



## Horses Have Five Brains: The Neurology of the Equine Digit



The hoof is a neurosensory organ. It has a dense network of sensory nerves and receptors which report directly to the horse's brain and spinal cord



Mechanoreceptors in the horse's hoof respond to changes in balance and keep the horse moving smoothly over varied terrain



Nerves in the hoof transmit pain, pressure, touch, proprioception, and vibration. Evidence suggests that there are also thermal receptors in the equine digit



Chemicals released locally in the hoof dictate blood flow by controlling vasodilation and vasoconstriction. They can also trigger inflammatory responses



The vast neural network of the equine digit allows it to respond instantly to stimuli independently of conscious perception



The coronary area is loaded with highly sensitive touch receptors



Onion-like, layered, fluid filled structures called Pacinian Corpuscles in the hind part of the hoof activate during heel strike and help to determine ground surface perception



The hoof is as densely innervated as a human finger

### Why is the Neural Network of the Hoof Important to Natural Hoofcare?

Because the touch receptors and proprioceptors of the hooves and limbs give input to the horse's central nervous system (brain and spinal cord), which dictates the actions of the reflex system (such as the flexion and extension of extensor and flexor tendons). Mechanoreceptor activation is dependent on **which hoof structure is loaded at a given time. This is dictated by hoof balance. Abnormal input will yield abnormal output.**

**TO PUT IT SIMPLY: WHEN YOU ALTER A HORSE'S HOOF FUNCTION, YOU ARE ALTERING HIS NEUROLOGICAL FUNCTION. HIS MOVEMENTS ARE DRIVEN BY THE INPUT HE RECEIVES FROM THE NEUROSENSORY STRUCTURES IN HIS HOOF.**

This relationship shows clearly the importance of hoof health and management to overall health and function. POOR HOOVES HAVE SYSTEMIC EFFECTS. If you love your horse, you will manage his hooves! Bear in mind the overwhelming neurological responsibility of your horse's hooves next time you consider stretching out his trim cycle or neglecting to pick his hooves or treat infections!

THE ULTIMATE MYTH is that horses that are not being ridden do not need their hooves maintained. All horses require proper hoof maintenance to be healthy! Ignoring a horse's podiatry needs because you are not riding him is neglectful. Foals should be trimmed every four weeks starting at four months. Allowing a young horse to go without trimming undermines his ability to develop great hooves in the future. A horse's youth is the period in which neurological connections and movement patterns are developing and it is a prime time for correcting abnormal growth and movement patterns.

AT THE VERY LEAST, a horse should be **picked out daily or as often as possible, trimmed regularly, and not allowed to go so long without trimming that he develops damage or flare in his hooves.** If you cannot afford to trim as often as necessary, buy the tools and maintain the horse in between trims. Do not let your horse's feet get long, flared, cracked, and infected. Treat infections as soon as they occur. Bacterial infections like thrush cause pain, lameness, and destruction of the hoof that takes months to overcome.

**Caring for your horse's hooves is caring for your horse's brain!**