

Management & Treatment Options for Coffin Joint Disease, Ring Bone, and/or DIP Connective Tissue Damage in Pigeon-Toed/Base Narrow horses.

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Introduction

Horses that are pigeon-toed and/or base narrow are frequently seen to have lameness and gait fault issues. Ring bone, coffin joint disease, and collateral ligament lesions, as well as tripping and stumbling are common with these horses. Most of these lameness and gait fault issues are created by the belief that something is wrong with this conformation and that it should be changed. Past and current literature, as well as the demands placed on the farrier by the owner/trainer directs the management of the foot in a way that creates hoof capsule distortions that lead to lameness. Medial/Lateral balance is critical for feet that have a pigeon-toed or toed-out condition. Some popular methods of M/L balance not only fall short in the treatment of these feet, but can actually aid in creating more distortions. In this lecture, we will go over some simple guidelines that are easy to follow. Hoof preparation protocols that are directly related to the anatomy and its relationship to the ground are found to be the basis for successfully treating lameness associated with these conformations. These same guidelines are also vital to prevent lameness and gait faults that reflect on the horse's comfort and performance.

Background

A survey of 20 skilled farriers who commonly treat lame horses have reported that horses that are base narrow or pigeon-toed suffer from what is becoming branded by them as a predictable lameness. The following is a general list of evaluations gathered on lame base narrow or pigeon-toed horses.

- Consistent hoof distortions appear to be one of the key factors that result in the cause of lameness.
- Lateral to medial hoof wall lengths are different in all cases (when measured against the live, functional sole).
- When comparing the ground surface mass (support surface) around the widest part of the foot, there is more mass or length ahead of the widest part of the foot to the toe than there is behind the widest part to the heels.
- Over 50% of the horses engaged the ground toe first at a walk.

The principles and guidelines for trimming and shoeing as taught in many of the current texts suggest that to find medial/lateral hoof balance you sight the limb or use a T-Square method. Recommendations for adjusting the pastern alignment consist of removing toe and/or leaving heel. For base narrow or pigeon toed horses, specific instructions call for trimming more from the medial toe and leaving more on the lateral heel. In theory these specific instructions for the base narrow conformation seem reasonable, however in practice they are shown to promote hoof capsule distortion, and for some horses predispose them to lower limb lameness. Our misunderstood perception of the base narrow limb conformation is responsible for our approach to maintenance and treatment, much like our conventional approach to mismatched feet. First of all, the belief that something is wrong with the slightly base narrow, base wide or mismatched pairs conformation is not correct. Secondly, we have falsely assumed that we can change a hereditary or early developmental component through shoeing without doing harm. Perhaps this

simple awareness of the hoof's design matrix will prompt a common sense direction to better understanding the diversities in foot and limb conditions and provide the guidelines for trimming and shoeing to best manage these conditions for all horses.

Hoof Design Matrix

To understand why there is more than one type of hoof conformation, it is helpful to describe or explain the role the sole seems to play in both regulating and adapting to the demands placed upon the foot. In simple terms, farriers are asked to maintain feet to avoid chipping, breaking, and distortions by removing any hoof that grows beyond the level of the sole. We are asked to preserve this hoof wall to sole relationship when the environment or activity of the horse can not achieve this task on its own. The hoof is designed to maintain its own equilibrium in the way that it wears. The sole and its relationship to the hoof wall is designed to manage the equilibrium both in a M/L and D/P plane. The hoof wall cannot stand alone without the support of the sole. The bond between the hoof capsule and the sole regulates the length of the wall. The wall will always wear itself close to the level of the sole in normal environmental and activity conditions. The sole can regulate the hoof capsule length or height by becoming more dense and durable. The ability of the sole to regulate its thickness (hence the wall height and length) is done to establish equilibrium (M/L & D/P balance) within the distal limb. For example, the sole appears to respond by modifying density and thickness at times when there is pain in the distal phalanx or when the equilibrium of the coffin joint requires adjustment. In the case of a clubbed foot, when the heels are over trimmed the sole will become thicker in the caudal aspect of the foot so that the heels can remain taller in order to relieve the additional DDFT tension. The sole is capable of adapting very quickly to a variety of stresses placed upon the distal limb in the form of pain, leverage or tension. The foot is constantly trying to achieve equilibrium in all planes, and the sole is the structure that is most capable of directing where adjustments need to be made in order to get there.

Hoof capsule distortion in its simplest terms is any amount of hoof wall that has grown beyond the level of live, functional sole and frog. The hoof capsule, although hard and brittle, is easily 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 that section of hoof wall to flare, collapse, or fail under the undo leverage or stress. For example, if the heel or heels become too tall or long and are driven forward due to the angle they grow, they become curled and crushed because they lack good support without help from the sole. What happens in many cases is that the hoof distortion is not recognized in the hoof capsule and then the curled, distorted portion of the heel is not removed to provide quality horn material access to the ground for support. In the case of flares, the hoof wall becomes drawn out horizontally, making it subject to chipping, cracking, or breaking in an attempt to maintain a functional balance with the sole and its internal boney counterparts. In short the hoof wall will curl, flare, and break as part of its inherent function in order to achieve its own balance or equilibrium, pending proper lifestyle conditions.

