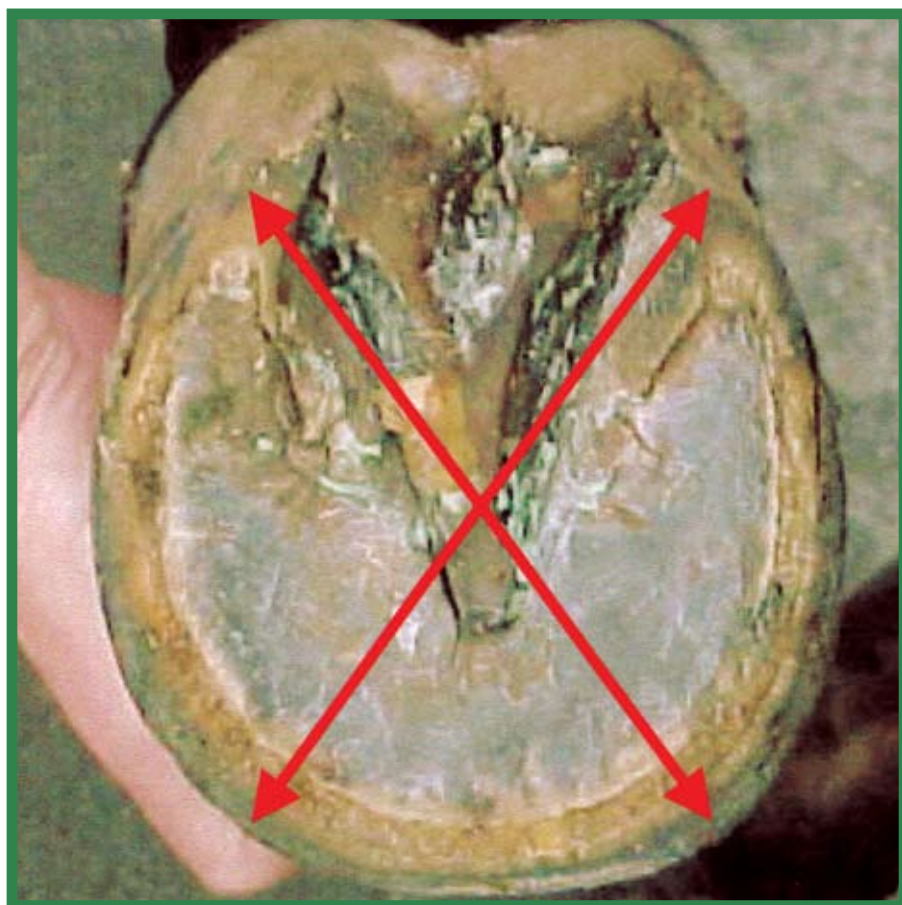
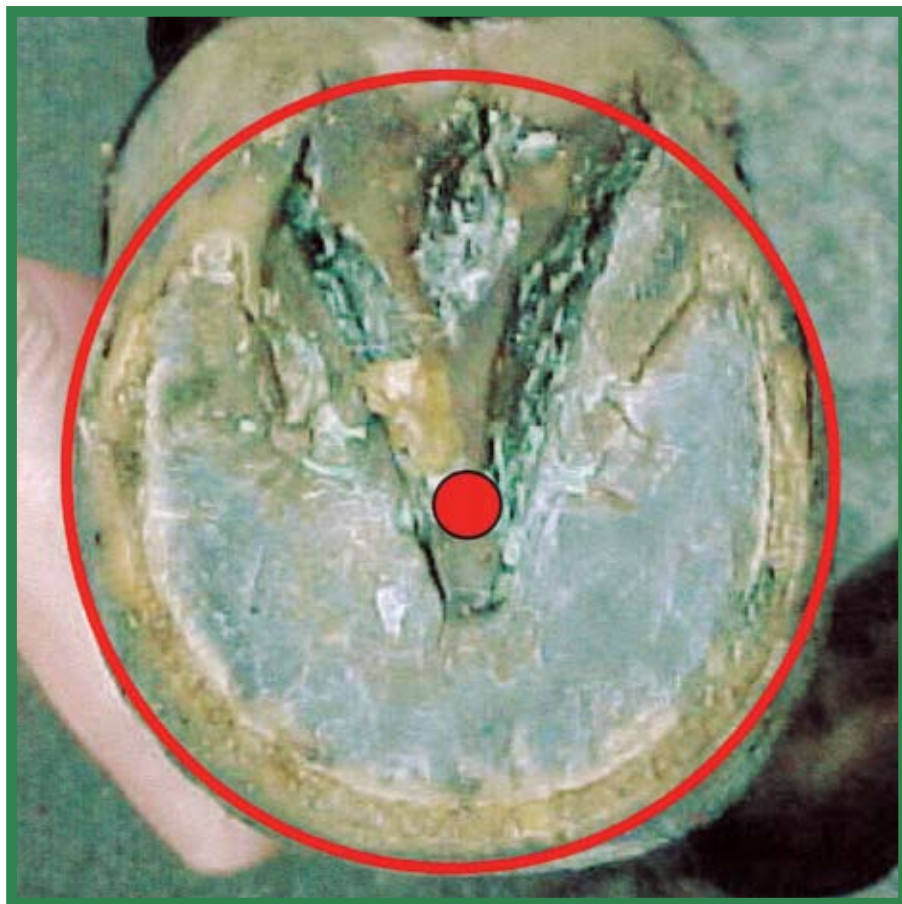


FIGURE 6. Diagonal balance utilizes the heel-to-toe symmetry. Note that this method uses the four pillars of support and the bisection of the arrows occurs at Duckett's dot.

