

The Natural Angle

VOLUME 19: ISSUE 3

THIS NEWSLETTER PUBLISHED FOR KEN DAVIS & SONS, INC.

Caudal Support to Maintain Vertical Depth and the Solar Arch

By AustinEdens,CJF

I have had the privilege of working at Austin Equine Veterinary Hospital for the past 20 years. Every Tuesday would bring new and interesting cases. Sometimes it would be just a case of thin soles that needed leather pads, or could be as complex as a keratoma extraction with the surgeon. Lack of sole depth was by far the number one lameness problem we dealt with and we often used one of many Vettec products, such as Equi-Pak, to create an artificial sole for added protection (*figure 1*).

A big portion of the cases lacked vertical depth and a solar arch, and that contributed to other problems. Vertical depth and the solar arch on these cases were likely initiated by the frog prolapsing and then by caudal failure. My initial goal in these cases is to rehabilitate the hoof capsule and to restore concavity to the sole, and that is done by going back to where the problem originally started, by adding caudal/frog support to the shoeing. I agree that caudal and frog support is not a cure-all, but it has asymmetric risk/reward results, very little downside and a huge potential upside. After adding frog support, I almost always witnessed an improvement in hoof structure, even if it did not resolve the horse's lameness problem.



Green represents the primary weight-bearing surfaces of the hoof capsule and yellow represents the secondary.

fig 2.

Why does frog/caudal support benefit the horse's foot? The short answer is that the horse evolved with the frog and bars as weight-bearing structures. On a normal, unshod hoof, the heels and the frog simultaneously contact the ground, and they were designed to share the load of the caudal half of the hoof capsule (*figure 2*).

When horses were domesticated, we shod them to protect the hoof when wear exceeded growth. When we shoe horses with a conventional shoe, we are creating an extension of the hoof wall. What about extending the frog and bars? The main side effect of shoeing



(figure 1) A hunter jumper with thin soles shod with Kerckhaert Aluminum Comforts. Plexus Pads and Equi-Pak CS were implemented to provide additional protection and support.

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horses with a conventional shoe is that the heels bear more weight, and the frog and bars bear less weight than that of a bare foot (*figure 3*). On the vast majority of horses, this has a negligible effect. However, on horses with weak and underrun heels, and horses that are prone to caudal collapse, this can have serious consequences.

CASE ASSESSMENT - CAUDAL COLLAPSE AND NPA

Henry is a semi-retired jumper that has a negative palmar angle and grows all toe and no heel. Henry looks pretty good when he is freshly shod (flat palmar angle), but looks really bad 5-6 weeks later (negative palmar angle). The average horse has a 3:1 ratio on toe-to-heel growth, but Henry probably has a 10:1 or more ratio (*figures 4 & 5*). Henry has no solar arch, a prolapsed frog, and is collapsed in the caudal half of his foot. His frog is seeking the ground and trying to assist in weight bearing (*figures 6 & 7*).

The arch in the sole of Henry's foot has collapsed and this has caused the dorsal wall to migrate forward, thus increasing leverage and crushing his heels even more. The dorsal wall has a rigid laminar attachment to P3 and being the strongest part of the foot, it maintains its vertical position. As the frog prolapses and the caudal half collapses (all soft tissue), the wings of P3 descend and cause the coffin bone to derotate (*figures 8 & 9*).



fig 3. A foot shod with a conventional shoe is an extension of the hoof wall. There is an increased load on the hoof wall, and heels are loaded more, the frog and bars are elevated and loaded less.



fig 4. Six weeks of growth on Henry's feet create less-than-ideal angles.



fig 5. Lateral radiograph taken approximately 4 weeks in the shoeing cycle. Henry presents a negative palmar angle of P3 and a broken back HPA.

