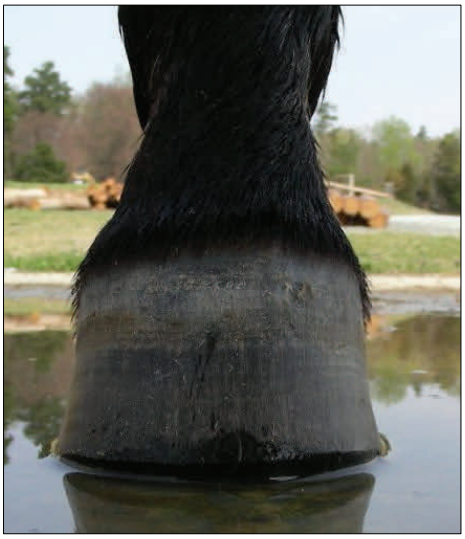
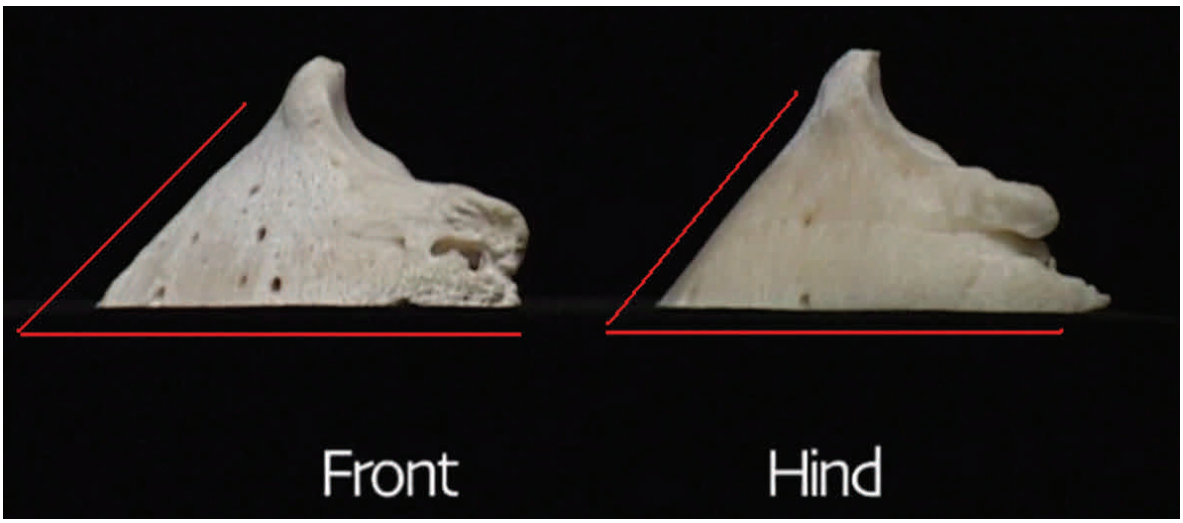
Hoof Form

The hoof capsule is, beside radiographs, our only visual tool. The shape of the hoof capsule is in general determined by the shape of the coffin bone.



While there are some breed differences, some breeds having more slanted hooves, others having more upright hooves, the same principles apply to all hooves in as far as form and function match in the healthy hoof.