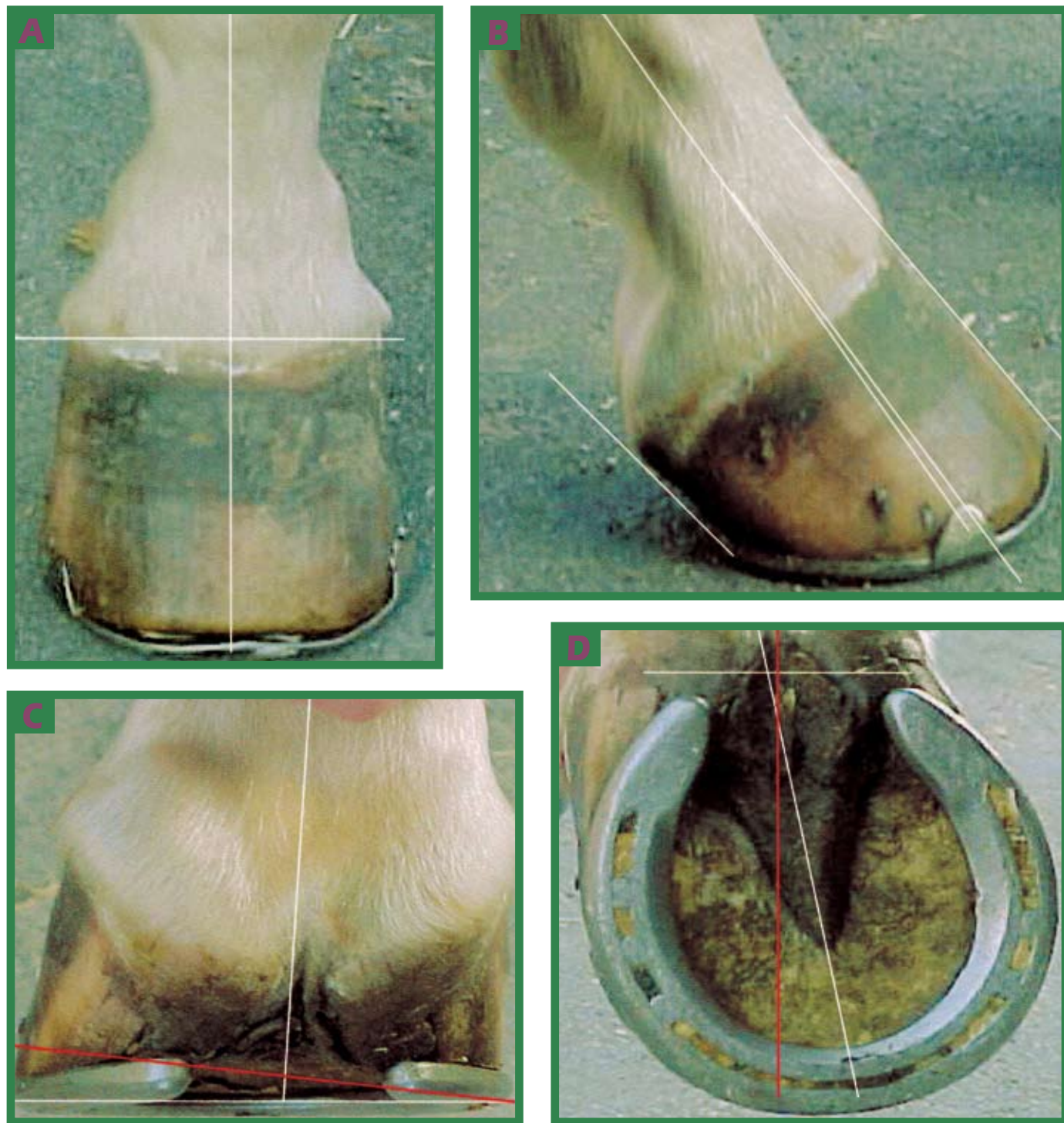


FIGURE 7. (A) Dorsal or front view. (B) Lateral or side view. (C) Palmer or back view. (D) Solar or bottom view. Note that each view gives a different perspective of the hoof. Even though this hoof looks good from the lateral and dorsal views, there are obvious problems seen in the palmar and solar views (red vs. white lines).

not so much techniques of “working” the hoof as they are methods of observation. Each of these balancing methods allows the observer to study the hoof from a slightly different point of view, then determine how far any hoof may deviate from the standard. It can be readily seen

that each of these techniques, when used, produces about the same relative result.

METHOD VS. SIGHT

However, problems arise with any of these techniques when the method becomes more important than the obser-

vation. That is when every hoof is forced to conform with some “standard.”

As has been shown, the techniques usually produce the same outcome. But there are hooves that, for various reasons (limb conformation, anomalies, old injuries, etc.), fail to follow

a pattern. It is important to utilize the observed information to determine the deficiencies of any hoof. However, it is not necessary — and probably incorrect — to force or cause all hooves to follow any one pattern.

LAMENESS CASES

Another problem arises when one tries to apply some of the principles to the lame horse. The hooves of lame horses often change, due either to pain or changes in normal weight-bearing patterns.