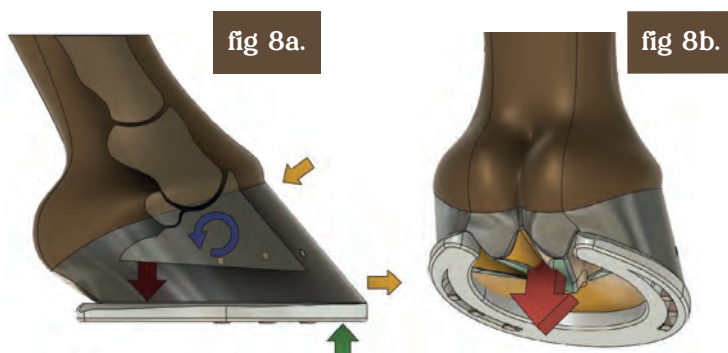
fig 6. Henry's frog is prolapsed and doesn't stop until it meets the ground level of the shoe.

fig 7. Henry's foot with the shoe removed and his frog is begging for engagement.



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(figure 8a) As the frog and sole collapse, the rigid dorsal wall and laminar attachment to P3 maintain their vertical position (green arrow), the caudal portion of P3 descends with the frog (red arrow), P3 derotates (purple arrow), the distal dorsal wall migrates forward and the proximal dorsal wall descends (yellow arrows).

(figure 8b) The frog is prolapsing and seeking the ground. As this is happening, the sole is losing its concavity and arch.

THE TRIM

I trimmed Henry's feet by leaving as much sole on his flat feet as possible. His feet are quite run forward and we will address bringing the breakover back in our shoe application. It is my focus to ensure his wall, frog, and bars are all sharing the load in weight bearing.

THE APPLICATION


Kerckhaert Comfort Sport, FootPro DIM 20, and Plexus Open Toe Caudal Support Pads.

SHOE

The Kerckhaert Comfort Sport is a great choice for Henry, as it has a long roll in the toe, beginning on the inside web. We are able to fit and support the dorsal wall, while simultaneously moving the breakover back (figure 11).



The rolled toe begins at the red line on the Comfort Sport. This gives us the ability to move the breakover back without compromising the dorsal wall.



SETTING THE INDUSTRY STANDARD FOR PERFORMANCE

BELLOTA GUARANTEES QUALITY & CONSISTENCY

BELLOTA RASPS STAY SHARP LONGER

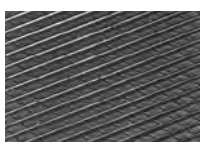
LOWER PRICES THAN THE COMPETITION

WHAT MORE COULD YOU ASK FOR?

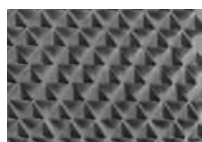
BELLOTA TOP LEVEL

The Bellota Top Level is 12% wider and 10% thinner than regular rasps, for perfect leveling balance and control. The 8 tooth rasp side pattern has an aggressive cut and an intermediate file side, similar to the Top Sharp.

FILE SIDE




RASP SIDE



Available in 14" (Top Level) and 17" Length (Top Level Long)

"The Bellota Top Level is great. I'm a Green Tang (Heller Excel Legend) convert. The balance is just right, smooth and an excellent finish."

Joel Brown, APF



View the full line of Bellota rasps at bellotafarrier.com

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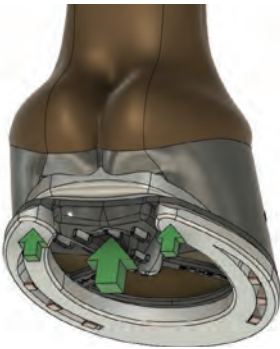
PAD

The Plexus Open Toe Caudal Support Pad (degree) is exactly what the heels and frog need on these collapsed feet. The large frog plate engages GRFs and helps transfer weight bearing from the overloaded heels to the frog (figures 12 & 13).

DIM

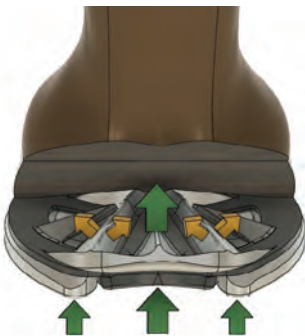
My go-to for dental impression material is FootPro DIM 20. With a Shore A hardness of 20, it offers the perfect balance of cushion and support. There are two main reasons to use DIM in the caudal region of the foot. The first is that the DIM creates an even load across the sulci, bars, and frog. Secondly, the back half of the foot is constantly expanding and contracting, and the flexibility of the DIM allows the foot to move freely. The DIM molds into the commissures and helps provide additional expanding support on contracted heels (figure 14). Figures 15 - 23 show the steps to apply the pad and frog materials.

fig 13.