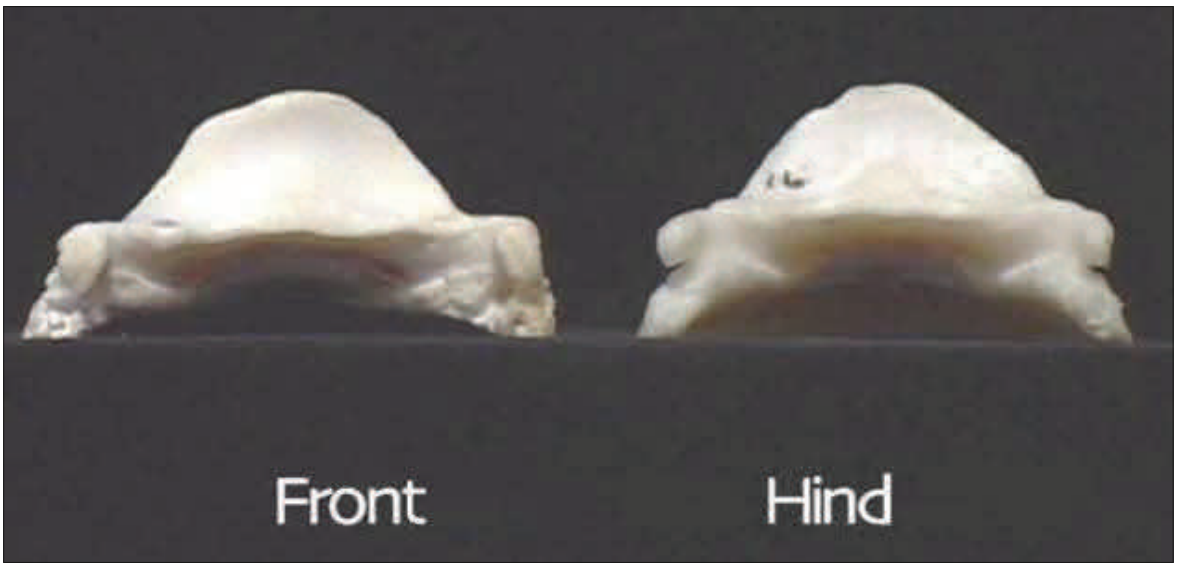
Healthy frontal coffin bones have a toe angle of about 45+º; healthy coffin bones of the hind feet are about 55+º

UNO ALLA VOLTA — ONE AT A TIME

This top view reminds you of the form the coffin bone should have within the hoof capsule.

Top: Front coffin bone, a rounder shape
Bottom: Hind coffin bone, a more elliptical shape

Healthy coffin bones have a more shallow solar vault in the front hooves, a steeper solar vault in the hind hooves



Frontal View

Right: When viewed from the front, the coronet band is level (horizontal) and the hoof walls diverge

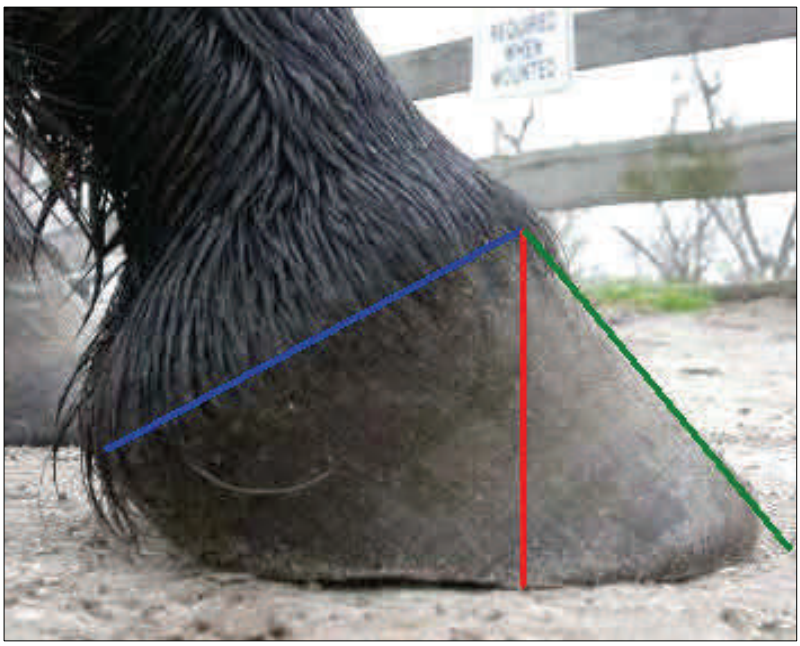
Lateral View

While the frontal view is relatively easy to remember, it takes some more practice to see correct hoof form from the side (lateral view).