These balancing methods are based on the horse being willing to bear weight on its limb normally. The hoof is a dynamic structure that readily alters its shape to

“Observe the hoof, not only standing and in motion, but also from all directions...”

accommodate stress. Therefore, until the pain is relieved, changes in the hoof capsule can be both cause and effect.

Alterations of the hoof capsule may have caused a particular lameness. In such cases, correction would eliminate the lameness. However, alterations of the capsule may have been caused by altered stresses on the hoof as a result of changes in weight bearing due to pain. Altering this hoof may only cause the lameness to worsen. Therefore, in any lameness, the cause must be determined first, before appropriate therapy is applied.

Appropriate therapy is very likely to utilize changes in shoeing to relieve or alter stress. Once the pain is relieved, the observations about balance can be utilized once again.

VITAL PRINCIPLES

When dealing with the art and science of hoof balance, there are several important principles to keep in mind.

First and foremost, observe the hoof, not only standing and in motion but also

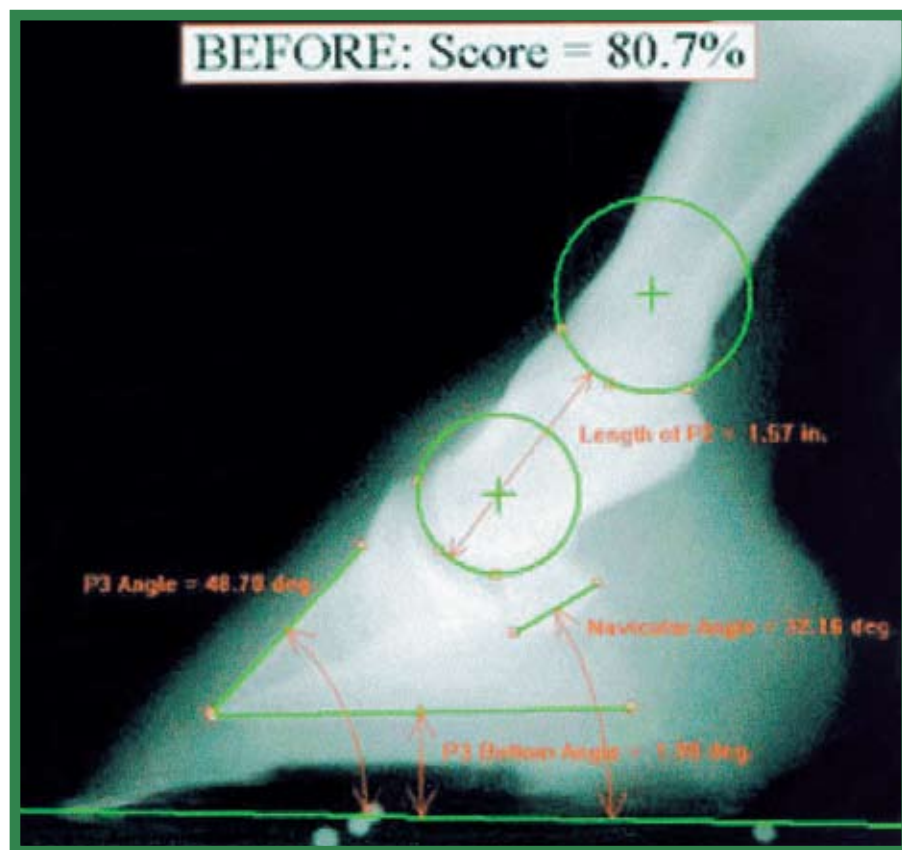
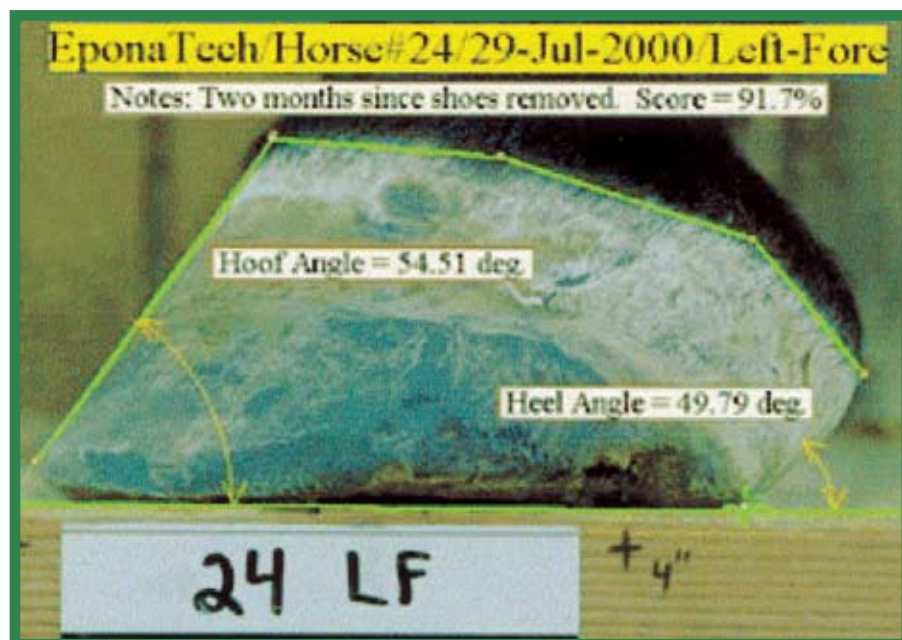


FIGURE 8. EponaTech software used with digital photos (upper image) and with digital radiographs (lower image).

from all directions. It is my opinion that the hoof must be observed from the front (dorsally) (Figure 7). This provides the first impression of how well the hoof is positioned on the leg, including medial-

to-lateral balance, as well as anomalies of the toe or quarters.

