The E.L.P.O. offers guidelines that pinpoint causes to modern day lameness issues and pathology.

- Historically horses have been used as vehicles of travel and work. In an average day a given horse would spend 8 to 12 hours pulling a cart, working a field, riding a trail, gathering horses or carrying riders into battle. The majority of their activity was very demanding, but for the most part was done at low to moderate speeds and primarily in straight lines. Foot maintenance and protection was of paramount importance for the demands placed upon the foot and the horse. For the most part, the hoof care practices that were used met the needs of the horses AT THAT TIME. Although lameness and hoof pathology existed, they did not impact the horse industry as much because expectations and investments in horses were not as great. If a horse became lame and unable to do what it was asked to do, the owner would transfer that horse to a new occupation and get another sound horse to meet their needs.

- Over the last 50 years, the role and expectations of horses in the lives of humans have changed. Horses in general have become vehicles of sport and leisure. The average horse today may spend 20 – 22 hours a day in a stall or small paddock and only ridden 2 – 4 hours if they are lucky. Most horses do not get ample time to warm up and when they are ridden, it is often in circles and at moderate to high speeds. Although horses have proven to be extremely durable, the tasks and demands of the modern day horse have surpassed the ability for conventional hoof care practices to meet the challenges and expectations placed upon the foot & horse.

- E.L.P.O. hoof care guidelines are simply a way of trying to understand and recognize the needs of the modern day horse and adapt the hoof care practices to each individual horse and individual foot to help meet the current demands and expectations.

- Through looking at lameness and pathology from a causation standpoint (meaning finding the root cause), we can better formulate both a treatment plan for those lameness issues, as well as employ those common practices as preventative hoof care guidelines.
E.L.P.O. Hoof Care is.....

- becoming more aware of the horse’s foot by way of scientific research and the observations of the naturally prepared foot.

- understanding what is healthy & normal, and what is distorted & abnormal, and how performance & soundness is affected by an unhealthy or distorted foot.

- understanding good foot function and how to achieve equilibrium around the DIP Joint.

- a set of guidelines & principles to follow for hoof maintenance that will help overcome distorted feet.

- a set of hoof preparation guidelines that will support the biomechanical needs of the foot, with special attention given to caudal foot function & medial/lateral balance.

- a set of guidelines to help better understand the movement of the horse from a performance & soundness perspective (e.g. – hoof landing, length of stride, etc.)

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A Basic Definition of Hoof Balance

Hoof Balance is the state whereby the hoof wall, sole, bars & frog are prepared so that equilibrium exists in and around the coffin joint. With a shoe placed on the foot, a maximum base of support should be provided while still minimizing stresses and leverages to the lower limb, both statically & dynamically.

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Dr. Rooney’s theory on how Navicular Disease occurs...

- the unnatural toe first landing seen in many horses, and the unnatural forces, rocking and vibration that result, is the primary cause of Navicular disease, not the other way around. Damage occurs:
  1st. To the fibro cartilage surrounding the Navicular bone.
  2nd. To the fibro cartilage surrounding the deep flexor tendon.
  3rd. To the deep flexor tendon itself
  4th. The Navicular bone is damaged by the rough surface of the damaged deep flexor tendon.

MRI & Ultrasound findings are now confirming this sequence of events.
Similarity between the Chronic Laminitic Foot and the Club Foot:  
*Hence Similar Treatment Protocol*  
Gene Ovnicek, RMF

Over the last 10 to 15 years that I’ve been dealing with primarily lame or pathologic horses, I’ve found that the treatment for chronic laminitis (using Natural Balance Guidelines) has helped me better understand and manage clubbed and mismatched feet.

Club Feet and/or High-Low, mismatched feet are represented in about 60% or more of the domestic horse population. Within that 60%:

1) Approximately 30% - 40% are seen as **Minor** conditions
2) Approximately 50% - 60% are seen as **Moderate** conditions
3) Approximately 10% are seen as a **Severe** condition

- **Minor** upright feet are seldom ever noticed by skilled horsemen.
- **Moderate** club feet – upright feet are usually noticed by knowledgeable horsemen
- **Severe** club feet are noticeable by almost everyone

**Minor Upright (Mismatched) Feet Characteristics**

1) The frog apex is close to a “normal” distance from the dorsal wall.
2) The heels terminate ahead of the frog buttress.
3) The outer wall at the heels has a similar curvature as the bars.
4) The dorsal wall is normally straight but will become dished when left long.
5) The general shape of the foot is round
6) The heels grow forward if left with extra length.

**Moderate Club or Upright Feet Characteristics (Grade 1 or 2+)**

1) The frog apex is a greater distance from the dorsal wall then a “normal” foot.
2) The heels terminate close to the back of the frog buttress.
3) The hoof walls at the heels curves abruptly while the bars substantially straighter.
4) The dorsal wall is frequently straight below the coronary band, but develops a dish if the toe and heels are left too long.
5) The general shape of the foot is straighter on the sides.
6) The heels grow in a vertical direction but can become underrun if the heel and toe are left too long.

**Severe Club Feet (Grade 3 or higher)**

1) The frog apex is a noticeably greater distance from the dorsal wall than a “normal” foot.
2) The frog appears very short in comparison to other feet.
3) The heels terminate at the back of the frog buttress.
4) The outer wall at the heels has a very abrupt curvature, yet the bars are extremely straight.
5) The dorsal wall is very straight below the hairline (almost vertical), and dishes abruptly if the toe is left with any extra length, regardless of the heel height.
6) The heels grow upright (almost vertical) and do not grow forward with extra length. At the same time, trimming the heels down will not increase caudal support (e.g.: increased length and width).

What can be expected of each of these type of feet:

1) The **Minor** upright foot is not easily distorted, so lameness is not likely.

2) The **Moderate** club/upright foot can be managed easily with NB principles, and performance is not normally affected by the condition.

3) The **Severe** club foot can be useful in many cases, but can be limited by the condition. Special shoeing and/or surgery are often helpful in the management program.

