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Examination of the Equine Foot
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10-year-old Oldenburg mare was presented for pre-purchase examination. The mare was current on all health care, vaccinations, deworming, etc. The mare was currently in 4 to 5 hours of work weekly. She was intended to be used for dressage.

The purpose of the pre-purchase examination is to furnish the prospective buyer with medical information which is germane to their decision whether or not to buy the horse. The equine foot is the most common site for lameness to develop. It is therefore of utmost importance to perform a thorough examination of the foot in order to identify problems or predisposing factors that need discussion with the prospective buyer.

There are numerous causes of pain in the foot of the horse. These causes can be categorized as: (1) conditions of the hoof wall and horn producing tissues, (2) conditions of the third phalanx, and (3) conditions of the podotrochlear region. Hoof problems would include: hoof wall defects, such as cracks that involve the sensitive tissue; laminitis, laminar tearing (local, due to hoof imbalance), separation or inflammation of the sensitive laminae from the insensitive laminae; abscess formation; contusions of the hoof causing bruising or corn formation; neoplasia, and pododermatitis (thrush or canker). Third phalanx problems include: fractures of the coffin bone (types I-VII), deep digital flexor insertional tenopathy, pedal osteitis (generalized or localized inflammation of the bone), and disruption of the insertions of the collateral ligaments, cyst-like lesion formation, and remodeling disease. Conditions of the podotrochlear region have been reported to include distal interphalangeal synovitis/capsulitis, deep digital flexor tendinitis, desmitis of the impar (distal navicular ligament) or collateral sesamoidean ligaments, navicular osteitis or osteopathy, and vascular disease of the navicular arteries, and navicular fractures. The common denominator of all these conditions is that they are characterized by pain that can be localized to the hoof.

**Examination:** The examination requires comprehensive evaluation of the external hoof, evaluation for deep pain, evaluation of “hoof balance”, evaluation of radiographs or other imaging modalities. The evaluation of the horse’s foot, like all examinations, requires a thorough medical, performance and shoeing history.

An appreciation of the breed and the use of the horse will provide information relative to the incidence of certain foot problems. Thoroughbred and Quarter Horse racehorses have a relatively high incidence of foot bruising, pedal osteitis, distal phalanx fractures, heel bulb damage from overreaching, quarter cracks, nail problems, underrun and sheared heels. Standardbred racehorses also have similar foot problems but have a much higher incidence of quarter cracks. Racing combines extraordinary speed with surfaces that are more conducive to speed rather than cushion, thus creating tremendous force on the hoof. Quarter Horses, Thoroughbreds, Standardbreds and the warmblood breeds have the highest incidence of navicular problems; whereas, Arabians and ponies have the least issue with the navicular bone. Horses that participate in agility sports such as roping, cutting, reining, barrel racing and polo have frequent problems with pulled shoes and...
associated hoof wall loss. Distal phalange fractures occur but with less frequency than in racing. Palmar foot pain syndrome is a frequent diagnosis in this group as well. Horses used over fences such as show jumpers and eventers suffer frequently from foot bruising, pulled shoes and hoof wall loss, quarter cracks, and palmar foot pain syndrome. Gaited horses such as Morgans, American Saddlebreds, Tennessee Walking Horses, Arabians, and Hackneys (horses and ponies) are often purposely shod with longer hooves, heavier shoes, and pads, which alter the biomechanics of the hoof capsule for animation and frequently result in problems with hoof wall breakage, hoof cracks, and thrush. Sand cracks (coronary quarter cracks) occur more often in Saddlebreds and Tennessee Walking Horses than any other breed. Laminitis is seen frequently in older horses of all breeds, Morgans, ponies of all breeds, and heavily campaigned overweight show horses. Horses that are turned out to pasture for extended periods of time frequently show hoof wall loss, superficial hoof cracks, and subsolar infections. The larger draft breeds (Clydesdales, Percherons, Belgians) that work in harness often injure the coronet and associated tissues by stepping on their feet. There is reportedly a high incidence of canker in these draft breeds.

**Physical Inspection:** Evaluation of the hoof begins with a subjective evaluation of the size, shape, toe length, heel length of the hoof; as well as evaluation of hoof/pastern axis and position of the limbs relative to each other. The examiner should evaluate the shoes if the horse is wearing them, and inquire why any special shoe or additions to a shoe (calk, grabs, extensions, or bars) were used. Bar shoes, for example, are often useful in treating various foot problems, but may be employed solely as a fad (all the dressage horses in a barn wear egg-bar shoes). Is the bar shoe fitted appropriately? First and foremost, it is more important how any shoe is applied rather than the type of shoe i.e. “the application is more important than the appliance”.