Just as the shoe is an extension of the wall, the frog plate on the Plexus Pad is an extension of the frog. The large surface area of the frog plate allows for greater GRFs (green arrows) to the frog than the heels.

fig 14.



The GRF (green arrows) engage through the Plexus frog plate and support the frog. The secondary and expanding support of the FootPro DIM 20 (yellow arrows) in the commissures promotes better heel function and health.

fig 12.



The Plexus Pad with notches cut out for the clips and riveted to the shoe. Cut and grind excess and it will be ready to go.

GREAT NEWS!

You know your favorite Vettec products?
The prices just dropped.
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With improved availability of products, and inflationary pressures subsiding, Vettec inventory levels are back to normal and prices are now lower. This is great news for you.

Watch a Video of Vettec Sil-Pak and Plexus Full Pads in Action at farrierproducts.com

Sil-Pak Soft has all the features of Sil-Pak but with a shore hardness of 15 (Sil-Pak is approx 35).

Plexus Full Pads are a hybrid design, size S-M. This size will easily fit shoe sizes 00 through 3, front or hind. Available in Flat and Degree.



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Check the fit, it looks good, and it's ready to nail on.



Everything we need is on the Hoofjack table.



FootPro CS and a little copper sulfate is applied to the commissures. This helps the foot stay clean and sterile under the DIM throughout the shoeing cycle.



This is probably the most critical step in applying frog-support pads and DIM. The shoe package needs to be quickly secured with two nails, then the foot must be fully loaded by picking up the contralateral. This squeezes out any excess DIM and ensures we are creating support rather than pressure.



The Kerckhaert Comfort Sports and Plexus Pads are nailed up nicely with Liberty Hybrid Cu Nails.



Solar view - Caudal support from the Plexus Pads and FootPro DIM create an extension of the frog and bars to ensure they are engaging the ground as well.



Caudal view - The frog is weight bearing again and will help take a load off the crushed and underrun heels.



Lateral view - plenty of support to help ensure Henry's angles stay optimal during the shoeing cycle.



TOOL CORNER

Step by Step Drive-in Stud Application

Drive-in studs have been used for years for seasonal and non-seasonal low impact traction needs. FPD recently introduced solid carbide drive-in studs to the market. In the past, drive-in studs were commonly produced with a carbide insert in the center of a mild steel “sleeve”.

Solid carbide studs are very precise and hard throughout. It's important to use exactly the right drill bit size and one of a high quality to get an optimum fit. The studs are tapered so that they tighten as they are driven into the hole but require a 17/64” hole to fit correctly. A 17/64” bit is the only correct size. You may



FootPro Solid Carbide Studs, Step Point Bit and Bloom Stud Set tools

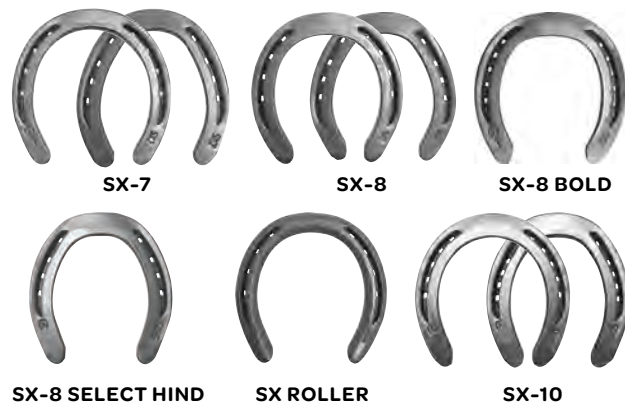
find bits in places like Home Depot or Lowes that indicate they are 17/64” but may also have a metric size shown like 6.8mm. It's very likely that the bit manufacturer is trying to accommodate various markets and the bits marked in this way may not be a precise 17/64” size and you could end up with a hole that is oversized or even undersized in some cases. Buy bits

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KERCKHAERT SX SERIES

The popular Kerckhaert SX Series offers the widest range of options for steel thickness and modification for a variety of disciplines.

