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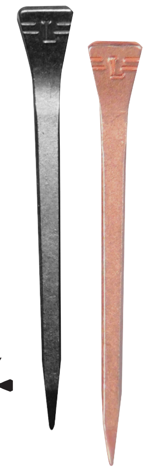
NEWS FOR FARRIERS

Liberty Hybrid Nails Regular and Cu Size 6 Now Available

Liberty Hybrid size 6 in regular and Cu are now available:

- Modified head design works well in concave and shoes punched for E-head nails
- Extra strong and durable material
- Extra length
- Extra pitch as result of new head design
- Perfect in combination with pads
- Extra sharp and smooth for less damage

Steel and Copper (Cu) Shield Hybrid Nails are also available in sizes 3, 4 and 5.



Diamond® Clinch Block Now Available

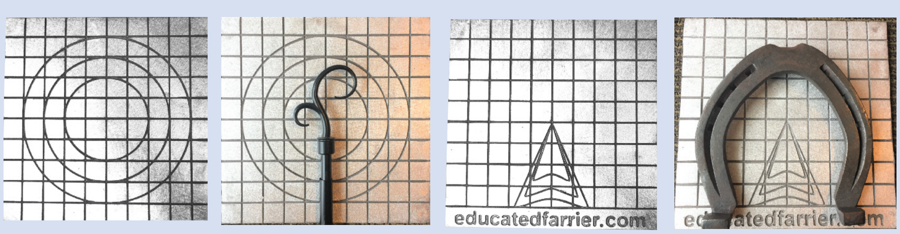
The new Diamond® Clinch Block features a hardened steel core encased in strong polymer plastic; creating a tool that is durable and comfortable in all conditions. Wide, curved handle provides secure grip while offering additional protection.

Diamond® Light Apron

The Diamond® Light Farrier Apron is an economical, professional grade apron. Constructed from thick, high quality leather and double-stitched throughout. Features a quick-release waist belt and adjustable leg straps. Double leather pads provide excellent coverage of inner and outer leg areas. Knife pocket on each leg.

Shoe Layout Plates

These new aluminum shoe layout plates were developed by Gerard Laverty, CJF AWCF. Gerard is the head instructor for the farrier program at Kwantlen University in Langley, BC. The plate is 1/4" thick, 10"x10" and weighs 2.35 lbs. The grid pattern has exact 1" squares on both sides and is very useful in developing an eye regarding shoe shape. The back side of the plate can be used as a small layout table for blacksmith projects. Several plates can be combined to assist for large scale jobs.



Kerckhaert Tradition 3 Hind with Toe Clips

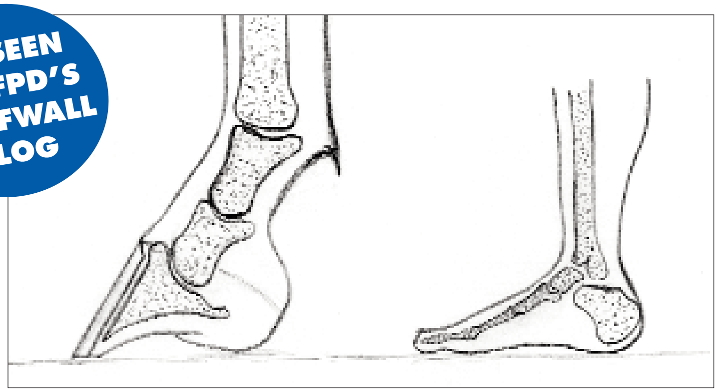
Kerckhaert Tradition 3 Hind with Toe Clips are now available; available with Regular or Quarter Horse Toe Grabs. The Tradition series racing plates offer the North American market an option for shoeing styles and feet that require a narrower pattern. The shoe has a slight taper in the width from toe to heel, a nail pattern that is spread and punched slightly finer. The shoes are symmetrical.