Like any physical examination, the hoof examination is more than simply measuring a few parameters and determining where on the scale of normality they fall. Instead, it should be is a systematic evaluation of the hoof capsule and the structures within, reflecting the general health of the hoof, the stresses that have been placed on it and the hoof’s response to these stresses. The hoof is a dynamic structure that grows continuously and therefore has the ability to deform continuously to stresses that are applied to it.

The examination begins simply by looking at the hoof, preferably from sufficient distance to compare all four feet at once. The size, shape, toe length, heel length, hoof pastern axis, and position of each foot relative to the each limb, and to each other, are assessed. This is the best time to evaluate the horse’s “balance”, which can be explained as the differences in each of the horse’s legs and how the horse stands on the hoof, evaluating the position of the hoof on the end of the limb. This analysis must be performed from 3 directions, the front (dorsal), the side (lateral), and the back (palmar/plantar). From the front, the hoof needs to be assessed for symmetry and alignment. Is the hoof centered under the cannon bone or is it offset? If the hoof is offset then the stresses on the hoof will change. Does the hoof rotate on the leg (toe-in or toe-out)? If it does rotate, where does it rotate from, knee, fetlock, pastern, or hoof? This will determine where the torque is occurring on the hoof. Does the ground surface of the hoof
appear symmetrical? If not, this indicates stresses on the hoof. Most commonly, one sees that the medial wall is more upright. Is the coronary band straight and parallel to the ground surface? If not, this indicates a stress on the wall below the coronet.

The next factor to observe is hoof alignment. This is viewed from the dorsal and lateral aspects. Most horses (60%) will have a hoof angle between 50-55 degrees. The hoof axis describes how the cannon bone, pastern, and hoof align. Ideally, when the horse is standing square; the cannon bone, pastern and hoof should form a straight line as seen from the front. From the side, the pastern and hoof should be parallel with the angle created by the dorsal hoof wall and the angle of the heels should be within 5 degrees of the angle of the toe. Horses that have a low hoof angle compared to the pastern have a broken-back hoof axis and fall into a group of horses called long toe and low heel. On the other hand, horses with a steep hoof and sloping pastern have a broken-forward axis and are called “clubby”. Unfortunately, horses do not normally stand with their cannon bones perfectly perpendicular to the ground, so evaluation of hoof alignment must be done with the horse standing comfortably. The purpose is not to determine right and wrong but to determine what is comfortable for the horse.

The next areas to evaluate are the shape and levelness of the hoof. Generally the front hoof should be round or circular in shape, while the rear hoof is more triangular or “pear” shaped. Front and rear hooves should be shaped like inverted cones. Both hooves should be evaluated for differences in length and width. Hooves of equal width and length tend to look circular but as the length becomes greater than the width, the hoof wall in the quarters becomes more upright and the stresses on the hoof will naturally be different. The levelness of the hoof has two aspects: the ground-bearing surface should be flat, and perpendicular to the upper limb. This determines how evenly the hoof wall will bear weight and how the leg is loaded during weight bearing. These factors are the basis for determining medial to lateral hoof orientation.

The final observation is evaluation of heel support. This is best performed from the side and back of the hoof. This is done by assessing the conformation of the ground-bearing surface of the heels relative to the remaining hoof capsule, pastern, fetlock and cannon bone. Does the ground-bearing surface provide sufficient support to the palmar (plantar) aspect of the digit? Are the heels of the hoof centered under the cannon bone (from the palmar/plantar aspect) or are they offset? This can be important in determining how the horse loads the heels, whether both sides are landing simultaneously or whether one heel may strike before the other. These observations are helpful for the examiner interpret how the hoof capsule has grown and remodeled to adapt to the forces on it.

The next stage of evaluation needs to be performed first with the horse in weight bearing position and then with the foot in non-weight-bearing position. This begins by palpating the pastern for any obvious heat, pain or swelling. The examiner also needs to palpate the bones and tendinous structures. Generally, the flexor tendons are not as wide as the pastern bones and there is a finger’s width difference medially and laterally. The tendons should be followed down the leg until they disappear at the heel bulb.
The digital arteries, vein and nerve are next palpated. It is normal to feel a digital pulse but not a bounding pulse, which is abnormal and an indicator of foot inflammation. The strength of the pulse can be compared to other limbs to enhance interpretation. A symmetrical abnormal pulse indicates generalized inflammation, whereas an asymmetric pulse indicates an inflammatory process on the side of the stronger pulse. In addition, the skin should be carefully palpated for the presence of neurectomy scars.

