

Where do they stand? *By R. Lord*
The Equine Foot Balance Debate
Russell, Duckett, La Pierre

Hoof balance has been debated for decades. Researchers have tried, often in vain, to put their thoughts into print. For your comparison, here are the basic principles of just three of those researchers whose work has had an influence on today's hoof care professionals. They are Professor Russell (1903), David Duckett (1998), and KC La Pierre (2002).

Russell's basic principle of hoof balance is symmetry.¹ He maintains that the hoof capsule should have medial/lateral symmetry, that each half should be a mirror of the other. He tells us digital alignment must be maintained. He insists the natural angle of the hoof is about 50 degrees. He tells us to leave the sole and frog alone when trimming, and to only remove that which is about to exfoliate anyway. He tells us the shoe should fit the perimeter of the bearing surface with nothing protruding. He tells us the bearing surface of the shoe should be perpendicular to the leg column.²

Duckett's basic principle of hoof balance is biomechanical neutrality. He maintains the shoe should support P3 and the coffin joint that the breakover should be at the point where a line through the centers of rotation of the phalanges exits the bottom of the foot, and that the heel support should be at least as far behind the coffin joint as the breakover is in front of it. He maintains the natural angle of the hoof should be approximately 54 degrees. He tells us the hoof capsule is not symmetrical but remodels to accommodate the stresses put upon it by shoeing, conformation and the environment. He tells us medial/lateral balance should address joint congruency rather than a one size fits all formula.²

La Pierre's basic principle of hoof balance is to create equilibrium of biomechanical influences (stresses) on the dermal layer of the foot. He suggests that stresses produced by the epidermal (hoof capsule) and received by the dermal layer (self defined internal arch) are responsible for neurological function, which in turn would aid in establishing biomechanical balance by the development of correct structure. He further concludes that heel placement supersedes the importance of breakover placement, as digital breakover is consistent with a line drawn proximal/distal from the tip of P3 exiting the bottom of the foot, whereas heel placement can be displaced. Heel placement in relationship to the center of rotation of the coffin joint will determine correct distortion of the ungular cartilages, and the various components of the Internal Arch apparatus, thus defining correct foot function. He suggests that hoof angle should not be generalized upon, as it can lead to misinterpretation. La Pierre agrees with Duckett that the hoof capsule is not symmetrical, but remodels to the influences of environmental and conformational stresses, but goes a step further in stating that environmental influences can be utilized to change the shape of the internal structures to the benefit of creating biomechanical to neurological neutrality. He maintains that medial/lateral balance refers to the placement of the hoof capsule in relationship to the sagittal plane of the Internal Arch, and not to the

distal/proximal placement of the hoof capsule on the medial/lateral plane in relation to the coffin joint.³

In that, I knew of Duckett's and of Prof. Russell's work. I noted that neither researcher took into consideration the extent of soft tissue, cartilage and ligaments within the foot of the horse, this short of Duckett's reference to the attachment of tendons and the tip of the sensitive frog. My work revolves around the existence of a fully functional internal arch consisting of all vascular structures within the hoof capsule, distal to P1.

Mapping of the foot uses landmarks that are closest to their points of origin (i.e. dermal layer). Utilizing the widest part of the foot as defined by two locations both medial and lateral which are the greatest distance from the sagittal plane of the foot, can often be misinterpreted as Duckett's bridge. It should be understood that the widest part of the foot at its solar aspect has been used by numerous researchers over the years.

KC La Pierre, RJF, PhD

Reference:

1. *Scientific Horseshoeing*, 7th edition, Russell, published in 1903
2. *American Farriers Journal*, Duckett vs. Russell, Taimuty M.
3. *The Chosen Road*, La Pierre KC, Naked Greyhound Press, DE 2003