Traditional Treatment Protocol for Upright Feet

**A) Lower the Heels**

1) To adjust for pastern alignment
2) To match the angle of the other foot
3) To stretch the tendon

**B) Leave the Toe Longer**

1) To adjust for pastern alignment
2) To match the angle of the other foot
3) To help stretch the tendon

<table>
<thead>
<tr>
<th>Positive Aspects of Traditional Corrective Treatment</th>
<th>Negative Aspect of the Traditional Corrective Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Temporary change in the appearance of the foot.</td>
<td>- The horse fails to land heel first</td>
</tr>
<tr>
<td></td>
<td>- In time, the dorsal wall becomes severely distorted.</td>
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<tr>
<td></td>
<td>- The heels become contracted</td>
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<tr>
<td></td>
<td>- The frog loses ground contact and contracts</td>
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<tr>
<td></td>
<td>- The sole fails to adequately protect the distal border of P3</td>
</tr>
<tr>
<td></td>
<td>- Pedal osteitis soon develops from landing toe-first on thin soles</td>
</tr>
</tbody>
</table>

*Why so many negatives?*

- Tendons do not stretch easily or with any significant length
- Muscles will contract when excessive tension is applied
- The inferior check ligament limits the length of the DDFT distal to the muscle attachment

*Why do we try to correct the foot?*

- Most people do not realize that it can be normal to have two different feet
- Traditional literature
- Many schools teach matching feet for A/P balance
- The owners and/or trainers demand that the feet look the same
Sole Thickness & Heel Growth in Laminitic Feet

Feet that do not have a predisposition to being clubbed, naturally upright or laminitic do not seem to grow an unusually thick live sole in the heel region, for example a non-painful, flat thoroughbred foot. It is not until problems arise with pain involvement like pedal osteitis, laminitis or some other condition that creates discomfort to the foot in general or to the DDFT. Pain seems to be one of the key factors in the acceleration of heel growth and thickening of functional sole material in the caudal part of the foot. At the same time, controlling the pain or eliminating the pain in the foot seems to minimize or stop the production of live looking sole in the caudal part of the foot. Therefore, when the foot releases sole tissue that is ready for exfoliating, the sole material at the heels becomes chalky and flaky. At that time, the heel of the foot (the hoof wall) is ready to be trimmed.

Trimming of the wall should be conservative and must not reach the depth where you invade the waxy sole behind the widest part of the foot. If the breakover is not placed with either the shoe or the trim so that the pain or tension on the DDFT is controlled, the heel will re-grow in defense of trauma to the distal border of P3 or excessive tension on the DDFT.

Hoof distortion in chronic laminitis has similar characteristics as a club foot:
- Elevated heels control the tension on the DDFT by producing a thicker live sole at the heels.
- Bars become strait and grow voluntarily to often connect at the frog apex to reinforce the sole inside the distal border of P3 to protect the distal border of P3 and to provide for early breakover (forms an inner hoof wall).
- The dorsal wall becomes dished to help reduce tension on the DDFT and laminae tearing, and so that it can be more easily removed to allow for early breakover.

Hoof management for chronic laminitis and club feet.
1) Prepare (trim) the heels to the live, functional sole from the frog apex caudally (rearwards).
2) Leave ample hoof wall length forward of the frog apex to ensure sole clearance.
3) Optimal breakover may need to be caudal to or directly below the tip of P3 initially, to help reduce the rapid heel re-growth.

Complications when heels are trimmed continually and aggressively into the functional sole and the toes are left long.
1) Increased tension on the DDFT will cause the heel to re-grow and the wall to flare.
2) The heels will contract.
3) The horse will not land heel first.
4) The horse may develop pedal osteitis.
5) Long-term, aggressive trimming may cause laminitis.

Reasonable expectation for Moderate club/upright feet if the heels are not over-trimmed and the breakover is place below or just slightly forward of the tip of P3.
1) The area of the sole at the heels will exfoliate and allow the heels to be trimmed (lowered) some from one shoeing or trimming to the next.
2) The sole over the tip of P3 will thicken and provide ample protection for the distal border of P3.
3) The dorsal hoof wall will reorient itself to P3 and assume a more normal (parallel) relationship.
4) The flat or low foot will change to an easy to manage, more upright foot if the same trimming and shoeing guidelines are followed. However, the horse must land equally heel first on both feet, regardless of the hoof type. In time, the two feet will look more alike, but will never be the same.
Negative Plane Distal Phalanx (NPDP) Syndrome

or

Negative Palmar/Plantar Angle (NPA)

Causes & Symptoms

Possible Causes

Although there has not been much research into this condition, it is believed to be one of three conditions (or a combination of the three) that leads to a negative palmar/plantar angle of the coffin bone. Like many conditions, there is likely a genetic component to the existence or acquisition of a negative PIII angle. It is certainly more present in horses like Thoroughbreds who have a flatter, lower angled foot to begin with. However, it can still occur in horses that normally have a steeper natural angle or more upright feet like Arabs. Never the less, certain breeds do seem to be more susceptible than others, therefore there has to be some sort of genetic contribution.

The most widely accepted theory about the cause of the NPA condition is that there is a collapse of the support tissue in the back of the foot. There seems to be an insufficient, or in some cases, an almost complete lack of fibro cartilage (FC) in the digital cushion (DC), which connects one lateral cartilage (LC) to the other. At the same time, the lateral cartilages themselves are weak or under developed, as is the digital cushion. The lack of fibro cartilage and a weak digital cushion and lateral cartilage system leads to an inability of those structures to support the back of the coffin bone. Without proper support, the bone tips backwards, creating a negative plane for the distal border of PIII. Although not every horse with insufficient fibro cartilage and a weak DC and LC will have a negative plane, they do tend to naturally have a very low or flat angle to the coffin bone. However, if the maintenance of the foot (and possibly the environment) is such that the back of the foot becomes less functional and supportive, the weak structures can collapse and the angle of PIII will then take on a negative position.

The third possible cause is probably not seen worldwide, as the circumstances surrounding it are not seen in all environments. In areas that have hot & dry or extremely cold & dry conditions, the foot tends to build extra sole depth for protection and insulation. In these environments, it is easy for these additional layers of sole to become retained, especially in the front half of the foot. If these retained soles are not recognized and dealt with in a proper manner, they can become so hard and built up that they almost push the tip of the coffin bone up, therefore creating a negative angle to PIII. Often times a weaker caudal part of the foot also exists, but it may not be a complete collapse of the FC, DC and LC that puts the bone in a negative position. The foot may normally be able to withstand the weak caudal aspect of the foot; however the retained sole may be enough to push it over the edge (the straw that broke the camel’s back). Moreover, if you couple a retained sole with a horse that works in a sandy environment, and tends to drag its toe through the deep sand, it can thin the dorsal wall in the bottom
half, which minimizes the integrity of the dorsal wall to hold the tip of the bone down. Now, there is even less resistance for the retained sole to push the tip of PIII up.

As mentioned earlier, it is possible for one of these conditions to cause the negative palmar/plantar angle of PIII; however it is generally a combination of 2 or all 3 that produces the NPA situation. Horses that have 2 or 3 conditions contributing to the negative position of PIII are more difficult to treat and return to a flat or positive angle. Moreover, the longer the condition has perpetuated, the more difficult it can be to improve the angle of PIII. Typically these horses have developed range of motion, and back & joint issues in conjunction with (or as a result of) the NPA condition. Although you can usually deal with the range of motion and back/joint problems relatively easy by changing the mechanics of the foot, making changes to the collapsed structures within the foot that will last and withstand the demands upon them takes time and persistence in restoring good foot function. It is possible if you recognize it early and deal with it in all aspects of eliminating distortion and restoring mechanics. If the condition goes untreated for a long period of time and only some symptoms are addressed, it is unlikely the situation will change.