Observation of the hoof from the side (laterally) provides evaluation of front-to-back symmetry, hoof-pastern alignment

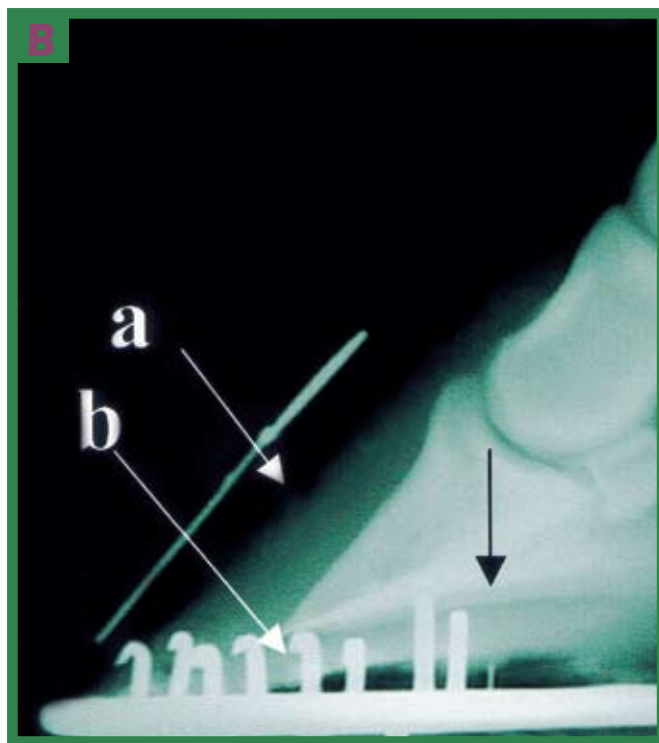
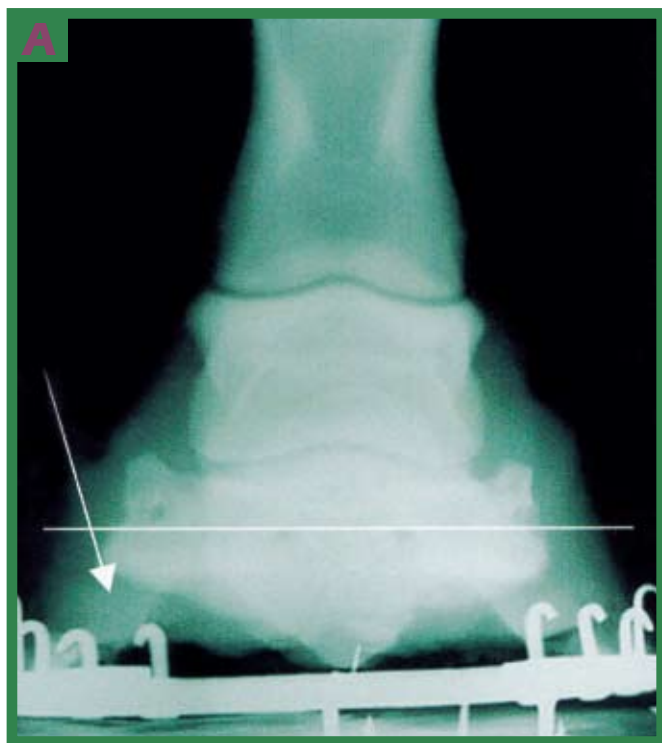


FIGURE 9. (A) On this dorsal palmar radiograph, the arrow indicates there is more wall of one side. Note that the line through the coffin bone is not parallel to the shoe. **(B)** This lateral radiograph has a dorsal hoof wall marker and a tack in the frog at the widest point of the hoof (black arrow). This hoof shows poor heel support because there should be the same amount of shoe behind the tack as in front. There is also increased thickness of the hoof capsule (a), but adequate sole depth (b).

and heel support. Observation from the back (palmarly) provides further medial-to-lateral, heel-strength and symmetry evaluation, as well as evaluation of the heels and quarters. Finally, observation from the bottom (solarly) allows evaluation of the straightness of the hoof, strength and width of the frog, twisting flaws in the hoof and heel support.

Photos provide an excellent method to continuously assess and catalog changes in any hoof. The modern technology of digital photos and computer software such as that developed by EponaTech, makes this type of evaluation simple (Figure 8).

USING RADIOGRAPHS

Whenever possible, the hoof should be imaged using other methods as well. Radiographs can help the assessment of balance whenever they are possible. This is an area where veterinarians and farriers can really help one another.

Two radiographs need to be assessed. A horizontal, dorsopalmar (DP) projec-

tion and a lateral-to-medial (LM) projection should be evaluated. Both allow assessment of the bony column within the hoof capsule.

Placing markers on the dorsal hoof wall at the hairline and either at the apex of the frog or on the frog at the widest part of the sole, provides external

“Problems arise when the method becomes more important than the observation...”

markers to help evaluate positioning of the bones within the capsule (Figure 9).

The DP projection provides information on medial-lateral balance and depth of sole from side to side. The LM projection provides information about hoof-pastern alignment, palmar hoof support, sole depth and hoof capsule-third phalanx alignment.

Once again, software such as

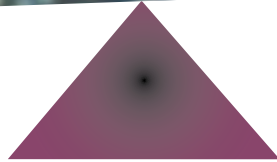
EponaTech’s makes this evaluation easy. Thermography also can be used but the availability of the equipment at this time limits its usefulness.

