

## Applied Equine Podiatry Explodes the Myths

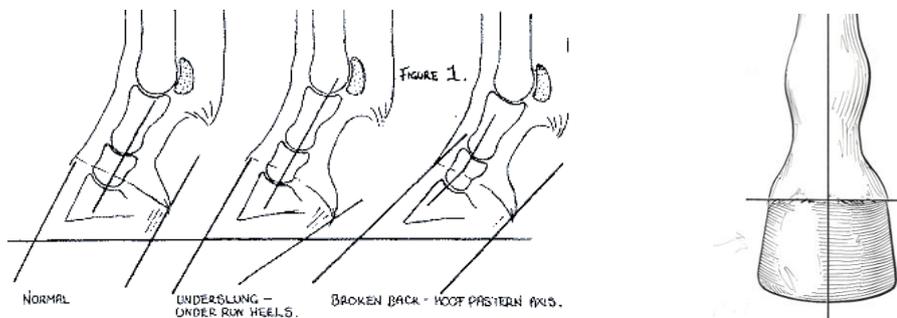
By Tom Bowyer DAEP MIAEP Licensed Instructor

In this article I will do my best to explain how some commonly held beliefs about the equine foot are being disproven by the theories put forward by the Institute of Applied Equine Podiatry (IAEP). The following is a list of four theories which, currently, are accepted as conventional knowledge and, as such, are still being taught to both farriers and veterinarians.

1. The lamellae are responsible for maintaining the correct position of the pedal bone within the hoof capsule (relative to the joint).
2. The frog is a pump for the blood.
3. The hoof functions by expanding and contracting.
4. Laminitis is a disease of the lamellae which can lead to rotation of the bone column once separation occurs.

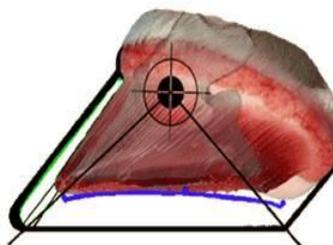
**Point 1** - The lamellae are responsible for maintaining the correct position of the pedal bone within the hoof capsule (relative to the joint).

To begin with, I need to give you a little background information regarding the way the hoof is conventionally viewed and addressed. Many of us will be familiar with images like this in most of the text books we pick up.



These images show us what angles the hoof should be balanced to so as to align the bone column. This method **only** considers the bone column and assumes that the bones within the hoof are held in position by the interlocking sensitive and insensitive lamellae. A farrier will trim the hoof capsule so that the angles of the dorsal hoof wall, the pastern and the scapula are all aligned. This is the model that has been used for the equine foot for hundreds of years now; it has its roots in the science of static mechanics, which is the science of a body at rest. Static mechanics is the science which was available to us before the industrial revolution.

The model for the foot used by the IAEP is called the internal arch apparatus and has its roots in the science of Energetics which is the science of biomechanics and physiology. The internal arch apparatus looks like this.



As you can see it not only incorporates the bones of the foot (the pedal bone, the navicular bone and half of the short pastern) but also comprises a large amount of soft tissue i.e. the digital cushion, cartilage, sensitive frog and coronary band. Covering the whole lot we have the sensitive lamellae which are the pleats that you can see in the picture.

The above picture was taken during a dissection where the hoof wall and the sole had been removed (thus separating the interlocking lamellae) and what we noticed was that the pedal bone remained in position in relation to the joint thereby proving that the laminar attachment is not responsible for maintaining that position and that it is actually the healthy conformation of the cartilage and connective tissues at the back of the foot which are responsible.

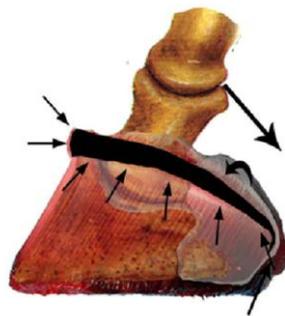
The weight of the entire horse is not standing on the lamellae; it is instead actually standing on the hoof wall, on the coronary band. The entire foot of the horse is held in suspension, within the hoof capsule, from the coronary band.

Our trim is based not on aligning angles but on balancing the outer hoof capsule to the inner foot of the horse in exactly the same way as you would buy shoes for yourself; you don't buy a pair of shoes based on the angles of your ankles and your shoulders, you buy a pair that fits your foot!

**Point 2** - The frog is a pump for the blood.

Applied Equine Podiatry (AEP) has at its core the principle of "Structure + Function = Performance". This very simple law forces us to look at each and every structure and determine exactly what their function or functions might be and how they relate to all of the adjoining structures and their functions so that the whole thing can give high performance. When you have that sort of mindset you quickly realise that form follows function and if something has a particular job it will be shaped in such a way so as to perform that job to the best of its ability. With that in mind, answer me this: If the function of the frog is to be a pump for the blood then why is it a triangle and not round like a dog's pad?