**Possible Indicators of a Negative Palmar/Plantar Angle** *(the more indicators that exist, the more likely the condition exists)*

- Radiographs actually showing the negative position of PIII (this is the ultimate indicator)
- Domed or “Bull Nose” dorsal hoof wall
- Very low angle or almost horizontal growth of the heels (yet the toe is shorter and not flared)
- Over developed or prolapsed frog
  - May also be painful in the center of the frog
  - Central sulcus may be flat, have a very narrow & shallow crease, or non-existent
  - Frog buttress may bleed if you trim any amount of material
- Live sole may be shallow and flat between the heels and bars (in the “V” below the wings of the coffin bone)
- The horse has an excessive retained sole in the toe region & low heel angle
- Deep cup in the front of the foot once it is exfoliated
- From a lateral view, the angle of the hairline (on hind feet) points to a position above the knee of the front foot
- The horse fails to track up or is short strided in the hind end
- The horse has an extremely sore back
- The horses has sore hocks and/or stifles
- The horse drags its hind toes as it brings its feet forward
**Professionalism, Ethics & Business Practice Guidelines**

Part of the goal of the E.L.P.O. and the Certification is to not only help establish a consistency and quality of excellence around the E.L.P.O. Hoof Care Protocol, but also to promote a high level of professionalism through its members. Some of the following information are only a few tools, techniques and tips that have been offered by E.L.P.O. leaders and members that you will hopefully find useful.

**What you do before you start working on any horse plays a big role in the outcome.**
- Walk the horse before you ever pick up the feet. (Why?)
  - Observe and point out any minor lameness or gait faults that are there BEFORE you have worked on the horse.
    - Look for how the foot lands. (Toe-First, Flat or Heel-First)
    - Look for length of stride or how they track up from behind.
    - See how they turn in a small circle.
    - Observe their general attitude or demeanor. (Might give you clues to how they will be to shoe or trim)
  - Gather Information. (Ask Questions before you make any decisions.)
    - General Info: Age, Discipline, Level of Use, Frequency of Use, Etc.
    - Behavior: Is he bad to shoe? Can he be tied? Any Discipline Issues?
    - Any owner concerns or goals unable to be met in the past?
  - Gives you time to recognize issues and talk about strategies while you are calm and cool
  - Cover All your Bases! (If you can recognize issues or lameness before hand and the owner sees you taking notes [physically or mentally] about issues, they will have little room to make accusations regarding pre-existing conditions prior to your work.)

**Setting and knowing your own policies, practices or customer relation strategies before you show up to do the work.**
- General Pricing and Addition Charges
  - Know what your standard material & travel cost are.
  - If you need to use additional materials (like pads, impression material, etc.), discuss the items required and why, and try to give an accurate estimated price. Owners don’t like to be surprised with a higher bill than what you quoted. If the price comes in under the quoted price, then they feel like they got a deal.
- Horsemanship and horse handling
  - Behavioral issues (do you allow the horse to be in your face or in the owner’s face?)
  - Is schooling or training horse’s part of your job or not? (mixed bag here, but have a plan and fee/price in place before you start)
  - What schooling methods do you use and are there other’s that might be more beneficial?
  - Approach each horse with the mindset that they are not a “bad horse”. Keep in mind that they did not ask to be there, so you need to do what you can to make the event comfortable and safe. If you have done everything you can to make them comfortable and at ease, yet they still become reactive, take a moment to collect yourself, and then discuss options with the owner.
  - Strategies for horses that can’t be tied.
  - Strategies for trimming babies.

**Overall business goals and approach**
- Everybody must WIN! (Horse, Horse Owner & Farrier)
- Try to anticipate questions or situations and have a plan so that you can respond in a manner you are comfortable with. If you do not have a plan in place, make sure to take a few minutes to think about the ramifications of your response, or ask questions until the best answer become apparent. (Don’t get in a hurry and don’t get flustered.)
- Present yourself as a PROFESSIONAL and not as an EXPERT! Stay humble and modest even when success appears to be guaranteed.
Purpose of E.L.P.O. Hoof Evaluation Protocol

- To accurately evaluate distortions that are/can contribute to pathology or performance issues.
- To communicate about locations/structures that are distorted and degrees or the amount of distortions that exists with owners, veterinarians and other farriers. Others need to see how much and where distortions are in the foot, and whoever you talk to about these distortions needs to be on the same page.
- To track changes or improvement in distortion from the beginning to the end of the trimming process and from one shoeing/trimming to the next.
- To gather data between a large group of people that is consistent and comparable regardless of the environment or person doing the work. (need to compare apples to apples)

Why and what each structure tells us.

- The Quality of the Central Sulcus
  - Shows how the frog is being used – Closed up and deep usually means the back of the frog is not being used. Open with a defined, rounded bottom means that the back of the frog is functioning and probably participating in load/support.
  - May give us clues to what application needs to be considered – Narrow, deep and painful at the bottom may mean a bacterial or thrush concern that needs treating and may determine if you can active load the frog or just passively support it. If it is open, healthy with a round bottom, may mean you can go without a pad if other conditions are met.
  - Can give you clues about the type of foot you are dealing with – Narrow crease with a very shallow bottom or flattened central sulcus can mean that the frog is prolapsed and therefore the horse has a negative palmar/plantar angle (if other conditions concur).

- The Width of the Back of the Frog
  - Shows how the frog is being used – Narrow (Grade 3 – 5) means the back of the frog is not being used. Wider than the length of the SC (Grade 0 – 1) means that the back of the frog is functioning and probably participating in load/support.
  - May give us clues to what application needs to be considered – Narrow means that the frog needs to become an active part of load/support and needs to get some ground contact (either with a pad or with heel trimming and left barefoot). If it is wide, it may mean you can go without a pad if other conditions are met.
  - It can give you direction to look at how the horse is landing – If it is narrow, the chances are the horse is landing toe-first. If it is wide, the chances are the horse is landing heel-first.

- The Length of the Frog
  - Lets us know if the frog apex is a reliable reference to the coffin bone – The longer and more distorted the frog apex is to start with, can mean that it is less reliable, even after you trim it back.
  - Lets us know how much distortion exists in the frog of the foot – A longer, stretched frog apex is usually an indication that the sole has been pulled forward with a distorted wall, usually due to over trimming the toe repeatedly. A shorter, rounded frog apex usually indicates a lesser amount of toe distortion probably exists, and that the overall frog health is pretty good.
- The Position of the Heel
  o Tells us if the back of the foot is functioning properly – Run forward (Grade 4 – 5) means the back of the foot is unable to fully function and support the internal structures of the foot at the time of landing and load. Low numbers (0 – 1) means that the heels are in a position that is able to accept the load and impact of the horse.
  o Can tell us what type of foot we are dealing with (if other conditions concur) – Grade 0 heels with high (3 – 5) frog numbers can be an indication of an upright or club foot. Grade 5 heels with low (0) frog width and length numbers can be an indication of a negative palmar/plantar foot.
  o Can give us clues to M/L Imbalances – Different numbers from one heel to the other is usually an indication of a M/L imbalance. The higher number is the taller heel. Knowing which side is higher will allow you to be more focused/specific about searching out the live sole in that region.
  o Can give you reason to hoof test and investigate heel pain situation – High numbers would lead you toward hoof testing or looking for indications of heel pain, as well as how the horse lands.