THE ART AND SCIENCE

To balance a horse’s hoof is both an art and science. The art is in developing a visual sense of what is needed and how to manipulate what you have to achieve your desired effect. The science is found in developing a systematic, consistent method of observing the hoof. The science is learning what is normal and what is not. But it is by developing both the art and the science that we all can better serve the horse.

Tracy Turner is a professor of large animal surgery at the University of Minnesota School of Veterinary Medicine. He worked his way through veterinary school as a farrier and is nationally and internationally known for his research on lameness.

THE QUESTION OF BALANCE



What other farriers and equine vets had to say about balance from the pages of American Farriers Journal



AS TRACY TURNER notes, there are no shortage of opinions regarding the best way of balancing a hoof — and farriers, veterinarian and farrier educators have had plenty to say about the topic in the pages of *American Farriers Journal*.

Here are some samples of what they've had to say over the years.

IMPORTANCE OF BALANCE

“Balance as it applies to horseshoeing can be defined as trimming and shoeing the foot so as to apply the weight-bearing base of the foot as close as possible to the center of gravity of the leg and foot. In general, we trim the foot to align with the foot's center of gravity and apply a shoe to align with or support the limb's center of gravity ... The object of foot balancing is to approach an equality of equilibrium of forces in the foot and limb structures that will provide an optimum performance that can be sustained over an extended period ... Feet that are kept balanced are seldom lame.”

— Doug Butler, *La Porte, Colo.*,
Dec., 1996, Page 11.



“Problems in balance manifest themselves in the foot.”

— Richard Dugan, *Minnesota School of Horseshoeing, Ramsey, Minn., Dec., 2001, Page 97.*

“The majority of breakdown and lameness concerns in the performance horse with musculoskeletal discovers can be directly traced to hoof imbalance. This is due to the abnormal and unequal forces transmitted up the horse’s limbs, placing undue stress and concussion on joints, tendons and other supportive structures.”

— Wayne Wells, *Wappingers Falls, N.Y., Dec. 2001, page 101.*

STRIVING FOR BALANCE

“Whether balance is determined by the way the horse stands or travels, farriers work hard to achieve ‘ideal’ balance for a particular horse each time it’s trimmed and/or shod. Ideal balance for one horse may not be ideal for the next.

“Trimming and dressing the hoof wall regularly prevents the need for drastic changes in hoof balance that may lead to remodeling of the coffin bone.

“Hooves should be balanced to accommodate the horse’s conformation, not to change it once the growth plates in the legs have closed. The conformation of the whole horse and its legs must be considered in addition to the hooves when assessing hoof balance prior to, during and after trimming and/or shoeing the horse.”

—Nate Allen, *Tucumcari, N.M., and Doug Butler, La Porte, Colo., May/June, 1996, Pages 28-29.*

“To achieve correct balance and function, the posterior of the hoof capsule and its horn tubules must correspond angularly to the anterior of the hoof capsule and the aligned phalanges within the hoof, respective to the individual horse’s conformation.”

—Brian Gnegy, *Auburn, Calif., May/June, 2001, Page 32.*



"I find we overlook the fact that the center of balance is under the hoof capsule as opposed to being under the center of the extended shoe."

—Billy Neville, Baerami, Via Denman, Australia, July/Aug., 1998, Page 16.

"Balancing the hoof and bony column is influenced by the structure and conformation of the horse. The farrier should be familiar with the breed and the use of the horse. A Thoroughbred is not shod the same way as a warmblood, as the different structure and conformation results in a different carriage. The differences in muscle mass and distribution affect the way a horse moves. All these factors can be influenced and enhanced with foot balance.

"By changing the balance and angles of the hooves, you can change the horse's posture. With balance and centering, both the front and hind limbs can be placed properly under the horse's body. This impact on posture is the direct effect of manipulation of the horse's anatomy with trimming and shoeing."

—Scott Curtis, Poway, Calif., Dec., 1999, Page 100.

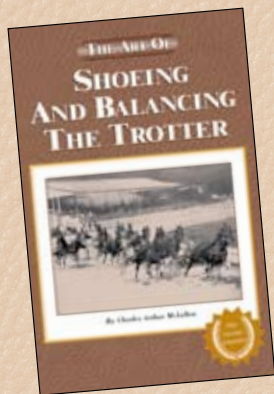
"It's often recommended that the hoof should be trimmed to an axial symmetry for the optimal mediolateral balance. But in the study presented here, hediolateral symmetry was more characteristic of injured horses than the controls. This suggests trimming the hoof to perfect mediolateral symmetry may not be the

best approach to preventing catastrophic injury (in Thoroughbreds)."

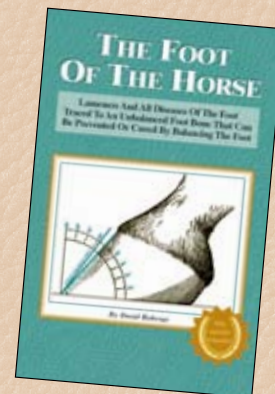
—Al Kane, Fort Collins, Colo., Jan./Feb., 1999, Page 43.

"When once asked whether I trim for static or dynamic balance in a deviated limb, I replied, 'I can make them stand straight or make them move straight, but not both simultaneously.' Dynamic balance should be achieved whenever possible. The three-dimensional forces placed on the hoof demand level contact with the ground to equalize the forces transmitted upward through the joints during various gates."