Green line: Toe length

Red line: Toe height

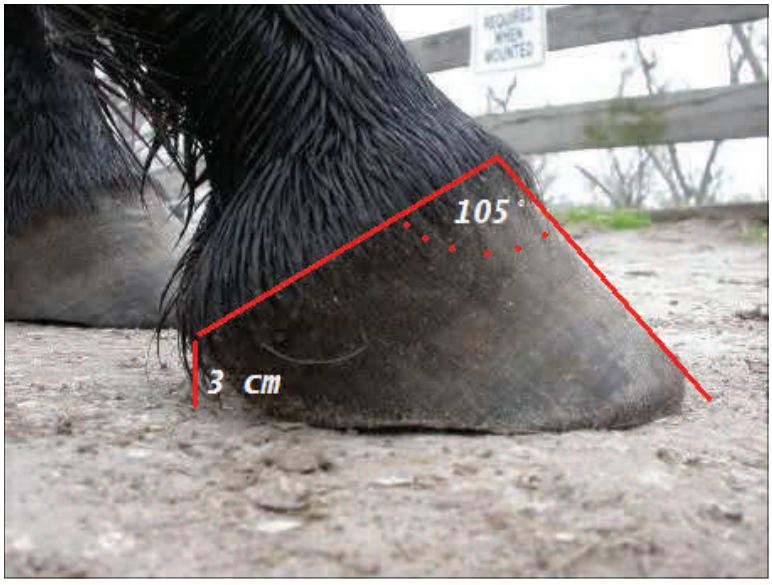
Blue line: Coronet angle



In a healthy front hoof …

...the coronet band runs at a 30° angle to the ground

... the toe runs at about a 45° - 50° angle to the ground



... the relationship between the two lines is 105 °, the heel height is 3 cm measured in a vertical line between the hair bearing skin at the heel and the ground

All these measurements are approximate, but become important later when we have to deal with pathologies

UNO ALLA VOLTA — ONE AT A TIME

UNO ALLA VOLTA — ONE AT A TIME

In a healthy hind hoof….

…. the coronet band runs at a 30° angle to the ground

… the toe runs at about a 55 ° angle to the ground

… the relationship between the two lines is 95 °, the heel height is 3 cm measured in a vertical line between the hair bearing skin at the heel and the ground

In general, if all these angles (30° hairline, 45° toe line in front hoof, 55° toe line in hind hoof, 105° relationship between the two in a front hoof and 95° relationship between the two in a hind hoof, all with a 3 cm heel height) are met in a hoof, you can ascertain that the coffin bone is ground parallel.

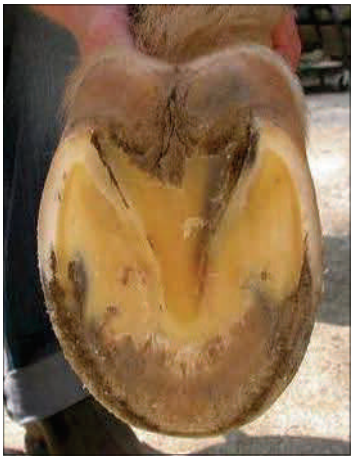
Sole View

The bars end at the middle of the frog.

Below:

A healthy, wide frog.

The front hooves differ in form and function from the hind hooves. The hind quarters provide propulsion. The horse pushes off backward and outward.