- The Curvature of the Bars
  o Tells us if the back of the foot is functioning properly – Curved bars (Grade 4 – 5) means the back of the foot is unable to fully function and support the internal structures of the foot at the time of landing and load. Low numbers (0 – 1) means that the bars are strong, upright and better able to accept the load and impact of the horse.
  o Can tell us what type of foot we are dealing with (if other conditions concur) – Grade 0 bars with high (3 – 5) frog numbers can be an indication of an upright or club foot. Grade 5 bars with low (0) frog width and length numbers can be an indication of a negative palmar/plantar foot.
  o Can give us clues to M/L Imbalances – Different numbers from one bar to the other is usually an indication of a M/L imbalance. The higher number is the taller side. Knowing which side is higher will allow you to be more focused/specific about searching out the live sole in that region.
  o Can give you reason to hoof test and investigate other pain causing situation – High numbers would lead you toward hoof testing or looking for indications of bruising or jamming of the bars, as well as how the horse lands.
  o Can give you an indication as to how well the lateral cartilages are being supported, and therefore how the back of the coffin bone is being supported.

- Length of the Toe
  o Tells us how much leverage is being incurred on the DIP Joint – High numbers means that the toe distortion is probably contributing the how the horse lands (toe first) and how much strain and effort is taken up by the DIP joint at the time of breakover. Low numbers can mean that excessive leverage is probably not a contributor to current lameness conditions.
  o Can tell us what type of foot we are dealing with (if other conditions concur) – Grade 3 - 5 toe with 0 heel numbers can be an indication of an upright or club foot. Grade 0 toe with grade 5 heel numbers can be an indication of a negative palmar/plantar foot.
Opaque Plate Distal Phalanx (Neg. Palmar/Plantar Angle)

Negative Plate Distal Phalanx (NPDP or NPA) has only been talked about over the last 10 or 15 years. This is a condition where the rear of the coffin bone is closer to the ground than the front of the bone. Although there are some feet where the coffin bone sits parallel to the ground, most feet have a slightly positive angle, where the palmar/plantar aspect is raised. At this time, an ELP foot is not normal or desirable. The foot may be representative of a foot that has a Negative Palmar/Plantar Angle.

Lameness is also often associated with hock or stifle pain, and an extremely sore back. An NPA foot does not always possess all of these characteristics.

Severe Club Feet Characteristics

1) The frog area is a noticeably greater distance from the dorsal wall than a “normal” foot.
2) The frog appears very short in comparison to other feet.
3) The heels terminate at the back of the frog buttresses.
4) The dorsal wall is very straight below the coronary band, and develops a dish if the toe and heels are left too long.
5) The heez grow in a vertical direction but cannot become uniform if the heel and toe are left too long.

Moderate Club/Upright Feet Characteristics

1) The frog appear short in length & the area is a greater distance from the dorsal wall then a “normal” foot.
2) The heels terminate close to the back of the frog buttresses.
3) The hoof walls at the heels curve abruptly while the bars are substantially straight.
4) The dorsal wall is frequently straight below the coronary band, but develops a dish if the toe and heels are left too long.
5) The general shape of the foot is straighter on the sides.

The goal of the E.L.P.O. Hoof Evaluation Protocol is to accurately, consistently and in accordance with an established standard be able to determine the amount and/or location of hoof distortions in individual equine feet. Although an overall rating for each foot may be achieved, individual attention to primary hoof structures is the key. Through the systematic evaluation of the external hoof anatomy, a more accurate and meaningful evaluation of the foot can be achieved, as well as a determination of the overall health and soundness of the horse.

The primary hoof structures that will be specifically evaluated are the: frog, bars, heels, and toe, and will be evaluated from a sole viewpoint.

Foot function is often being compromised and common gait faults such as stumbling, forging and landing toe-first are prevalent, and signs of coffin joint pathology may be recognized and even diagnosed by veterinarians. Feet or Hoof Structures with a #3 rating are challenging the soft tissue around the DIP joint.

Feet or Hoof Structures with a #2 grade have hoof distortions that can start to affect proper foot function.

Feet or Hoof Structures with a #1 grade have minor hoof distortions that would still allow the foot to function efficiently.

#0: Considered to be a perfectly natural, normal foot, free of hoof distortions that is expected to be functioning at its optimum efficiency. Hoof structures with this grade would also be representative of a foot that either requires no maintenance or has just been trimmed and/or shod, and again is free of hoof distortions.

FEET OF HOOF STRUCTURES WITH A #5 GRADE HAVE THE MOST SEVERE HOOF DISTORTIONS THAT CONTRIBUTE TO BOTH SOFT TISSUE AND BONY DAMAGE. HORSES ARE OFTEN SEVERELY LAME OR DELIBITATED AS A RESULT OF THE DISTORTIONS. A #5 RATING IS SOMETIMES IRREVERSIBLE, BUT CAN BE IMPROVED WITH THE USE OF VARIOUS PROSTHETICS AND MORE DETAILED HOOF PREPARATION.

#3: Feet or Hoof Structures with a #3 grade have hoof distortions that can cause minor to moderate lameness issues. Foot function is often being compromised and common gait faults such as stumbling, forging and landing toe-first are prevalent, and signs of coffin joint pathology may be recognized and even diagnosed by veterinarians. Feet or Hoof Structures with a #3 rating have been subject to long term hoof distortion and often, irreversible damage can occur. Foot function can be at least somewhat restored with shoes, pads, and detailed hoof trimming.

#4: Feet or Hoof Structures with a #4 grade have moderate to severe hoof distortions that are often associated with serious lameness issues. Feet or Structures with a #4 rating have been subject to long term hoof distortion and often, irreversible damage can occur. Foot function can be at least somewhat restored with shoes, pads, and detailed hoof trimming.

#5: Feet or Hoof Structures with a #5 grade have the most severe hoof distortions that contribute to both soft tissue and bony damage. Horses are often severely lame or debilitated as a result of the distortions. A #5 rating is sometimes irreversible, but can be improved with the use of various prosthetics and more detailed hoof preparation.