—Jim Ferrie, Newmilns, Ayrshire, Scotland, Dec., 1997, Pages 45 & 46.



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DAY-TO-DAY BALANCING

"I don't aspire to the theory that there is only one way. I don't really care if you do this with a grinder as long as the horse is balanced, level, comfortable and sound."

—Tom Keith, *Floyd Knobs, Ind.*,
July/Aug., 1998, *Page 25.*

"Trim it (the hoof) down and balance it. Everything else will fall into place."

—Wally Johnson, *Issaquah, Wash.*,
Dec. 2000, Page 42.

"If the horse can recognize a difference of 1 degree on one foot, he's too good for me to be shoeing. We're not making watches here, but balance is important ... We'll put the shoe where the foot should be to help keep him balanced."

—Chuck Bright, *Beloit, Wis.*, *Sept./*
Oct., 2000, *Page 16.*

"We just work to get the horse's foot balanced and symmetrical with minimal distortion, then see if we need a wedge or bar or whatever. Just get the horse a non-distorted hoof capsule."

—Margie Lee Gustafson, *Palto Alto,*
Calif., *Dec.*, 1997, *Page 59.*

"A lot of people who shoe think they need to do more tricks. Just stick to good, old-fashioned shoeing — balance and learn to recognize problems. It's our best bet."

—Greg Burdette, *Enumclaw, Wash.*,
March/April, 1999, *Page 40.*

BALANCE AND PERCEPTION

"Balance is your perception and perception is reality. So how you perceive your application using your knowledge is a balanced horse. To me, a balanced horse is a horse that goes forward comfortably."

—Jack Millman, *Worthington, Mass.*,
July/August, 1998, *Page 40.*

"California farrier Alice Johnson has a fabulous way of describing how to balance a foot and it's really interesting how she does it, but it's still her perception of what she's going to see. My perception of what she's going to see is different sometimes."

—John Arkley, *Wasilla, Alaska*, *July/*
August, 1998, *Page 45 & 46.*

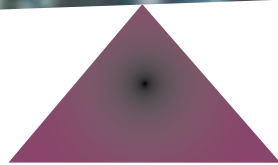
DUCKETT, RUSSELL COMPARED

"As I researched this article, it was obvious that (Dr. William) Russell and (David) Duckett are on the same track to the point that it is a good bet that Russell would be very enthusiastic about Duckett's work were he alive to see it ... Russell wrote: 'Balance the feet and body and every joint will work properly in its journals, and every muscle will move with its greatest yet most economical expenditure of force. The science of horseshoeing must be studied, the same as any other science, if you wish to become a successful farrier.'"

"Duckett has taken a different approach in the research and development of the science of farriery. His work has been proven accurate and reproducible by both the scientific community and the farrier in the field. Duckett's work is considered by many to be the industry standard criteria for farriery science today ... Both men should be hailed as pioneers in our profession and given credit for great advancements."

—Matthew Taimuty, *Colora, Md.*,
March/April, 1999, *Page 26.*

THOUGHTS ON BALANCE FROM A CLASSIC SHOER



19th century author's thoughts still relevant today

By David Roberge

EDITOR'S NOTE: THE debate on hoof balance has probably been going on in one form or another since humans first domesticated the horse. In 1894, David Roberge first published, "The Foot Of The Horse."

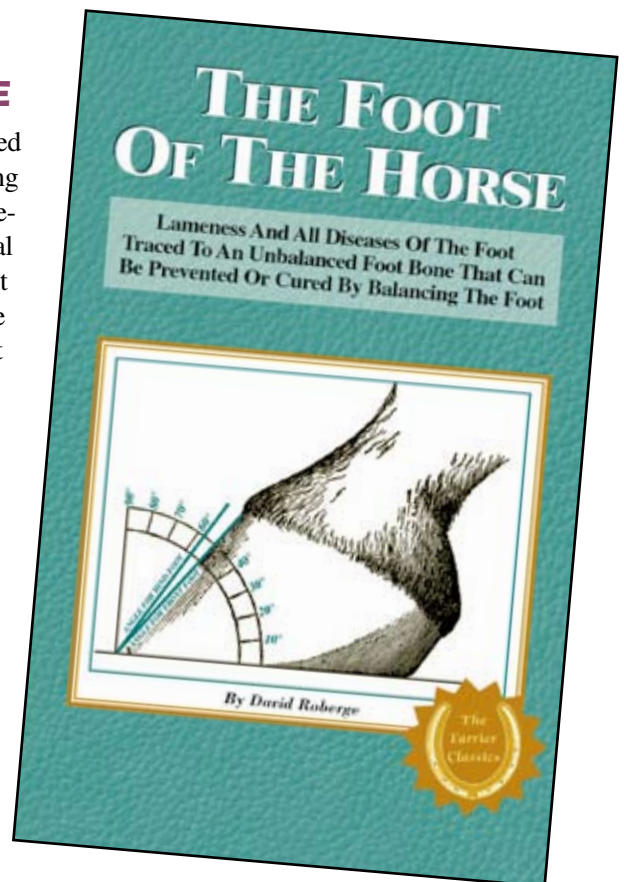
While some of the material in this 304-page book is clearly dated, much of what Roberge had to say about balance is still discussed today. Not surprising, given that the subtitle of the book is, "Lameness And All Diseases Of The Foot Traced To An Unbalanced Foot Bone That Can Be Prevented Or Cured By Balancing The Foot."