In the case of a base narrow, base wide, pigeon toed or toed out horse, the sole regulates the balance of the coffin bone to the ground, specific to the limb deviations above. In a conducive environment, the wall would be worn to the level of the sole all the way around thereby achieving equilibrium for that foot and limb. However, if the environment is unable to facilitate the required maintenance, then it is the job of the farrier to provide that maintenance. If the methods used for trimming the hoof wall relies on the use of the functional sole to balance the coffin bone, then proper joint spacing and equilibrium to the DIP joint is met. On the other hand,

if the hoof wall is not trimmed with respect to the sole, but instead modeled so as to manipulate the conformation of the foot or limb, then imbalance in the joints and strain on the connective tissue surrounding the joints is inevitable. Simply put, attempting to change conformational differences by creating imbalances within the foot can cause lameness and pathology.

A Common Sense Approach to Hoof Maintenance

Once there is an understanding of how the hoof capsule, the sole, the frog, and the bars are designed to work in concert to support the horse, it is much more easy to design a common sense maintenance protocol. The fact that we believe the functional sole regulates itself to maintain balance in the joints, and that the hoof wall is designed to both support and be supported by the sole, makes hoof preparation simple. If proper exfoliation of the sole surface is achieved, you can be confident that if you trim the wall to that level of the sole, or at least equal in depth all the way around, that equilibrium will be met. If long term imbalance and severe hoof capsule distortion exists, the guidelines offered by the sole still take precedence. As the stresses to the wall are addressed, the hoof capsule will re-establish a better relationship to the coffin bone over time. Each time you go back to trim the foot, the sole may release more exfoliating material on one side or in one area as it responds to the relieving of stress and leverage. Usually within 3 trimming/shoeing cycles, the hoof capsule will stabilize and most of the discomfort to soft tissue strain will subside. In the case of arthritis or ring bone that has already developed, the horse is certainly more comfortable, but the condition still exists and needs proper maintenance.

In many conventional applications for horses that are base narrow or pigeon-toed, it is customary to produce a lateral heel extension to achieve better symmetry around the frog. It should be noted that if you follow this basic guidelines of preparing the hoof wall close to the level of the live, functional sole on each side of the foot, the symmetry around the frog will be close to perfect and the use of lateral or medial extensions will not be necessary. The reason being that on a pigeon-toed horse, the lateral heel will generally run under and curled inward, while the medial heel is either straight up and down or flared some. As you trim the lateral side down to the level of the sole, it gets wider. And, as you trim the medial side down closer to the sole, it will get narrower. By the time you have both sides trimmed equal or an equal depth from the live sole, the foot has achieved more symmetry around the frog. The same is true as you dress the flares to a uniform wall thickness configuration. As long as you follow sole, the balance in a D/P and M/L is plane is more easily achieved and the undue stress to the DIP joint is minimized.

Other Products of Distortion and Vehicles of Maintenance

Abscesses, corns and hoof wall cracks are in most cases a part of the hoof's maintenance program. Corns are a product of imbalance and most commonly seen when the heel buttress on the same side is crumbly, curled and appears to be of poor quality. In reality, the heel is simply too long and in a poor position for support, and therefore needs to be trimmed.

Most abscesses that occur in the bars and heel buttress are examples of attempts at foot maintenance for structures that are distorted by their excess length and are not eliminated by natural means or by trimming. For example, feet that have a fracture in one of the bars and may be susceptible to abscessing, will be seen with a heel that has more curve or contraction than the other heel on the same foot. When the non-functional sole is accurately exfoliated from the medial and lateral surfaces of the foot, it will be clearly seen that the hoof wall on the more curled-heel side with the fractured bars has more hoof wall length beyond the level of the

exfoliated sole. The deep cracks in the bar on that side serve two purposes. One, they are more easily removed if they are in smaller segments. And two, they provide a tract for bacteria to work their way under those structures, weakening their attachment. If for some reason the bar and heel that are too long are still not removed after these efforts, then an abscess is likely to blow, removing the whole heel and bar in one violent event.

Summary

Horses with limb and foot conformational issues such as base narrow, base wide, pigeon-toed and toed-out should be approached from a standpoint of maintaining the feet to keep the horse sound as apposed to trying to change something that is not capable of changing without compromising the health and soundness of the horse. Through an understanding of how the sole, wall, frog and bars all play a role in support and protection to the foot, we will be better able to address these common lameness issues before permanent damage is done, or more importantly recognize them before. The guidelines that the sole offers are important for every horse and every discipline, regardless of the type of foot or conformation. This approach of preparing the foot close the level of the sole all the way around is becoming widely accepted for treating many lameness issues. That not withstanding, it is time that we start looking more closely at preventing pathology and being proactive in our hoof care protocols. If you start applying these principles before there is a problem, you will see fewer horses with lameness issues and in many cases, an improvement in performance.