Disclosure: The information presented in this evaluation protocol are only general guidelines designed for equine professionals as a means to have a standardized formula for recognizing common hoof distortions that exist in many feet with basically “normal” conformations. This evaluation protocol is not intended to diagnose any lameness, nor is it intended as instructional guidelines for trimming or shoeing. For details on hoof care guidelines, please look at the “E.L.P.O. Hoof Trimming & Shoeing Protocols” offered by the Equine Lameness Prevention Organization, Inc.
FROG: Central Sulcus - Anterior Frog Length - Frog Width

<table>
<thead>
<tr>
<th>Grade</th>
<th>Central Sulcus (CS)</th>
<th>Frog Length</th>
<th>Frog Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Open, Wide &amp; Round at the Bottom.</td>
<td>CS Length (A)</td>
<td>1/4&quot; - 1/2&quot; Greater than the CS Length (A)</td>
</tr>
<tr>
<td>1</td>
<td>Open, with a Crease at the Bottom.</td>
<td>CS Length (A)</td>
<td>Slightly Greater or (+) to the CS Length (A)</td>
</tr>
<tr>
<td>2</td>
<td>Narrow, with a Crease at the Bottom.</td>
<td>CS Length (A)</td>
<td>Slightly Less or Equal (=/-) to the CS Length (A)</td>
</tr>
<tr>
<td>3</td>
<td>Mostly Closed with a Deep Crease at the Bottom.</td>
<td>CS Length (A)</td>
<td>10% - 20% Narrower than the CS Length (A)</td>
</tr>
<tr>
<td>4</td>
<td>Closed with No Accessible or Distinguishable Bottom</td>
<td>CS Length (A)</td>
<td>25% - 35% Narrower than the CS Length (A)</td>
</tr>
<tr>
<td>5</td>
<td>Closed, Painful and Possibly Diseased (Thrush)</td>
<td>CS Length (A)</td>
<td>40% or More Narrower than the CS Length (A)</td>
</tr>
</tbody>
</table>

BARS: Medial & Lateral

- Midline of the Bar is Between 3/8" & 1/2" from the Plane of the Frog Commissure
- Toe Length is 1/2" or 1" Longer than the Length from WPOTF to the Back of Frog

HEELS: Medial & Lateral

- Midline of the Bar is 1" from the Plane of the Frog Commissure
- Toe Length is 1/2" or 1" Longer than the Length from WPOTF to the Back of Frog

TOE: Length

- Toe Length is Equal or 1/4" Longer than Length from WPOTF to the Back of Frog
- Toes are Fractured, Bruised, have Black Tracts & the Deepest Part of the Commissure is Distorted

*Automatic Downgrade 1 Point if the Bars contain Fractures, Black Tracts or Bruises.*
RECOGNIZING, EVALUATING & UNDERSTANDING HOOF DISTORTION & HOW IT RELATES TO LAMENESS

Gene D. Ovnicek, RMF
Equine Digit Support System, Inc.
506 State Hwy 115
Penrose, Colorado 81240
gene@e-hoofcare.com

There are many common factors connected with lower limb lameness (LLL). Horses that are driven or ridden in a straight line are less affected by lower limb lameness than those horses who are asked to continually and repeatedly turn circles and make complicated lateral movements. Endurance horses, light driving horses and general pleasure horses in general exhibit fewer instances of lower limb lameness as compared to performance horses (roping, reining, cutting and barrels), dressage horses, and hunters and jumpers. Similarly, horses that are not confined to stalls and are not limited in their exercise are also less affected by LLL than horses that are confined to stalls, regardless of how they are shod. This does not mean that lameness is absent in this active group of horses that go in a straight line, however I believe there are correlations to the instances of lower limb lameness, and the activity (conditioning) and lateral movement requirements of horses. I can remember back 40 and 50 years ago where the existence of lameness was minimal compared to the percentage of cases today. I believe that is largely due to the fact that horses were ridden much harder and much more frequently than they are today and usually traveled in straight paths, with the exception of the rodeo stock. Rarely were horses confined to stalls or even small paddocks, and many horses were actively used without shoes and were self-maintained for the most part. Never the less, times have changed and the role that horses play in people’s lives have changed. Limited space and activity, as well as an increase in the frequency and severity of lateral and circular movements are the changes that contribute the occurrence of lower limb lameness. The question is, has or can the hoof care parameters being used address the current demands placed upon the horse to overcome LLL or better yet prevent LLL from happening in the first place.

There are several factors to consider when determining if the hoof care principles being employed are adequate and/or beneficial for a particular horse. Assessing the needs of the horse in terms of discipline, terrain, frequency of use, level of activity, current condition of the hoof (foot function), and the presence or absence of lameness must all be considered. Other aspects of hoof care that have probably not received enough consideration in the past, but are now proving to be real keys in both treating and preventing lameness is leverage and hoof distortion.

LEVERAGE

Like every structure that is in motion, the foot and lower limb are always subject to some sort of leverage. It is designed to be able to tolerate a certain amount of leverage from front to back, however when the leverage becomes greater than what is “normal” then structures begin to fail. The most vulnerable structure affected by excessive leverage is the distal interphalangeal joint (coffin joint). In the wild, horses are not asked to repeatedly make sharp turns or engage in constant circles, yet they will wear away as much of the outer hoof wall as necessary in all direction to minimize the leverage to the DIP joint. The harder the terrain, the more the wall is worn away to bring the pivoting points of the foot more towards the center of the foot. In a softer environment, the hoof wall does not need to wear as much because the ground will yield to the hoof wall. My point is that leverage is being reduced much greater than what is conventionally provided for our domestic horses, and the wild horses in general are going in a straight line and don’t have the added weight of a rider and tack. We need to start thinking about leverage and using some common sense about how we prepare the feet and what we apply to the foot, and how that affects what we ask the horse to do. As mentioned earlier, many horses today are constantly going in circles, either in exercise, training or in the discipline they perform. It is good that many of the
arenas that horses compete in have footing that will partially yield to the foot and allow for some leverage reduction. However, you cannot depend upon the surface to provide enough leniency for the DIP joint, so the hoof care provider needs to address the leverage, and it needs to start with the preparation of the hoof. That is where being able to recognize hoof distortion is such a key. Hoof distortions are either directly or indirectly the cause of most of the undue leverage to the DIP joint. It has become obvious that the longer, distorted toe directly increases the leverage at the time of breakover, which increases the effort and strain on the DIP joint. Distortion of the heels is more indirectly increasing the leverage, because they can push the toe forward or cause diagonal toe-quarters to flare. And finally, distortions of the bars and frog all offer insight to distortions that exist in other parts of the foot. Pain in the frog or bars can also force the horse to use another part of the foot to land, usually the toe which will perpetuate further problems. Distortion and leverage is a big deal, and if you only get one thing from this lecture, that would be it.