"The Foot Of The Horse" has recently been reissued by *American Farriers Journal* as part of "The Farrier Classics" series. Here is some of what Roberge wrote on the subject of balance.

PERFECT BALANCE

Great relief is always obtained immediately by simply lowering the toe, as that causes an abatement of the pain while the animal is in a standing position; that is, supposing the case to be one of navicular disease; but unless the leverage caused by both high and long toe be also judiciously reduced and kept reduced, no permanent cure can be effected.

No veterinary writer that I am aware of has ever suggested any device, mechanical or otherwise, for the purpose of realizing this intention. Veterinarians will find an important addition to their list of mechanical appliances in the rocker shoe. With this shoe no horse



points, which proves that the horse enjoys a perfect balance while using it. The locomotive on wheels when in perfect order needs its perpetual supply of oil to maintain the harmonious working of its different parts; the locomotive on legs only requires its bearing and carrying surfaces to be kept level and in a well-balanced condition by the judicious use of the rasp and knife, to insure perfect equipoise of all the forces that animate the vital machinery of the horse, and to be self-oiling into the bargain.

LEVELLING

The ordinary idea of levelling is simply to remove the inequities upon the plantar surface of the foot regardless of symmetry or balance. What the dead level of its foundation is to a building, the perfect level is to the body of the horse. This is the first requisite of a perfect balance. Men whose proper business is wagon-building sometimes engage in horseshoeing.

These men and boys, many of them, could hardly define the limits of the frog, the sole, and the wall, and yet they are permitted to jeopardize values amounting to millions of dollars every day in the week. The college of horseshoers, which should instruct in practice as well as theory, and with power to grant diplomas, would soon correct this evil.

As we have seen, the white line is a safe rule to go by; but after this is reached care must be taken to leave the foot a perfect level — not a plane surface more or less oblique, but a dead level fore and aft and from side to side. I have read of sandals and plates; and although iron plates are in vogue in some Eastern countries, I don't think they have reached the acme of perfection there any more than we have in our Western civilizations in regard to horseshoeing.

I have read nothing about them anywhere suggestive of the ideas of levelling, symmetrizing, or balancing the foot, their idea being simple protection against wear and tear.

Horseshoeing must reach a higher

plane than this before it can satisfy the requirements of Europe and American communities.

My opinion is that when the dead level of the foot and its perfect balance in all directions is fully understood and generally practiced, we shall hear of greater speed and capacity of endurance among racing and trotting horses than we have yet witnessed. There will be physical and mental developments in horses not dreamed of in the common philosophy; that lameness will virtually become a reminiscence; horses will enjoy better health and condition; people who own horses will have less plagues and losses from such property and as a consequence more pleasures and gains; and though last in the list, not the least important result will be a higher respect for horseshoeing as an art — for it must needs be through the instrumentally of improved horseshoeing that these benefits can ever be brought about.

SYMMETRY

Symmetry concerns the balance of the foot from another point of view. The foot may be dead level without being properly balanced. A perfectly balanced foot laterally is one in which the central line of bearing runs through to the toe and divides the foot into two equal halves.

This means equal weight on both sides, and equal weight implies a perfect balance; and this is the just requirement of every horse, and especially so for horses which are kept for speed.

The knife and rasp must be in requisition to produce symmetry, which means a perfect lateral balance. If the foot is so misshapen as to make it hard to symmetrize, the object aimed at, a perfect balance, must be effected as far as possible by the judicious adjustment of the shoe.

BALANCE

The essential importance of a perfect balance, if we wish to secure perfect ease or perfect action for the horse, cannot be overestimated; and this idea, *beau ideal*

I might have said, will be emphasized in the following observations.

You may have a foot perfectly level and yet not perfectly balanced. This must be effected by the perfect adjustment of the shoe in the fore and aft direction, all other things being equal.

These three ideas, levelling, symmetrizing, and balancing, should permeate every nook and corner of the horseshoer's mentality, if he would remove horseshoeing from the domain of empiricism and place it in the region of science and art where it ought to be. It should be his first and last study, as it is the most vital and essential portion of his art.

LACK OF BALANCE

It cannot be denied that many horses shod in the best manner under ordinary methods of shoeing evince a restlessness and uneasiness in their feet, without any sign of active disease, which lack of balance, I think, will sufficiently account for.

It is not uncommon for shoes to be removed under the impression that they have been hammered on too tight, or that a nail might have crowded the sensitive tissues somewhere or other, and nothing being discovered, the shoe is reset and the cause of the uneasiness remains as great a mystery as ever.

Mr. Bonner dictates his own shoeing, because horseshoers have not undergone the technical and manual training which alone would inspire confidence to leave the performance of that work to others without supervision.

PERFECT BALANCE

Further, the value of a perfect balance to horses is seen in the fact that horses have no inclination to point with their feet when they enjoy a perfect balance, any more than the animals which have ball pads in their feet.

A perfect balance is perfect repose and rest. It is astonishing to some how horses recuperate their muscular energies while standing on the centre-bearing shoe; and who does not know how the muscular tissues actually waste away under

the maleficent effects of a lame foot, producing a condition termed atrophy? It would take an abler pen than mine to do justice to this part of the subject.

EFFECTS OF AN UNBALANCED FOOT

An unbalanced foot is the fruitful cause of nearly every form of lameness to which the foot is liable, excepting those from accidents. In support of this statement, I have given a list of nine different diseases, defects, or deformities arising from a want of balance produced by the toe being too high.