The reason the frog is a triangle is a question I'll answer when we address "point 3", for now though let's address circulation within the foot. There have been numerous studies conducted into hemodynamics which have now proven that what actually happens is this:



During the stride of the horse the heels hit the ground and that initiates pastern movement downwards, as the pastern descends the coronary band acts like a tourniquet and applies pressure around the top of the hoof which greatly minimises or effectively shuts off the flow of blood in and out of the foot. When the pastern has fully descended the hoof is under immense pressure, this pressure within the hoof forces the blood into all of the capillaries and micro-vasculature it needs to reach and then as the stride continues and the pastern begins its ascent, all of the blood under pressure gets shot back up the leg. It's an amazing system and one that is variable and gait dependant i.e. a horse that is walking doesn't require the same resistance at the coronary band as a horse that is at a gallop so the pressure provided by the foot at each gait provides the required

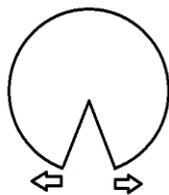
correct amount of resistance. To add to that, if there are any excess pressures then the energy gets converted into heat which is then dissipated in the circulatory system.

**Point 3** - The hoof functions by expanding and contracting.

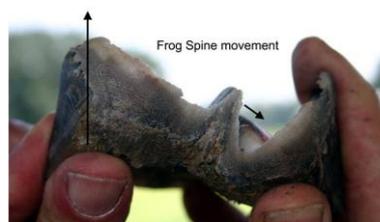
So, why is the frog a triangle???

A farrier or vet' will usually say that shoes don't interfere with the correct function of the foot because the nails are only ever put into the front half of the hoof wall thereby leaving the back half free to expand and contract.

What the IAEP has found with their research is that there is a lot more to the back half of the foot than most people realise. The easiest way to start seeing this is with a paper plate.



If you cut a triangle out of the back half of a paper plate it gives you a useful model of the sole of a horse and the frog-stay. Grab what would be the heels and try moving them outwards as if they were expanding and contracting. They won't. Now try flexing them up and down and the distortion is limited to the back half of the foot. This becomes critically important when we relate it to what happens on the inside of the hoof capsule.



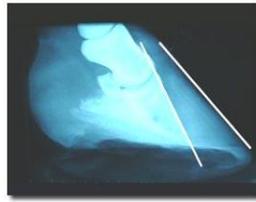
If you look down on your horse's frog, the centre of the frog at the widest part has an indentation called the central sulcus. Underneath the central sulcus, on the inside of the foot, is a structure we call the frog spine which looks a bit like the dorsal fin of a shark. As the heels are flexing and distorting the frog spine actually moves from side to side. The movement of the frog spine is fundamental to the development of a healthy foot because it delivers the stimulus required to maintain healthy cartilage. The entire back half of the hoof capsule is produced by the sensitive structures which have cartilage as their foundation therefore if the cartilage is not healthy it will produce a hoof capsule that is equally unhealthy.

Shoes negate the correct function of the foot and over time compromise not only the performance but also the health of your horse.

**Point 4** - Laminitis is a disease of the lamellae which can lead to rotation of the bone column once separation occurs.

Laminitis is a huge subject and one that we are going to turn completely on its head! We have already spoken about how the IAEP's model of the foot differs from the conventional model in that we believe the foot is held in suspension within the hoof capsule from the coronary band whereas the conventional model is based upon the assumption that the foot is suspended from the lamellae.

The conventional view of laminitis is that the lamellae become inflamed due to physical, metabolic or emotional stresses and this is the bruising you sometimes see in the hoof wall. In extreme cases this can sometimes lead to rotation of the bone column.



AEP no longer recognises laminitis as an actual condition because we believe that it is not a disease of the lamellae at all but is in fact a change in the conformation of the cartilage caused by the presence of cortisol in the system. We instead call the condition Equine Digital Elastosis (EDE).

Cartilage has elastic potential which means that it has the ability to stretch and then return. Cortisol (the stress hormone) causes a loss of elasticity of cartilage which means that all of the connective tissues at the back of the foot, which are responsible for maintaining the position of the bone column, now become unable to do that job and rotation occurs. It's important to know that it is not just rotation of the bone that is happening but rotation of the entire foot/internal arch apparatus and it is this rotation which in turn causes the bruising that you see in the hoof wall as the rotation puts stress on the lamellae; this is the exact opposite of the conventional theory. We believe that the bruising is in fact a secondary condition caused by the rotation and not the primary cause of the rotation!

Elastosis can still be attributed to physical, metabolic or emotional stresses however so anything you can do to remove or reduce any stress from your horse's life the better. When it comes to dietary stress it's actually sensitivity to acid in their diet so providing something that the horse can self medicate with to counteract the acidity in their system will often help to prevent the condition. I find that providing them with a second water bucket in the field with a tablespoon of bicarbonate of soda dissolved into it works well and allows them the choice of whether they want it or not. Keeping your horse off of unsuitable grasses is also extremely important. High sugar food converts to acid in their system which is also why horses prone to this condition will, often, be overweight; the fat acts as a protective buffer for their system against the excess acid. If you neutralise the acid you will quite often find that they then also lose the weight and this should improve their temperament somewhat too!

When dealing with cases where the hoof capsule has migrated away from the internal foot, AEP and the knowledge it provides us with gives us the ability to take direct action to bring the hoof back into balance with the foot, in one trim and with confidence.



**Covering Shropshire, Powys and surrounding areas:  
Tom Bowyer DAEP MIAEP Licensed Instructor  
07747 680946  
[www.courses4horses.net](http://www.courses4horses.net)**