**HOOF DISTORTION**

In general, hoof distortion is any growth, presence or lack of presence a hoof structure possesses that interferes with the proper function of the foot. For example, hoof capsule distortion is basically any amount of hoof wall that has grown beyond the level of live, functional sole and frog. The hoof capsule, although hard and brittle, can become twisted, bent, shifted and manipulated around the coffin bone. Extra length or growth in a direction that forces it out of its normal position will cause areas of the hoof wall to collapse or fail under the undo stress. For example, if the heels become too tall or long and driven forward due to the angle at which they grow, they take on weight that they were not intended to. If this happens, they often become crushed and lack good support quality. As the heels grow in excess of the functional sole, they become more curved the further forward they grow. The forward growth of the heels causes the bars to become more bent as well. Excessive curvature, cracks and bruising in and around the bars are all examples of bar distortions. The frog on the other hand can become atrophied and becomes weak as the heels and the hoof wall grow beyond the level of the sole. If the toe is distorting forward at the same time, it will pull the frog apex forward as well, causing the tip of the frog to become long, narrow and pointed. All of these structures can offer insight into hoof distortions that can mean extra leverage and stress to the internal components of the foot and ultimately lead to lameness. Therefore, being able to recognize and eliminate even the most subtle hoof distortions will help keep you ahead of the curve in preventing lameness or give you good direction when treating lameness.

**NATURAL BALANCE HOOF EVALUATION PROTOCOL**

Natural Balance Hoof Care is a standard set of guidelines and principles that promote proper foot function in horses. Foot function is described as all of the structures of the hoof working together in equilibrium or balance around the DIP joint. Hoof distortions cause stress in and around the DIP joint and therefore become a focus for hoof care maintenance in order to establish balance. Through the cooperation of the directors and members of the Equine Lameness Prevention Organization, we have helped develop some guidelines on evaluating feet. The goal of the Natural Balance Hoof Evaluation Protocol is to accurately, consistently and in accordance with an established standard be able to determine the amount and/or location of hoof distortions in individual equine feet. Although an overall rating for each foot may be achieved, individual attention to primary hoof structures is the key. Through the systematic evaluation of the external hoof anatomy, a more accurate and meaningful assessment of the foot can be achieved, as well as a determination of the overall health and soundness of the horse. To give you a general idea of what each number rating means, we have listed a short explanation of each rating.

**#0:** Considered to be a perfectly natural, normal foot, free of hoof distortions, and is expected to be functioning at its optimum efficiency. Hoof structures with this grade would also be representative of a foot that either requires no maintenance or has just been trimmed and/or shod, and again is free of hoof distortions.
#1: Indicative of a natural normal foot that is at the end of a trimming/shoeing period and requires basic maintenance. Minor hoof distortions seen are the result of normal growth and with basic maintenance will be returned to a #0 status. If a #1 status is achieved after trimming/shoeing, then this grade would be representative of hoof structures that possesses only minor hoof distortions that would still allow the foot to function efficiently.

#2: Feet or Hoof Structures with a #2 grade have hoof distortions that can start to affect proper foot function. Although these are commonly seen at the end of a shoeing cycle, this rating is indicative of distortions that generally were not fully dealt with at the beginning of the shoeing/trimming cycle. Feet and structures in this condition can start to negatively affect performance, but may not be recognized as problems by everyone.

#3: Feet or Hoof Structures with a #3 grade have hoof distortions that can cause minor to moderate lameness issues. Foot function is often being compromised and common gait faults such as stumbling, forging and landing toe-first are prevalent, and signs of coffin joint pathology may be recognized and even diagnosed by veterinarians. Feet or Hoof Structures with a #3 rating are challenging the soft tissue around the DIP joint.

#4: Feet or Hoof Structures with a #4 grade have moderate to severe hoof distortions that are often associated with serious lameness issues. Feet or Structures with a #4 rating have been subject to long term hoof distortion and often, irreversible damage can occur. Foot function can be at least somewhat restored with shoes, pads, and detailed hoof trimming.

#5: Feet or Hoof Structures with a #5 grade have the most severe hoof distortions that contribute to both soft tissue and bony damage. Horses are often severely lame or debilitated as a result of the distortions. A #5 rating is sometimes irreversible, but can be improved with the use of various prosthetics and more detailed hoof preparation.

In general, the hope is that through following the guidelines of Natural Balance Hoof Care, veterinarians and farriers will be able to effectively lower each hoof distortion rating by 1 or possibly 2 points through their hoof trimming. Some structures like the frog may take several trimming or shoeing cycles to realize an appreciated improvement, where other structures like the heels, bars and toe will commonly yield the most instant results. In short, the more structures of the foot that are brought to a #0 to #1 distortion rating, the more positively it will affect those structures that need time to respond. Either way it is important to know that you can recognize when something is not right and then be able to have some tools to know that you can either fix it or at least make an improvement.

References

HOOF CARE GUIDELINES FOR EFFECTIVELY DEALING WITH HOOF DISTORTIONS & LAMENESS ISSUES

Gene D. Ovnicek, RMF
Equine Digit Support System, Inc.
506 State Hwy 115
Penrose, Colorado 81240
gene@e-hoofcare.com

The information contained within these notes will help simplify many issues that pertained to lateral/medial hoof balance, dorsal/palmar hoof balance, as well as establishing a reliable formula for detecting and treating hoof deformities and distortions before they have a negative affect on the performance and soundness of horses. What makes this information easy to apply is that finding the widest part of the foot offers the most reliable reference to the distal phalanx. This will help to recognize hoof distortions long before they become irreversible or seriously damaging to the horse.

When I originally studied the feet of feral horses in 1986 & 1987, my purpose was to find consistencies with naturally worn feet that might be valuable in treating lameness in domestic horses, as well as preventing lameness. This information opened the door to research expanding in slightly different directions. For one, the sole and frog seemed to be an active part of weight-bearing, which was a new thought for some farriers and veterinarians. It has also been shown that domestic feet wear exactly the same when the environment and lifestyle will maintain the feet optimally. An important part of the feral hoof information was the discovery of the sole callus and how it stopped the foot from wearing closer to the apex of the frog and into the distal phalanx. Dr. Robert Bowker’s research on lamina density with barefooted horses helps to understand what Dave Duckett talked about in the late 1980’s and early 1990’s regarding “pillars”. The pillars appeared to be stronger portions of the sole seen in the medial and lateral toe quarters of the foot. It is also shown that the lamina is more dense in the areas of the medial and lateral toe quarters on barefooted horses according to lamina counting done by Dr. Bowker. The denser lamina is consistent with the imprint marks made on the foot from the hoof study of the feral horses. It was also noted by Bowker that some feral horses had no secondary lamina between the two pillar points on the dorsal aspect of the distal phalanx. This seemed to suggest that the wall forward of the pillars was not utilized for weight-bearing when the foot was loaded on the pillars and flat to the ground. Moreover, the friction that occurs at the time of breakover is what wore the foot to this rolled, rounded form. The friction was obviously less stressful than the impact in normal movement because the wear was always maintained close the distal border of the distal phalanx. The part that is still difficult for many horsemen to accept is that the wear that occurs on the front of the foot is a normal event. Dave Duckett's work in the late 1980’s and early 1990’s suggests that breakover occurs at the same spot that the imprint marks were found, and at the same position that we see naturally worn domestic horse’s feet. However, many of our conventional ideas of breakover are based on domestic feet that have distortions. Because hoof distortion was, and is something that we commonly see, it is considered normal and used by many as the optimal model. The goal of this paper is to offer ways to recognize distortions, and get a clearer picture of what is actually NORMAL, as opposed to what is COMMON.