I will now present you with a category of similar ills which proceed from the heels being too high, numbering eight, following which will be an inventory of ailments distinctly traceable to a lack of lateral balance, which will be referred to as the inside portion of the foot being too high, numbering twenty-seven; and closing the procession with a catalogue of maladies due to the outside portion of the foot being too high, thus making a total of fifty-four abnormal conditions which I charge to the account of an unbalanced foot.

MALADIES PROCEEDING FROM THE HEELS BEING TOO HIGH

1. Corn in one or both feet on account of treading too much upon the heels.
2. Scratches caused by the jarring of the feet and producing fever in the soft tissues between the heels.
3. Knee-spring.
4. Front-foot fissure.
5. Pointing backward.
6. Ossification of lateral cartilages.
7. Quarter-crack.
8. Inability to extend during fast progression; thus forcing the horse to step too much under his body.

DISEASED CONDITIONS DUE TO THE INSIDE PORTION OF THE FOOT BEING TOO HIGH

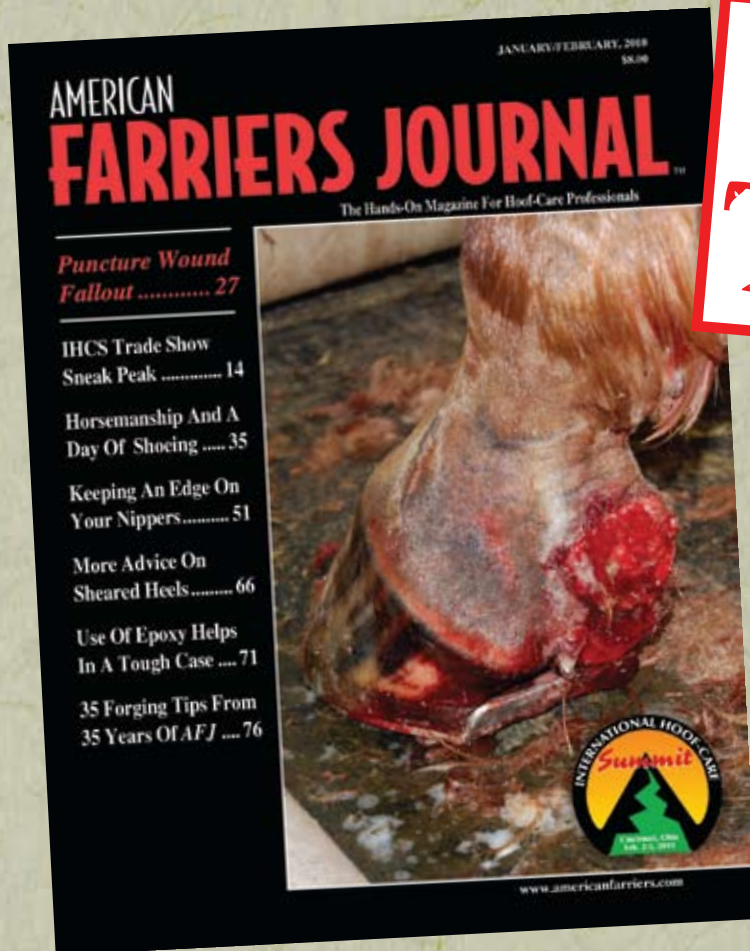
1. Warping the hoof, causing contraction of the outside heels and widening the inside heels at the same time.
2. Bending or bowing the fetlocks, hocks and knees outwardly.
3. Abnormal enlargement of tissues and hoof, the inside heel.
4. Corn on the inside heel.
5. Quarter-crack of inside heel or quarter.
6. Deformity of the inside heel by lengthening.
7. Causing the feet to stand too close to each other resting or travelling.
8. Causing ringbone on the inside of the pastern.
9. Causing ossified cartilages.
10. Stumbling both before and behind.
11. Sprain of the suspensory ligament on the outside of the fetlock.
12. Wingall on the outside of the fetlock.
13. Knuckling before and behind.
14. Splent immediately under the knee on the inside.
15. Knee-sprung outwardly.
16. Spavin and deformity of the hoof of the same foot.
17. Soft tumor on the inside and inclining to the front of the knee.
18. Interfering before and behind.
19. Boxing or hitting the knee.
20. Hitching behind.

21. Causing the hind foot to tread between the two fore ones.
22. Causing the head to be carried on the same side that is carried inward.
23. Causing the horse to drive on one line and to cross the road.
24. Bony deposits on the inner and forepart of the fetlock, called high ringbone.
25. Causing one foot to rest against or upon the other.
26. Springhalt.
27. Bog-spavin and thoroughpin.

DISEASES CAUSED BY THE OUTSIDE PORTION OF THE FOOT BEING TOO HIGH

1. Corn on the same side.
2. Enlargement of the quarter, and ossification of the lateral cartilage of the same quarter.
3. Increased growth of hoof on the same side compared with the inside.
4. Ringbone partly in front and toward the outside of the pastern.
5. Wingall on the opposite side of the fetlock in both fore and hind legs.
6. Rupture of inside suspensory ligaments of both fore and hind legs.
7. Cause of travelling too wide apart of both fore and hind feet.
8. Cause of an outside spavin, or a soft spavin opposite the ordinary spavin.
9. Cause of a bony deposit on the outside of the fetlock, and partly in front of the same, which corresponds with the high ringbone of the opposite side.
10. Ossification of lateral cartilages.

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