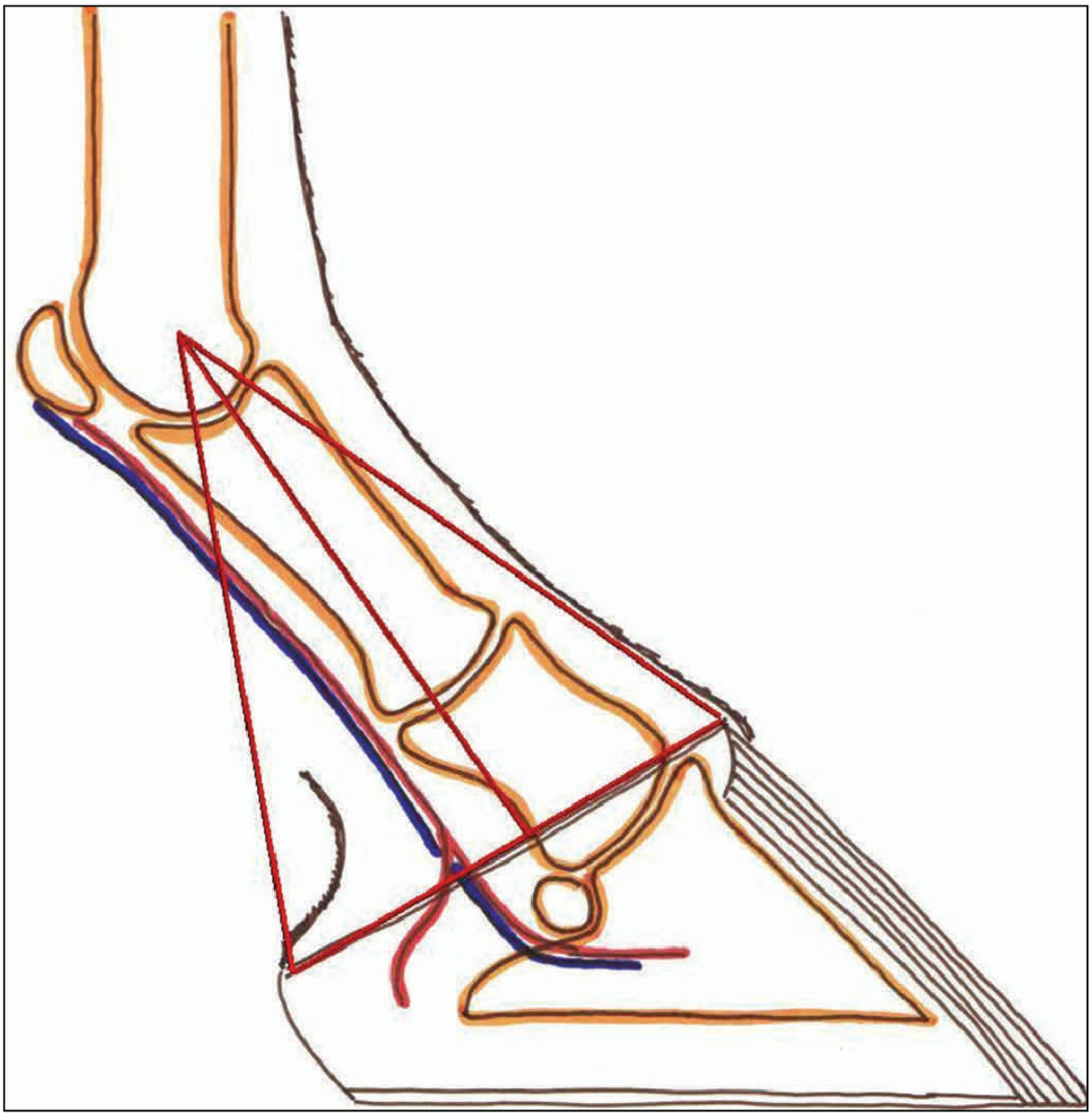
It is physiologically correct (both in terms of hoof wear and traction) for the outside wall of the hind hoof to be more slanted than the inside wall. The outside half of the hind hoof is also slightly wider than the inside.

Quarters

The term "quarters refers to the area between the widest part of the hoof and the heel.

A near perfect foot. The scoop on the bottom of the hoof prevents the hoof wall from binding against the ground when the hoof becomes fully weight bearing.

Why is this hoof form so important?



Only when the hoof capsule has the correct balance does the exerted force provide equal loading and distribution onto the coronet, coffin bone and hoof capsule. This usually (but not always) also means that the coffin bone is ground parallel. Furthermore the end points of the meridians, the so called ting-points, will be evenly stimulated, which is important for the health of the entire body.

Connections between Hoof Form and the Whole Organism

The hoof form which we see in equines today has developed over many millions of years and has obviously proven itself. We must thus assume that there is no better possible shape for this organ.
Once we accept this, we must try to understand this organ in all its details, since it (like all components of an organism) is in turn connected to the other organs and functions. Therefore, if something changes in the hoof, this influences and affects the entire organism.
Unfortunately, this fact is often forgotten. Organ problems are considered isolated from the rest of the organism, which leads to inadequate diagnoses and even more unsatisfactory treatment results.
There are various ways in which hooves are connected to the rest of the body.

1. The mechanical connection: the hoof is connected to the body via the skeleton, ligaments, tendons, joints, and muscles.
2. The blood vessels and the blood also constitute an intense connection.
3. Nerves connect the hooves with the central nervous system.
4. Energy pathways called meridians integrate the hooves into the energy system of the body.

With changes in the hooves, we must therefore assume disruptions in the normal, physiological functions of these systems. From the outside, optimal hoof form can be recognized by the physiological angles of coronet and toe contour.