Palpation is then continued to the coronet (hairline / hoof capsule junction). I prefer to palpate from the central toe region caudally on the medial and lateral aspects. Normally one should appreciate a "spongy" feel to this area and deviation such as swelling, discharge, focal pain or heat, absence of tissue (loss of sponginess or a "trough") should be examined more closely. The examiner should feel that the hairline forms a smooth edge with the hoof capsule. Any area where the hoof capsule is prominent indicates an area of stress. The author believes that these edges indicate a proximal movement of the hoof capsule ("jamming") into the hairline. In many breeds, particularly in the gaited breeds that carry longer lengths of hoof, this seems to be normal. As the edge becomes more prominent, the examiner can be sure that the vertical distance from the hairline to the extensor process of the third phalanx is increasing (measurement that can be confirmed with a lateral radiograph).

From the coronet, the examiner moves to the collateral cartilages which should be are palpated and manipulated. The palmar and proximal edges should be easily defined. The thickness, density, and pliability of the cartilages need to be assessed. Palpation of this area not only will determine if there is any pain but also can give an impression of the flexibility of the hoof. For instance, a very stiff, inflexible collateral cartilage is associated with a narrow, upright hoof. On the other hand, flimsy cartilages are commonly seen in the hoof with collapsed heels and a narrow, convex shaped frog.

The entire hoof wall must be examined for the presence of cracks, fissures, bulges, growth abnormalities, focal heat, wall loss, or breakage. A high percentage of quarter and heel cracks begin as small very fine fissures at the coronet. They may extend less than 1 cm distally and are easily missed if this area is not carefully examined. In fact, the author pays particularly close attention to any area of the hairline that is not straight. These small fissures are a definite cause of foot pain and usually associated with deeper injury to the coronet and/or lamina below. Concentric rings on all four hoof walls usually indicate metabolic stress, such as fever, or significant diet change. Divergent rings most often indicate laminitis.

The exit of all shoeing nails from the hoof capsule needs to be evaluated. The higher the exit point, the more likely the nail is impinging on sensitive tissue. This is an excellent time to use the hammer and gently percuss the hoof wall to determine wall defects, hollow sounds or painful areas.

From this point, it is natural to begin manipulating the foot in the non-weight bearing position. Begin by cleaning the bottom of the hoof, using the dull side of a hoof knife. Turn the hoof knife to use the blade to lightly pare away any debris that obscures the
surfaces of the frog, sulci of the frog, sole, and white line if the horse is unshod. Once the foot is clean, examine it in its entirety. The frog should be examined for size, shape, consistency, and to determine whether it is securely attached to the underlying tissue and its sulci (collateral and central). The examiner needs to determine how much of the structure could actually bear weight and how much represents loose tissue. It is the author’s opinion that the frog should be a resilient, rubbery structure versus a hard, flaky consistency.1 The frog should be nearly even with the ground surface of the hoof wall, particularly the caudal two-thirds of the frog.3 The frog should not be recessed deep to the sulci of the foot nor should the frog be convex at its apex. The receded frog is often associated with upright narrow feet, whereas, the convex frog is associated with weak and underrun heels. The author associates this conformation with a poorly constructed digital cushion and therefore, a poor hoof support mechanism.

The medial and lateral bars of the foot usually require light paring with a hoof knife to appreciate problems such as bar cracks.1 Do not pare the bars down totally as this weakens the foot. The entire sole of the foot should be carefully examined for fissures, punctures, consistency, discoloration (bruising), and the degree of concavity. The shape of the sole should be concave. If it is not, then the sole will be either flat or convex. A flat sole may signify either poor hoof conformation (a weak hoof) or coffin bone displacement. A convex sole, however, indicates a displaced coffin bone. The consistency (relative degree of stiffness) is usually determined using digital pressure as well as hoof testers. At this point it is necessary to evaluate the texture of the sole. By grasping the quarters with your fingers the thumbs can be used to gently press on the sole. If the sole moves under this pressure, it is thin and the examiner knows that there is little space between the coffin bone and the outside environment. On the other hand, if the sole does not move, the examiner knows there is at least some thickness and depth to the sole. The true sole depth can be determined later via radiography.