A Working Knowledge of Anatomy is Important to Everyday Shoeing Concerns

BY **MITCH TAYLOR**

AS SEEN ON FPD'S HOOFWALL BLOG

In order to gain a better understanding of how to approach a variety of situations in foot care, a working knowledge of the parts of the foot and leg and how they relate or 'communicate' with each other is necessary.



This sketch illustrates the differences of bone contact to the ground between the horse and human foot. Notice the horse's coffin bone is suspended while bones of the human foot have more direct ground contact.

In nature, the general rule is that form follows function. Therefore, if you understand how a particular structure or system works, it is much easier to remember its parts. The names and types of bones in horse limbs are almost exactly the same as ours. So, if you know anything of your own anatomy, it's much easier to remember horse anatomy. For example, both the human and the horse have a scapula, humerus, radius, ulna, carpal bones, metacarpal bones and three bones called phalanges that make up our digits. However, the functions of our arms and those of the horse's forelimb are completely different making the arrangement and lengths of bone, and number of digits more suited to the needs of each animal.

One of the main differences between our feet and horses' feet is that our feet are much bigger in proportion to our body weight than the horse. Our feet don't deal with anywhere near the concussion that a horse does. If you look at the form of our feet, the bones are in almost direct contact with the ground, protected only by skin (sometimes callused) and small fibro-fat pads, which allow for easy bruising of the underlying bones when barefooted. Conversely, if we consider the horse's foot, its form is designed to withstand tremendous forces. Basically, the bones of the horse's foot (the coffin and navicular bones) are protected from direct contact with the ground by being suspended within the hoof capsule via the laminar bed.

The horse is unique in that it is able to travel great distances at moderate speeds and relatively short distances at high rates of speed. Few other animals have specialized their locomotor systems to incorporate both of these characteristics. By design, the feet and legs of horses must be able not only to bear the animal's full weight but dissipate enormous amounts of shock generated as the foot hits the ground at high rates of speed in order to maintain soundness. In addition to weight bearing and shock absorption, the foot must provide some natural traction and serve as a venous blood pump to clear the blood from the foot on its way back up the leg.

Let's look at it another way. When the average size horse (1000 lbs.) is breezing along at 30 mph the concussion that each foot and leg must deal with per stride is approximately 10,000 lbs. How does the very porous 2 1/2-ounce coffin bone handle this violent impact with the ground without fracturing?

Because the foot is the first thing to receive the impact of the ground at speed it is the first line of defense in dissipating that energy. In order to accomplish this, the foot must be both strong and elastic. Much like an engineer will combine the strengths of steel and concrete to build a foundation that not only can handle incredible weight, but also will have some ability to yield to changing conditions, the horse has developed a highly specialized form in its leg and foot that utilizes several different types of "materials" or tissues that when combined together are stronger than any of them alone. The design of the foot utilizes bone because it is best suited to resist compression. The coffin bone being porous would at first glance seem very fragile. But, when this bone is engorged with blood it is as strong as very dense bone and can have some elasticity if needed during the peak loading times of the stride. The navicular bone is situated adjacent to and just to the rear of the coffin bone within the hoof capsule. Two strong ligaments, the suspensory ligament of the navicular bone and the impar or distal navicular ligament hold it in place. It makes up about 1/3 of the floor of the coffin joint. The short pastern bone rests on the coffin bone and the navicular bone. Because the navicular bone is a separate entity and held in place by 'elastic' ligaments, the rear 1/3 of the coffin joint can 'hinge' or move to dissipate some energy as the pastern drops.

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Anatomy

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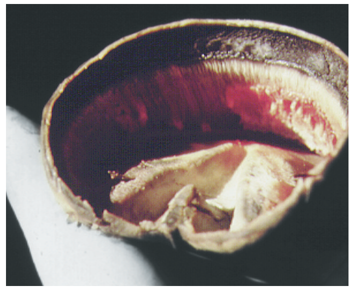

Top left: A freshly removed hoof capsule. The soundness of any foot and the regeneration of healthy horn depends on these structures being strong and elastic. **Top center:** A cross-section of the hoof showing how bony column is suspended above the ground. Notice how the hoof wall and white line are bearing weight. Also notice the dome shape of the sole. **Top right:** A cross section of rear third of hoof. The bone is replaced with the digital cushion in this area. The shape of frog and commisure allows for expansion as the foot bears weight.