1. Mechanical connection
The coffin bone with its pyramidal form is designed for a ground parallel position. For this, a balance in the flexor and extensor tendon systems is in place. The horse at rest can, as is known, stand without muscle action, only via the tension in the tendons and joints.
In this physiological situation, the coronet and laminar corium lamellae are equally weighted everywhere.
As soon as the hoof form is changed and the coffin bone is no longer ground-parallel, this balance is lost. Either the horse falls down, or it uses its muscles (which are only meant for moving the body) in order to stay standing. This, however, requires constantly greater contraction of the muscle cells. It is well known that such a situation leads to painful cramping of the muscles, which cannot always release again by themselves.
A non-ground parallel coffin bone thus means: cramped muscles - pain - altered body posture - altered movement.
Added to this is pain in the hooves, which arises out of the fact that with a non-ground parallel coffin bone, the suspension in the frontal region of the

laminar corium is over-stressed. This leads to unequal horn production and incorrect lever actions in the hoof capsule. The results of this are: pain - alteration in posture - muscle cramps - changes in movement…

The following muscle groups are especially affected: muscles of the arm and forearm, the triceps between elbow and shoulder blade, the neck parts of the m.serratus and rhomboid muscle. These are the muscles which must be active with movement of the front limbs.

One can tell from a distance whether a horse is standing in a relaxed manner or whether muscles which should be relaxed while standing are active.

We do not have the option of palpating, or feeling, the muscles of a horse right here and now; however, next time you have the chance, you will see that such markedly raised muscles are considerably harder than relaxed muscles.

It is also clearly noticeable whether the shoulder blade is steeper than is physiologically correct or not: the highest point of the withers should be so far back that a vertical line does not touch the elbow; ideally, it should be one hand’s width behind the elbow. Also, a not-rounded croup points to muscle deficit.

During activity, muscles need nutrients. Horses which live with constant muscle tensions have far greater energy consumption than horses which use every moment of not moving for relaxing.

When such horses are not fed with more than normal rations (i.e. more feed than a healthy horse), they lose weight and suffer from metabolic problems.

As we know from our own experiences, muscle cramps are especially painful when such muscles are supposed to work or receive pressure. This particularly affects saddle horses which are supposed to move during a riding lesson (with cramped muscles), and on top of that are expected to carry a rider and saddle placed on the cramped, painful back musculature. Possible reactions are refusal, bolting, throwing off the weight (i.e. the rider).

When the cramped musculature changes the bone alignment in the hoof, i.e., pulls the coffin bone into a steeper than normal alignment, then too much pressure comes down on the tip of the coffin bone and the bone is destroyed in this region.

When the hooves are compressed due to unphysiological lengths between between the various parts of the hoof capsule, the horse feels pain in the rear part of the hoof. As a result, it puts more weight onto the toe region, and "stands on the tip of the coffin bone."

Compression in a longitudinal direction, which causes an upward curve in the coronet, also levers the coffin bone with the solar vault upward and places it too vertically.

An excessively vaulted sole always places the coffin bone onto its tip and at the same time puts pressure against the navicular region. However, the problems resulting from this will not be addressed further in this presentation.

2. Blood supply

Metabolism

A constant exchange of blood contents establishes an intense connection between the hooves and the rest of the body. Hooves are—as cutaneous appendages—of importance for the excretion of products which the body can no longer use. Thus the horn production is not only important as a "constantly growing shoe" for the foot of the horse, but also for waste product removal from the body. When too little horn is formed, too much waste remains in the blood. This overstresses the other excretory organs (skin and kidneys), and also the liver, which absorbs all waste products from the blood and converts them into excretable form. After a while, all organs and blood fluids are enriched with waste products (as if, in a major city, the garbage trucks go on strike). This causes disruptions in all metabolic processes; we call this poisoning.

3. Nerve Connection

The importance of a nerve connection is mostly in reporting any damage to the hoof to the central nervous system. From there, reflexes over other nerves steer muscle reactions to any painful damage.
Nerve function is, however, dependent upon circulation in the hoof: only when the tissue cells in the hoof are continuously supplied with oxygen and blood sugars can the nerves "fire" if necessary.

4. Energy Pathways

For thousands of years, it has been known—at least in eastern Asia—that inside the body and on its surface run streams of energy. In certain places, these energy streams can be affected through pressure. On the coronet of the horse's hoof are the stimulating points for all important meridians. Physiologically, with constant forward movement in the search for food, these points receive alternating pressure and stimulation.