The white line is examined to determine its width and character.1 The white line is usually wider at the toe and gradually tapers to a thinner structure as it approaches the heels. It is best visualized following either light paring with the hoof knife or light rasping of the superficial portion of the foot. It is used to demarcate the insensitive hoof from the sensitive hoof for the purpose of driving horseshoe nails. Everything outside the white line is insensitive, everything inside is considered sensitive. Widening of this area represents stress and separation of the laminar hoof wall from coronary hoof wall. The deeper the separation goes, the more severe the injury. This separation can be seen anywhere on the solar surface and indicates a bending force on the wall that is pulling the wall away from the coffin bone. Most frequently this separation is seen at the toe and is referred to as “seedy toe” because it looks like small seeds could fit between the spaces created by the separation.

From the rear (palmar/plantar) of the hoof examine the bulbs of the heels to determine their relative position to one another.1 The strength of this tissue is assessed manually by attempting to distract the two bulbs from one another in a vertical direction. Digitally explore the heel bulbs for the presence of swelling, heat, pain, or separation at the coronet. The central sulcus of the frog needs to be examined and probed to determine its
depth. Normally this should be a shallow depression of no more than a centimeter. If the sulcus goes deeper, there may be either very serious thrush or loss of structural support in heel bulbs, in which case the heel bulbs can be distracted in opposite vertical directions.

Lightly support the limb at the metacarpus (metatarsus) and allow the foot to drop naturally.\(^1\) Position your line of vision so as to appreciate foot balance and levelness of the walls. Imagine a line drawn through the axial center of the limb, which transects the ground surface of the foot, and then determine the relative proportion of medial and lateral foot to this imaginary line. For example, a given foot may demonstrate a unilateral medial heel contraction in combination with a flared lateral quarter and toe (diagonal imbalance).

Repeat the palpation of the cartilages of the distal phalanx and the coronet.\(^1\) Bringing the limb forward and flexing the toe facilitate palpation in the region of the extensor process of the distal phalanx region and the associated distal interphalangeal joint. The thumbs or index fingers can then be pressed over this area to feel for joint distension, heat, or pain. The foot also should be rotated (twisted) medially and laterally around the vertical axis of the pastern. A normal range of motion allows for 10-15 degrees of rotation each way. Injury to the joint capsule, collateral ligaments or chronic navicular pain tends to reduce this motion. Likewise, distal limb flexion should reveal 30-45 degrees of excursion. Again, injury to the joint capsule, collateral ligaments or chronic navicular pain tends to reduce this motion.

If the horse is shod, the exam should include the following additions.\(^3\) First; determine the security of the shoe to the foot, by gently rapping the shoe at one inch intervals with a shoeing hammer. Make note of the shoe type as well as the presence or absence of additions such as toe grabs, block heels, trailers, and so forth. Carefully determine if abnormal shoe wear exists. Position the hoof testers to include the hoof wall at the exit point of each nail. Carefully record your findings, as it is easy to forget subtle discoveries that may ultimately determine how the horse should be treated or shod. Keep in mind that hoof testers are essential but certainly not foolproof. The response the examiner gets on hoof testers is dependent on many factors such as the hardness of the wall, depth of the hoof, thickness of the hoof, and the stoicism of the horse.

**Assessment of Pain:** The next step in developing a logical approach to the prepurchase evaluation of the hoof is an accurate exploration for pain in the foot and careful evaluation of hoof structure that may predispose to or cause the pain.\(^8\) First, examine the horse in motion, watching the foot strike for each foot. Determine if the foot lands flat, heel or toe first, medial or lateral quarter first.\(^1,3\) The landing position of the individual foot relative to the vertical axis of the respective limb should be noted. Evaluate the path the individual foot takes from foot breakover to strike. The character of motion may be a clue as to where on the foot or the limb a problem may exist. Always include this examination at the walk because it is the one gait that is sufficiently slow to permit the determination of fine movement error. Repeat the same process when reviewing the horse from the left and right side. The horse is then trotted (or paced) and visualized in the same manner. Circling the horse will often exacerbate foot problems.
Toe first landing or excessively heel first landing indicates either compensation for pain or dorsopalmar hoof imbalance. Similarly, medial or excessively lateral heel/quarter first landing suggest either compensation for limb conformation or pain leading to mediolateral hoof imbalance. The flight of the foot during the stride is correlated with rotational deviation of the limb and imbalance of the foot. The horse that wings-in or “dishes is either toed-out or breaking over the inside toe. Conversely the horse that paddles or wings-out is either toed-in or breaking over the outside toe.