The hoof capsule can be described as those insensitive, protective, weight bearing structures of the foot consisting of the hoof wall, white line, sole, frog, bars and bulbs. The hoof wall takes the general shape of a cone with the top cut off. Foundations are strongest when the base is wider than the top. The function of the wall is to bear weight. It is a constant weight bearing structure, i.e., it will bear weight on hard ground or soft, bare footed or shod. Weight is transferred from the wall through the laminar bed to the bony column of the leg. The wall is designed to temporarily distort under a load. Most of the distortion of the normal foot is measured in the heel area as the heels expand.

The sole is an intermittent weight bearing structure i.e.; it bears weight depending on the situation. Obviously, if the foot is not shod and is on soft terrain the sole will contact the ground and bear weight. Only after the wall has taken a considerable amount of the load first though. A healthy dense sole is designed to handle this. If, however, the foot is shod and on hard ground it may not contact the ground at all. But because the sole is the protective foundation of the bottom of the coffin bone, it will take some weight from above. The sole is concave. It is concave because the bottom of the coffin bone from which it grows from is concave. This concave form is no accident. It functions like a leaf spring from a car, which flattens when loaded (due to the weight of the horse from above and the outward distortion of the wall) and returns to its original shape when unloaded. When soles are over pared one not only exposes the underlying sensitive sole to bruising and potential changes of the coffin bone but also, weaken this natural 'dome' and the ability of the sole to rebound back to its original shape. This results in flatter soles. Flatter soles result in less upright walls that are not as strong.

The white line joins the sole to the wall. It can be likened to the rubber caulking between two cement pads at a pool. It is an elastic bond between the sole and wall that allows for some movement. The white line does not run from the ground to the coronary band but is only as thick as the insensitive sole.

The white line begins at the junction of the sensitive laminae and sensitive sole. It is a constant weight bearing structure.

The normal healthy frog will take up about 1/3 of the bottom surface of the hoof. It is an intermittently weight bearing structure. It has a triangular shape with the base of the triangle being even with the buttress of the heels of the foot. The frog is an important component of the natural traction capabilities of the foot. The triangular form furrows into soft ground, much the same as a plowshare does, helping the foot stop. The soft fleshy feel of the frog helps the foot to grip hard ground as the horse turns and sets up to breakover. The frog originates from its sensitive counterpart, the sensitive frog, and is connected to the hoof capsule by way of the commisure. When viewing the foot from behind the frog has the shape of a W. This form facilitates the expansion and contraction of the heel area under the strain of a load without sacrificing strength.

The bars are sometimes a forgotten structure of the foot. They are formed as the wall folds in on itself at the buttress of the heel. Commonly over pared, they are crucial for hoof strength. Think of the bars as internal struts of the capsule. Much like the cross members on the legs of a fold up table help it to be more stable, the bars help increase the foot's stability

Up to this point we have only really talked about the insensitive hoof capsule and its bones. It is important to remember the inner sensitive structures as well. These structures comprise vasculature, fibrous cushions, interlocking laminae and cartilage. The health of these underlying tissues is dependent on the structural integrity of the hoof capsule and its ability to hold up under less than desirable conditions. Therefore, as stewards of the feet we must know anatomy, respect the horn that constitutes the hoof capsule and employ sound farrier principals to promote healthy growth of the foot. ■

***Mitch Taylor** is the owner and director of the Kentucky Horseshoeing School in Mt. Eden, Kentucky. His program focuses on the anatomy and biomechanics of the equine limb as well as the fundamentals of horseshoeing and forging. For information on the program call 502-738-5257.*