THE WIDEST PART OF THE FOOT

The first and primary tool I use to evaluate the balance of the foot is similar to what Duckett refers to as the Bridge. However, it is more commonly recognized today as the widest part of the foot, or more specifically the widest part of the sole. If you can learn to quickly and accurately identify the widest part of the foot at the sole level, you will consistently be able to find the tip of the distal phalanx (coffin bone) and balance the foot around the boney column. A combination of 3 approaches is used to accurately identify the widest part of the foot. The first step is to locate the TRUE frog apex. This is not always easy because it generally requires some assertive trimming to find the true origin of the frog from the sole. The widest part of the foot is generally about 1” behind the TRUE frog apex. (Figure 1-A) However, if the frog apex appears to be stretched and pulled forward, you must employ the other methods to get a more accurate assessment. The second method is to find the place where the bars terminate into the frog commissures. If you run a pick along the commissures, you will feel or see a bulge or swell where the bars appear to terminate. (Figure 1-B) A line across the foot at that point should be very close to the widest part. Third, and generally the most accurate, is to actually exfoliate the sole from the toe quarters to the heels on each side (meaning remove the chalky material until the waxy appearing
surface is revealed). Then, using a marker, draw a line at the wall/sole junction from the toe quarters to the heel. Mark a line at the apex or peak of the arc you’ve just drawn. (Figure 1-C) Connect the mark from one side to the other. This line is reliably the widest part of the sole. If through the use of all 3 methods you find the lines you have drawn all fall on top of each other, you can rest assure that you are quite accurate with you assessment of the widest part of the foot. From this line, you can measure forward approximately 2” (on a #00 - #2 size foot), to find the tip of the distal phalanx (give or take 1/8” to 1/4” or so).

To use that information for trimming or for applying shoes, we then draw a line approximately ¼” ahead of the line at the approximate tip of the coffin bone to mark where we would like to place the point of breakover. (Figure 2-A) The breakover point of the shoe or the role of the toe (if barefoot) should fall over this location. The most caudal bearing point should be the back of the frog if the horse is barefoot, as the frog will typically take precedence over the heel once the heels are trimmed. (Figure 2-B) If the horse is shod, the heels of the shoe should be located at the most palmer aspect of the frog. The anterior/posterior ratio is generally 50/50 around the widest part of the foot. From that we know the foot is equally proportioned around the articulating surface of the Distal Interphalangeal (DIP) joint. On most horses, having the ratios equal around the widest part of the foot is usually sufficient. However, in many horses it is seen to be more beneficial to have more support base behind the widest part than in front, since the back of the foot is better designed for support and weight bearing. If you see a horse with more mass ahead of the widest part of the foot than behind, then you have a hoof with distortions. It’s that simple!
SHOE WEAR, HOOF WEAR & BREAKOVER

There has been divided controversy on shoe wear, particularly that which occurs at the toe. Some feel that shoe wear should be prevented and others feel that the shoe wear should be allowed to occur in light of the way the natural foot wears without shoes. In a natural environment it appears that the toe will wear a roll on the same part of the sole surface relative to the distal border of the distal phalanx on horses without shoes. However, with shoes placed around the perimeter of the wall, the wear does not occur quickly enough to find the optimal place for breakover before the next shoeing period do to the resistance of the metal. Therefore, the excessive wear that is commonly seen can be a good thing, in that it acts as an indication that moving the breakover back might assist in relieving the excess leverage, especially if some lameness is present. Adjusting the breakover has for some time been shown to be helpful for those horses that have Navicular related problems, as well as ligament and tendon issues of the DIP joint. Perhaps if we read the warnings in the shoe wear, we could address those needs before these Navicular related issues and soft tissue damages occur.

A closer look at shoe wear makes it easy to understand why metal is being removed in the manner that it is, and more wear is common when the dorsal wall has become a greater distance ahead of the widest part of the foot. It appears as though the excessive leverage that is necessary to pivot over the front of the foot creates extra wear. It is common knowledge that the inferior check ligament controls the tension on the deep digital flexor tendon, and there is very little-to-no stretching of the DDFT that occurs below the knee. This is the same mechanism that allows the horse to stand while sleeping without falling down. When the knee becomes rigid prior to the breakover phase of the stride, the leverage creates friction as the limb passes over the toe. Wear then occurs on the distal end of the dorsal wall or the front of the shoe. This fits very well with the position of Duckett’s Pillars and the findings of the toe wear seen on the feral horses. These findings are the same as the naturally maintained feet of domestic horses and worn shoes from everyday horses.

That pivot point seen through radiographs of naturally worn feet and reported by Dr. Barbara Page in 1999 at the AAEP, show that from the anterior distal border of the distal phalanx, approximately one quarter of an inch or 6 mm, is where the point of breakover is located. When you see a horse that has an obvious long toe and a broken back pastern axis, conventional standards for hoof trimming are to remove the toe portion of the foot from the bottom and leave the heel in order to align the distal phalanges. Serious complications can be derived from trimming the hoof aggressively (which happens) in order to achieve alignment, especially with feet that have a severe condition of poor pastern alignment. It's been noted that trimming close to the sensitive area of the sole can be responsible for causing dorsal wall hoof distortion. The tissue that surrounds the distal border of the distal phalanx (in light of the terminal papillae) seems to be as much of a bonding structure as it is protective sole material for the internal structures of the distal phalanx. When the foot is trimmed too close, the dorsal wall seems to detach at the distal end of the distal phalanx in the toe area between the two medial and lateral toe pillars. This can be easily noticed by the frog being deformed and stretched forward at the same proportions as the dorsal wall. The stretched frog can be noticed long before pathology has occurred. There seems to be a scar tissue forming between the distal border of the distal phalanx and the interface of the dorsal wall. We’ve demonstrated this by driving nails through the sole behind the lamina on feet that have major hoof distortions occurring in the anterior wall, similar to laminitic feet but none seen to be pathologic. This phenomena in-of-itself should alert us that hoof balance looked at primarily from using the external hoof wall, should be revisited. I believe hoof balance needs to include references that are more consistent with the distal phalanx. What's even more apparent now is that we've been able to see the pathology that occurs around the Distal Interphalangeal joint with the collateral ligaments, the flexor tendon, and the impar ligament as a result of the excessive leverage created by the distortion seen with the longer toe that we thought was normal. This appears to parallel cases of Navicular related issues associated with soft tissue injuries where no significant changes to the Navicular Bone are noted.

SHOE FIT & COLLATEROMOTION

It’s common to fit shoes with plenty of width in order to provide a wide base of support. However, in light of information regarding collateral ligament injuries as well as coffin joint pathology, rethinking the concept of a wide base of support and perimeter fit would be helpful in preventing lower limb pathologies. A shorter toe and medial/lateral breakover positioned inside the wall perimeter (much like a naturally worn foot), becomes even more important as a horse extends the pastern prior to liftoff, especially while engaging a corner at the same time. If you increase leverages beyond what is normal or practical, and then ask the horse to do
maneuvers and circles in a non-yielding or even partially yielding surface, the DIP joint is going to be challenged.