Four diagnostic tests should be performed: hoof tester examination, distal limb flexion, hoof extension wedge test, and palmar hoof wedge test. Positive response to any of these tests is important but a negative response is equivocal and does not rule out any problem.

Hoof tester examination should be performed systematically, how you perform the exam is unimportant but get use to a routine. I like to begin at the heel on my left side and work around the hoof in a clockwise fashion. Begin with the bar, move to the heel, to quarter and then toe then back toward the heel on my right. Space the tester’s progress at approximately one-inch intervals. Be sure to include each exit point of the shoeing nails. Next, place the testers in each of the collateral sulci and across the hoof to the opposite hoof wall (I like to progressively move the hoof tester along the hoof wall caudal to cranial to check for alterations in the pain response; then place the testers in the central sulcus to the hoof wall at the toe, and then across the heels). Remember that the closer the ends of the hoof testers are, the more accurate the exam is in localizing pain. A positive response should be repeatable, and in the frog region, the pain response should be uniform over those areas and must be evaluated in relation to examination of the remaining foot. That is, a positive response in the heels and quarters of the sole would also be expected to cause a positive response across the distal sesamoidean region in the same area of the foot. Percussion utilizing a small hammer can also provide important information regarding pain in the hoof wall or sole by gently rapping the structures on the bearing surface of the sole and frog and over the hoof capsule.

Distal limb flexion test may exacerbate lameness if any of the three distal joints of the leg are affected by synovitis or osteoarthritis. A positive response could also be expected by any condition that causes induration of the tissues of the foot. Distal limb flexion test is performed by flexing the distal limb, holding the limb in that position, and trotting the horse away after 30 seconds. This has been shown to be positive in over 95% of horses with foot pain.

The hoof extension test is performed by elevating the toe with a block, holding up the opposite limb, and trotting the horse away after 60 seconds. This test has a positive predictive value for foot pain of about 50%. The palmar hoof wedge test is performed in a similar fashion except the block is placed under the palmar two-thirds of the frog and forcing the horse to stand on that foot. The test can be further modified so that the wedge can be placed under either heel to determine if the pressure there causes exacerbation of the lameness. This test has a positive predictive value for foot pain of over 85%.
These tests simply allow the examiner to evaluate the horse’s response to a particular stress. None have been shown to be pathognomonic for any particular lameness.

**Imaging:** After thorough physical examination of the foot, imaging is necessary to evaluate the internal structures. Radiographic examination of the hoof requires a minimum of 5 radiographic views of each foot.\(^9\) The views consist of a dorso-60°-proximal to palmarodistal (D60PrPD) of the navicular bone, a dorso-45°-proximal to palmarodistal (D45PrPD) of the third phalanx, a lateral to medial projection, a horizontal dorso-palmar projection, and a palmaro-proximal to palmaro-distal navicular bone projection. These projections will allow the examiner to evaluate the bones of the distal limb to sufficiently assess a number of parameters. Digital radiography makes it possible to perform the same evaluation with only 4 views (the D45PrPD is unnecessary).

There are two schools of thought on how the radiographs should be interpreted. Most of the time, radiographs are examined for signs consistent with the tentative diagnosis, such as evaluating for signs of navicular disease. In this case, the radiographs are evaluated for changes such as enlarged synovial fossa (lollipop formation along the distal border), enthesophyte formation along the proximal or distal border, flexor cortex changes, cyst-like formation within the bone, or medullary sclerosis.\(^2,9\) Unfortunately, research has shown that these changes occur in the non lame population with the same frequency as horses with navicular disease.\(^10\) Further, each of these views must be assessed for any significant changes in any of the bone surfaces.