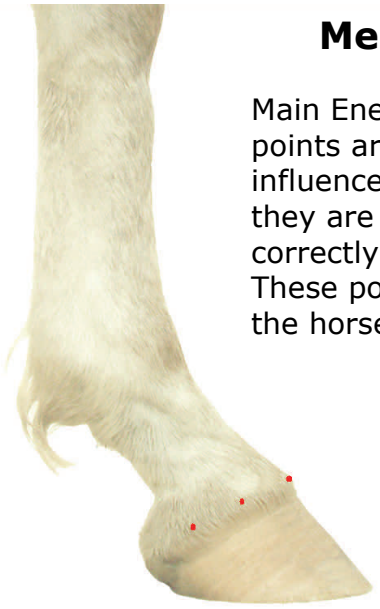
When the angle of the coronet deviates from normal, or when the hooves of the animal do not move enough (in other words, when the weight shift from bulb to side to toe takes place too infrequently), the stimulation of these points which has been going on for millions of years is lacking.

Conclusions:

The hooves are closely linked with the entire organism in several ways:

1. Mechanically, via the skeleton
2. Through metabolism and the circulatory system
3. Through nerves
4. Via energy pathways (meridians)

Through each of these connections, the entire organism can be influenced by hoof form. Vice versa, too, the hooves can also be affected in their form and ability to function properly.



Meridian Points (Ting Points)

Main Energy Points on the Front Coronet Meridian end points are stimulated on the coronet ban. These end points influence the major organs and their function. Only when they are stimulated correctly, can the organs function correctly.
These points are stimulated permanently by movement of the horse at day and night

Points on the Front Hoof

TH (**T**riple **H**eater) 1 – Laminitis, side bone, ringbone, hoof injury, inflammation of bulbs of heel and coronary band, colic, throat problems, convulsions, fever

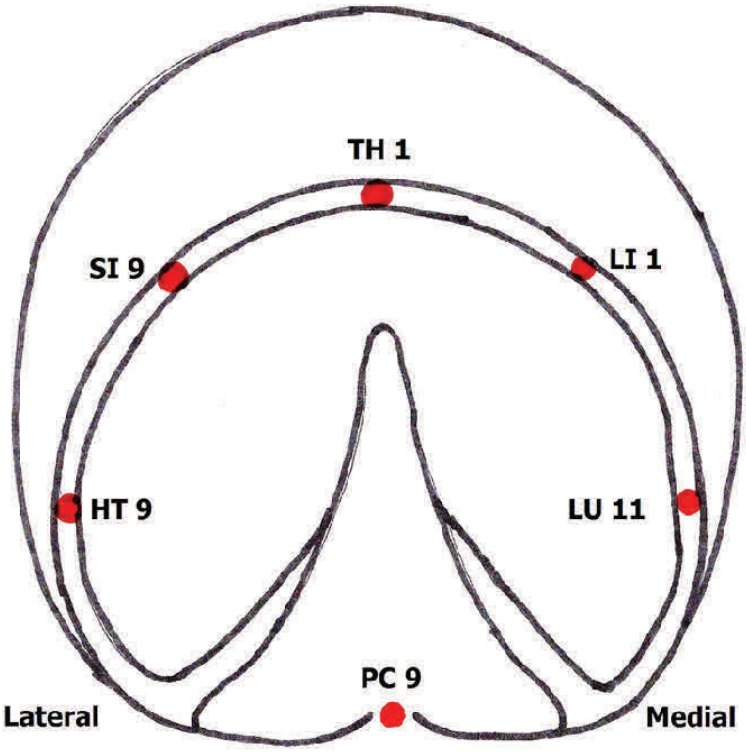
SI (**S**mall **I**ntestine) 9 – Shoulder pain, rheumatism and arthritis of forelimb

HT (**H**ear**t**) 9 – Inflammation of heel, laminitis, sidebone

PC (**P**eri**c**ardium) 9 – Laminitis and navicular, rheumatism of forelimb, arthritis of fetlock and carpal joints, tendinitis

LU (**Lu**ng) 11 – Immunostimulation, sore throat, respiratory failure, pain in pastern, laminitis, sidebone, bulb inflammation

LI (**L**arge **I**ntestine) 1 –
Like PC 9 plus fever, pharyngitis, emergency point



Points of the Hind Hoof

St (**St**omach) 45 – Laminitis, ringbone, sidebone, navicular, all hoof problems, colic, stifle problems

GB (**G**all**b**ladder) 44 – Laminitis, arthritis, hock problems

BL (**Bl**adder) 67 – Laminitis, arthritis, ringbone, sidebone, navicular, bladder control, back and hock problems

KI (**Ki**dney) 1 – Shock, high fever, heel pain

SP (**Sp**leen) 1 – Laminitis, arthritis

Liv (**Liv**er) 1 – Laminitis, sidebone