Use Kerckhaert with Confidence



*Liberty horseshoe nails
fit perfectly with Kerckhaert horseshoes.*



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that are consistently correct. The higher the quality, the better the bit will perform and last before dulling. A dull bit will end up creating inconsistent holes.

One option for a high-performance bit is the US made KnKut Step Point bit, now available from your FPD dealer. This bit has a unique point that “bites” instantly when making contact with the shoe. So much so that in many cases you don’t need to center punch to get started, unless you are punching just to make sure of your position on the shoe. The Step Point actually works as if you have drilled a pilot hole, lessening the stress on the full bit dimension and creating less heat. Heat is a contributing factor to the wear of a bit and reducing it will increase bit life.



KnKut 17/64" Step Point Drill Bit



KnKut Stubby Length 17/64" Drill Bit

It's also recommended to use a drop of cutting fluid with each hole you drill.



Cutting Fluid applied before drilling



FootPro Studs – C11 on left and C13 on right

Once you've drilled the stud hole, carefully position your stud before striking to be sure it is going in straight. Make one light blow to get it started correctly and then drive to the desired depth. It's important not to “bottom out” a stud on the anvil, something that usually would not occur except when using thinner shoes that are 1/4" or 7mm. The C11 studs have a button head configuration and you need to make sure you don't drive them to the point the head makes contact with the ground surface of the shoe. Leave a small gap between the shoe and the bottom of the



C11 applied – note the small gap between head and shoe surface.

head of the stud. Failure to do so could cause the stud to loosen prematurely or even fracture when applying.

Drive-in studs are an efficient way to provide traction for icy conditions, or travel across hard surfaces. In many cases, the solid carbide studs can be used for more than one shoeing cycle. Carefully applied, they are one more good tool to have in your rig.

KEY APPLICATION POINTS

- Buy good quality, precise 17/64" drill bits.
- Make certain you have the bit tightened correctly in the chuck of your drill press.
- Be sure your drill press chuck is rotating true- in time they can wear and not produce a true hole.
- Start the studs carefully and centered.
- Do not bottom out on the anvil or the ground surface of the shoe with the head of the button type studs.

THE NATURAL ANGLE is published to provide you with new and useful information about the industry. It is published through a cooperative effort of FPD, Kerckhaert Horseshoes, Liberty Horseshoe Nails, Bloom Forge, Austin Forge & Machine, Vettec and your supplier.

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Ask About These Quality Products Available at Ken Davis & Sons, Inc.

FOOTPRO DIM IMPRESSION MATERIAL

FootPro™ DIM Impression Material is a non-toxic, non-allergenic, dental grade silicone that is hand mixed to a moldable consistency and applied to the bottom of the equine foot with a pad. SOFT DIM20 provides cushion for issues such as thin soles, sensitive frogs or situations where you want to give the horse something very soft to stand on. When support is preferred, FIRM DIM40 is an excellent choice. It is most used in the heel area to support the bony column. Support limits movement.



BELLOTA RAZOR+

Most aggressive rasp cut requires only a light stroke in the early stages of using the rasp. Coarse file side. High-grade Bellota steel provides extra durability.



PLEXUS OPEN TOE CAUDAL SUPPORT AND FULL SUPPORT PADS

Shape and design allows for easy fit on front or hind for more hoof sizes; reducing the need for more inventory. Frog plate is tapered for heel fit reducing the need for trimming or grinding pads or heels of shoes. The open toe design minimizes trapping of foreign materials in the front half of the foot. The Full Plexus pads are a hybrid design, size S-M, to minimize the number of sizes you need to carry. The one size will easily fit shoe sizes 00 through 3. Both styles include high quality injection molded material allowing for resets and are available in Flat and Degree.



KERCKHAERT FULL & HALF SWEDGE UNCLIPPED

This Kerckhaert Swedge is made with tough, durable steel and provides support in the heels. Available in Full Swedge Fronts and Half Swedge Hind patterns. The toe clipped version offers additional security for the shoeing cycle.



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