It is the author’s opinion that the radiographs should be assessed for change and what the change means from a pathologic sense. Once the basic films have been examined, it may be necessary to take additional oblique views to completely appreciate any pathologic change. The author evaluates each of the 5 views for various changes, the dorsopalmar projection is used to assess the joint surfaces and joint alignment, assessment for osseous change within the bones, assessed for hoof capsule - bony column orientation and medial to lateral hoof balance. The lateral projection can be used to assess joint surfaces, osseous changes within the bones, navicular bone changes, hoof pastern axis deviation, and hoof capsule bony column orientation. The dorsosolar view of the third phalanx can be used to assess the weight bearing margin of the bone, assess the size and symmetry of the vascular channels and third phalanx bony architecture. The navicular bone should be evaluated along the proximal and distal borders, assessment of the distal border to determine presence or enlargement of synovial fossa, and for changes within the navicular bone architecture. The flexor view is assessed for changes along the flexor surface of the navicular bone. This view is also important to assess the medullary cavity of the navicular bone, and it is the best view for assessment of the wings of the third phalanx. Evaluation of the radiographs along these parameters allows a thorough assessment of the bones of the foot to determine changes that may have occurred as a result of pathology, or as a result of occupational stress both important factors for the potential buyer. If the radiographs show changes it may be warranted to do further imaging diagnostics to more accurately determine the pathological changes. Imaging such as navicular bursography, ultrasonography, or even magnetic resonance imaging may be needed to clarify changes sufficiently to appraise the pathology. In some cases it
may be warranted to perform physiologic imaging such as scintigraphy or thermography to fully comprehend the pathology. Scintigraphy is excellent for looking for inflammation of the deeper structures while thermography is excellent for assessment of the hoof capsule and superficial structures as well as it is an excellent method for assessing vascular disease.

**Evaluation of the foot, clinically and imaging, is subjective. The question arises, are there objective methods of assessment?** As part of any evaluation of the hoof, an objective assessment of hoof balance is important. Measurements are made of each forefoot. The horse's weight is determined with a weight tape or scale. Measurements are made of the hoof length with a tape measure (these can also be done using computer program such as Metron™): medial and lateral heel lengths, vertical distance from the heel coronary band and sagittal toe length. In addition, the frog's length and width are measured at their longest and widest points. The hoof angle is measured using a hoof gauge and hoof circumference is measured immediately below the coronary band. These measurements are used to compare right to left but these measurements can used to calculate the frog ratio (frog width divided by length), body size to hoof area (horse's weight (pounds) X 12.56 / square of the hoof wall circumference(C) (inches)), and the heel measurements with the vertical distance of the heel to the ground are used to calculate the angle of the heels.

These measurements can be used to identify measurable hoof imbalance. A lateral radiograph can be used to assess more accurately this relationship. Underrun heels are defined as when the angle of the heels of the hoof is 5° less than the toe angle. Contracted heels have been defined as a ratio of the frog length to frog width. When the frog width is less than two-thirds the frog length contracted heels exists. Sheared heels can be defined as any medial lateral asymmetry. Sheared heels, a form of medial-lateral imbalance, have been defined as a medial and lateral hoof wall length disparity of 0.5cm or more. Mismatched hoof angles have been defined as a right to left hoof angle disparity of more than 2°. Weight to hoof size is calculated by multiplying the horse’s weight by 12.56 then dividing that by the square of the measured hoof circumference. The maximum hoof to weight ratio is 78lbs/in² (5.5kg/cm²).

Previous studies have shown that these imbalances can affect future soundness. Broken-back hoof axis occurs in about 10% of athletic horses. However, it is three times more likely to be seen in a foot lame horse. Likewise, broken-forward axis occurs in 4% of the normal horses but is two times more likely to be seen in a foot lame horse. Underrun heels are the most common hoof imbalance, occurring in 52% of non lame athletic horses, but this imbalance occurs 1.5 times more often in lame horses. Contracted heels, measured as frog width less than two-thirds the length, have only been associated with 22% of non lame horses but it is 3.3 times more likely to seen in a horse with foot lameness. Medial-lateral imbalance is seen in normal horses only about 12% of the time but horses that develop foot lameness are 2.75 times more likely to have this imbalance. On the other hand, mismatched hoof angles occur in about 28% of horses and are equally likely to be present in lame horses as sound horses. Body weight to hoof area of greater
than 78 lbs/in\(^2\) occurs in only 2\% of competitive horses. Horses that develop hoof lameness are 7.5 times more likely to have small feet for their body weight.

These measurements also impact prognosis for associated lameness.\(^6\) If a horse becomes lame and the hoof has underrun, contracted and sheared heels, that horse is four times less likely to have the lameness successfully resolved. Another prognostic factor is weight to hoof area ratio. Horses with a ratio of greater than or equal to 83 lbs/in\(^2\) are extremely unlikely to have the lameness resolved. This is a grave prognostic sign, the author has never successfully resolved a case with this hoof ratio.

**Conclusion:** The examination of the foot must be based on observations of the hoof, followed by a careful exploration for areas of pain. This must be followed by an assessment of the biomechanical forces on the hoof and limb. Finally imaging gives insight into the nature of the stresses on the foot and allows the examiner to assess prognosis for its athletic future.

**References**


Footnotes:

a Metron™, Epona Tech, Pomona, CA