ALIGNING THE PASTERN

Pastern alignment in a static position is important. However, even more important is the alignment of the distal phalanges at the time of ground contact and foot loading. Simply engaging the back of the foot first by landing heel-first with the frog close to the ground will align the DIP joint upon ground contact. The ability of the horse to land slightly heel-first is highly influenced by the freedom it has to move over the toe. In other words, if the horse cannot get its foot off the ground in a timely manner, it is unlikely that the foot will land heel-first. Alignment of the distal phalanges upon ground contact is critical when the ground reaction forces are the greatest.

It must be noted that if there is a delay or more effort is required at the time of breakover, then the horse is more likely to engage the ground toe-first, causing a caudal movement of the pastern at the time of ground contact prior to loading. If you focus above the coronary band you will see the pastern move to the rear prior to loading on horses that have a short stride and land toe-first. According to verbal reports of MRI and ultrasound findings, and as predicted by Dr. Rooney some years ago, damage to the soft tissue in and around the DIP joint is likely.

DISTORTIONS OF THE BACK OF THE FOOT

Heels that run forward often develop corns, and usually belong to those horses that fail to land heel-first as a result of pain from heel distortion. Early recognition of this condition will enable the farrier an opportunity to alter this distortion before pain occurs. It is common to see bruising occurring at the place where the bars terminate, which is ventral to the Navicular bone. The distortion of the heels growing forward and bending inward, forces the tissue of the bars and sole into the center of the foot at its widest part. This condition can be altered by simply trimming the extra height from the heel to the level of the sole. This not only changes the curvature of the heel but also lengthens the base of support. The heel is positioned more caudal to the rest of the foot and the heel curvature is much straighter. The foundation in the heel buttress is more than stable and suitable for loading, and the frog is in closer proximity to the ground so that normal hoof biomechanics are likely to resume. Do keep in mind that you will probably need to address distortions in the front half of the foot as well, as they seem to go hand-in-hand.

MEDIAL/LATERAL BALANCE

It's been shown by Mike Savoldi that the thickness of the functional sole is equal under the ventral border of the distal phalanx. Therefore, trimming each side of the hoof wall the same distance from the exfoliated, functional sole will insure that lateral/medial balance is easily attained. It should be noted however, that you must be very specific about accurately identifying the live, functional sole in order to use it as a guide. If you cut into the sole too aggressively and go through the plane of the live sole/dead sole junction, you will jeopardize your ability to use the sole as a guide. So, tread lightly.

The live or functional sole is seen as the waxy appearing surface just below the chalky or exfoliating sole material. If you identify the live sole in the region close to the wall/sole junction, then trim the hoof wall an equal height from that live sole on each side, you have the best opportunity to get the ventral border of the distal phalanx parallel to the ground from side to side. Whether you leave ¼", 1/8" or NO wall above the level of the sole, balance is achieved as long as you leave the same amount on the opposite side. This method is extremely helpful and much more accurate on those horses that are pigeon-toed or base narrow, because the hoof capsule can be shifted and lose its visual relationship to the coffin bone, and consequently becomes unreliable when sighting in a more conventional way. In short, the live sole is proving to be a much more reliable and less subjective means of evaluating and achieving medial/lateral balance.

LAMENESS DETECTION & PREVENTION

Hoof distortions, as mentioned earlier, are the primary reason for lameness issues of the Navicular bone, impar ligament, deep digital flexor tendon, and collateral ligaments. Gait faults associated with hoof distortions are the early indicators that lameness is likely to occur. Stumbling is one of the more subtle conditions that is easy to recognize and is often mentioned by the horse owner. Forging is another gait fault that is often justified by breed type, rider’s ability or discipline the horse is asked to perform. However, these are
not justifiable excuses now that we understand hoof distortions by mapping out the bottom of the foot using the widest part of the foot, the frog, and the Pillars.

Horses that land toe-first are those that are closer to a lameness condition and considered by many veterinarians to be a grade one lame. Hoof conditions that are associated with lower limb lameness are generally those with heels that grow forward much like the dorsal wall, and when they are left taller than they should be, they start to crush, become underrun, and then painful. As a result of this condition, the horse will often land toe-first because of the caudal foot pain that is often associated with distorted heels. At the same time the longer toe affects the timing of breakover which discourages the heel-first landing. It is easy to see this condition in the early stages of distortion. Simply using the true frog apex, termination of the bars, and exfoliated sole in the quarters (as described earlier) will give you the information you need to evaluate hoof distortion. If the front portion (from the widest part to the point of breakover) is greater than the back portion, then there is hoof balance disparity. Consequently, extra effort will be required at the time of breakover. When the toe is longer than normal and the pastern moves beyond its normal range, the flexor tendon will lose a portion of its tension and support to the distal interphalangeal joint. The forces are then diverted to the impar ligament, suspensory ligament and the collateral ligaments of the distal interphalangeal joint.

A potential for lameness exists with horses that are shod with a flat plate fitted slightly wider than the prepared foot so that there a visible portion of the shoe around the perimeter of the hoof wall. The extra width and length is perceived as support; however the stress on the collateral ligaments and deep digital flexor tendon at the time of breakover increases when the perimeters are increased. Moreover, the strain to the DIP Joint is even greater when horses are engaged in circles and turning. With the technology available to us, deep flexor lesions, collateral and impar ligament strains, and coffin joint disease appear to have a fairly common cause. Considering this, it becomes easy to see how the natural wear or aggressive hoof wall wear on hard surfaces provides unilateral freedom to the foot, and may be beneficial to relieving some of the discomforts to the distal interphalangeal joint.

SUMMARY

The work of Mike Savoldi, Robert Bowker, and Dave Duckett, plus the information from the naturally worn foot of the feral horse as well as the naturally worn foot of the domestic horse, appear to offer a commonsense approach to a possible solution, or at least a direction for resolving the issues regarding pathology seen in-and-around the DIP joint. Many critics contend that the naturally worn foot is not valuable for domestic horse hoof maintenance. Keep in mind that horses were not intended to be ridden, and yet the foot (in its natural state) has been worn consistently to relieve strain on the distal interphalangeal joint. If we add extra strain and stress to the animal and their feet with a rider, a saddle, and disciplines that are challenging to the whole horse, why would we add extra length and width to the foot that only increases the leverage forces around the distal interphalangeal joint? Nearly all horseshoe manufacturers have become aware of the needs of the industry and are producing shoe styles and types to accommodate these excessive leverage forces in their newer products, and the benefits are being seen in the horses.

Keep in mind that the most valuable technique that can easily be used, is mapping out the foot to determine distortions of early and potential lameness situations. These same guidelines can be used in normal, everyday shoeing and maintenance practices as a means of preventing lameness as well.

References

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